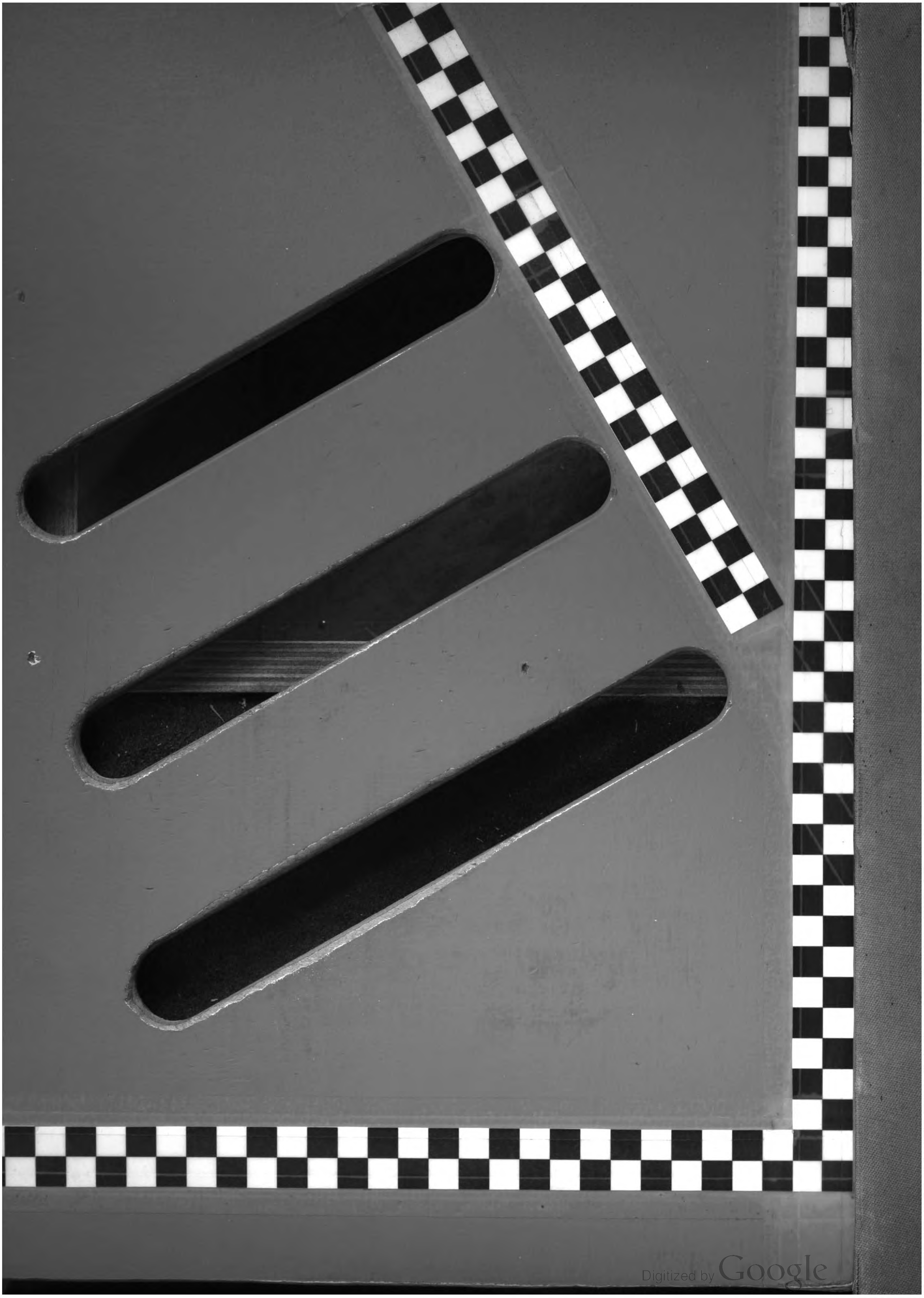

THE

BLACKSMITH AND WHEELWRIGHT

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AMBULANCES.

Information and Specifications for Several Styles of a Useful Vehicle.

Drawn to three-quarter inch scale.

Ambulances not only vary in styles, but also considerably in suspension and sizes. The length and height of the body are generally the same, but the width across and dimensions for all the pieces vary considerably. This holds good in regard to the manner of suspension and its sizes for all its parts. For the cheaper kind the front gear has one elliptic spring only and a reach. The rear part is built either with two elliptic springs or as illustrated on this draft. The axles are usually of the plain kind; the wheels are either plain and of the best material with rubber tires, or patent wheels with steel tires, with brakes and without. On account of this great variety of construction and the various wants which are dependent on the different conditions, it is difficult to suit the builders all over the country, but we will give the main features and different sizes for wheels, springs and axles, making it convenient for those who build lighter and cheaper ambulances.

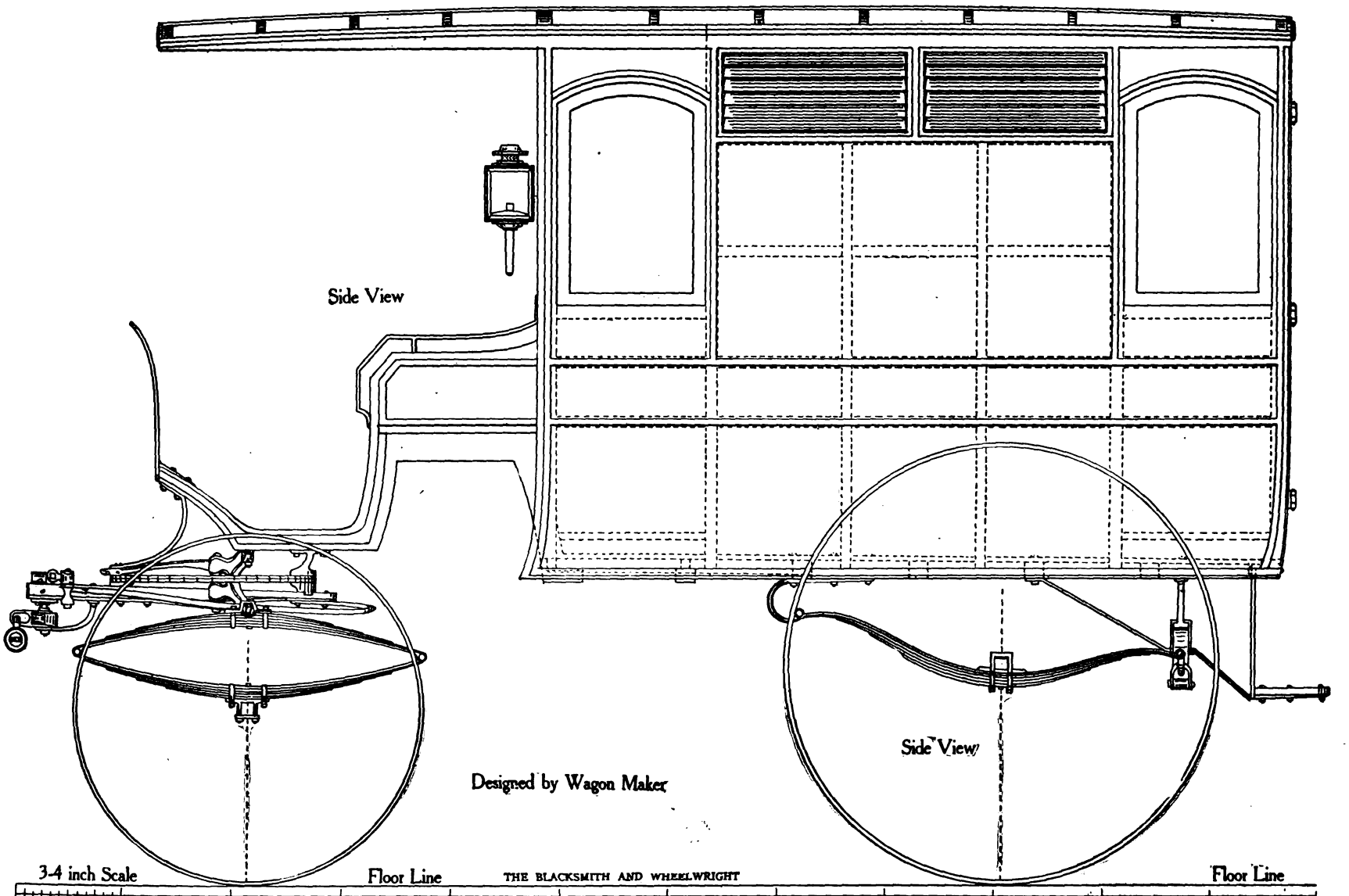
The length of the main body from outside of posts is 6 feet 11 inches, but this does not decide the length an ambulance should have. The length is taken on top of bottom boards from front panel at center to inside surface of doors, which is on this draft 6 feet 9 inches. In every case the stretchers are made to suit the length and width of the body. On light and small ambulances there is one stretcher only, consequently the width of the body is made from 42 to 46 inches outside dimensions. But on the heavy sizes, as on this draft, two stretchers is the rule, and therefore the width between the two door posts must not be less than 48 inches when the stretchers are 24 inches across. On this draft this width is 49 inches, allowing for the necessary play room for straps and strap fasteners.

The height of the body from the top of the bottom boards to the under curves at the center should not be less than 58 inches, and from the top of the front seat to the under curve at the center should not be less than 43 inches.

On all the ambulances the glass frames should be made to drop, and not only on the sides, but also the two in front, back of the driver, and those in the doors. When made to drop it will take heavier timber and also will take more space, but the glass frames are at each end of the body, having a space of 43 inches between the two window posts. Between that length are two posts, which are ⅞ or 1 inch square, making a recess of about ¾ inch.

On the space is a seat 43 inches long and 13 inches wide, and when not needed this is strapped to the sides of the body. Each seat has two hinges with a strap, so that when lowered it will not go further to make a comfortable seat to rest on. The hinge joints are made so that the thickness of the cushion rests between the top of the seat board and body when the seats are up, and two straps for each seat holds the seats in position.

Besides the two side seats, there is another seat across and back of the driver's seat, which is hinged similar to the side seats. The entire inside surfaces should be lined with ¼ or 5-16 inch thick boards, and all should be filled in and varnished, including the top curves and top boards. Besides the glass frames to drop there should be movable slats on the sides of the body near the top rails, and they should be made to open or close and stay in any direction they are put.



Construction of the Body.

This body is 55½ inches wide outside of moldings, which is about the widest they can be made for a 62-inch wide track; leaving only 3½ inches between the wheels and body panels, when there is 1½ turned under on each side. The object in view on all such bodies is to make the main body as wide as possible and contract the front seat as much as can be done without any contraction; or, in other words, without disturbing the straight surfaces to which the rocker plates are screwed. To do this the rockers on the bottom surfaces are 5 inches across; this makes the space between the rockers 42 inches, which is best seen on the bottom view. The dotted lines represent the position and thickness of the rocker plates. If the rockers are 1½ inches thick each end, add to this ¼ inch on each side for the thickness of molding. The width across the rockers will be 45½ inches. This width will clear the boot when the width of the track is 60 inches as drawn on this draft. Another important point is the depth of the rockers, and they should be as light as possible, because there is a width across of 5 inches, but sufficient space must be left for the rocker plates, and also to fasten the cross bars to the rockers. The side view will show this, and in front the rockers are 2⅞ inches deep, and on the rear end 2 inches. The two parallel dotted lines represent the thickness and position of the bottom boards. The upper edges of the rocker plates are level with the top edge of the bottom boards, and are 2 inches deep. The lower short dotted line on the side view represents the lower edge of the rocker plate and each is ½ inch thick.

The rear ends of the rocker plates are best seen on the bottom view; they run up to the third cross bar from the wheelhouse, form a corner and rest against the cross bar. The

tenon at each end of the cross bar is not strong enough to hold it in position, and to strengthen it a plate is welded on each of the spring shackles and bolted to the cross bar as shown on the bottom view. The other cross bars are mortised into the sills as usual, and their sizes are best seen on side view. All side panels are ⅜ inch thick, glued on and canvased from the inside. All curves are ⅞ inch square and rounded from the inside surface, and the bottom boards are ⅝ inch thick and 10 inches wide. The top is covered with 1¼x¼ inch strips beaded on one side and covered with imitation leather, drawn tight, and its edges covered with ¼x⅝ inch rounded moldings.

Dimensions for a full size body as shown on Dorhing draft:

Patent Wheels.

Diameter of wheels without tires, 37½ inches.
Diameter of wood hubs at center, 5⅛ inches.
Diameter of hub bands, 4x4½ inches.
Width of spokes at square end, 1½ inches.
Length of hubs, 8 inches.
Number of spokes front and back, 14 and 16 inches.
Thickness and depth of rims, 1⅝x1¾ in.
Thickness and width of tire, ⅝x1⅝ inches.

Front Elliptic Springs.

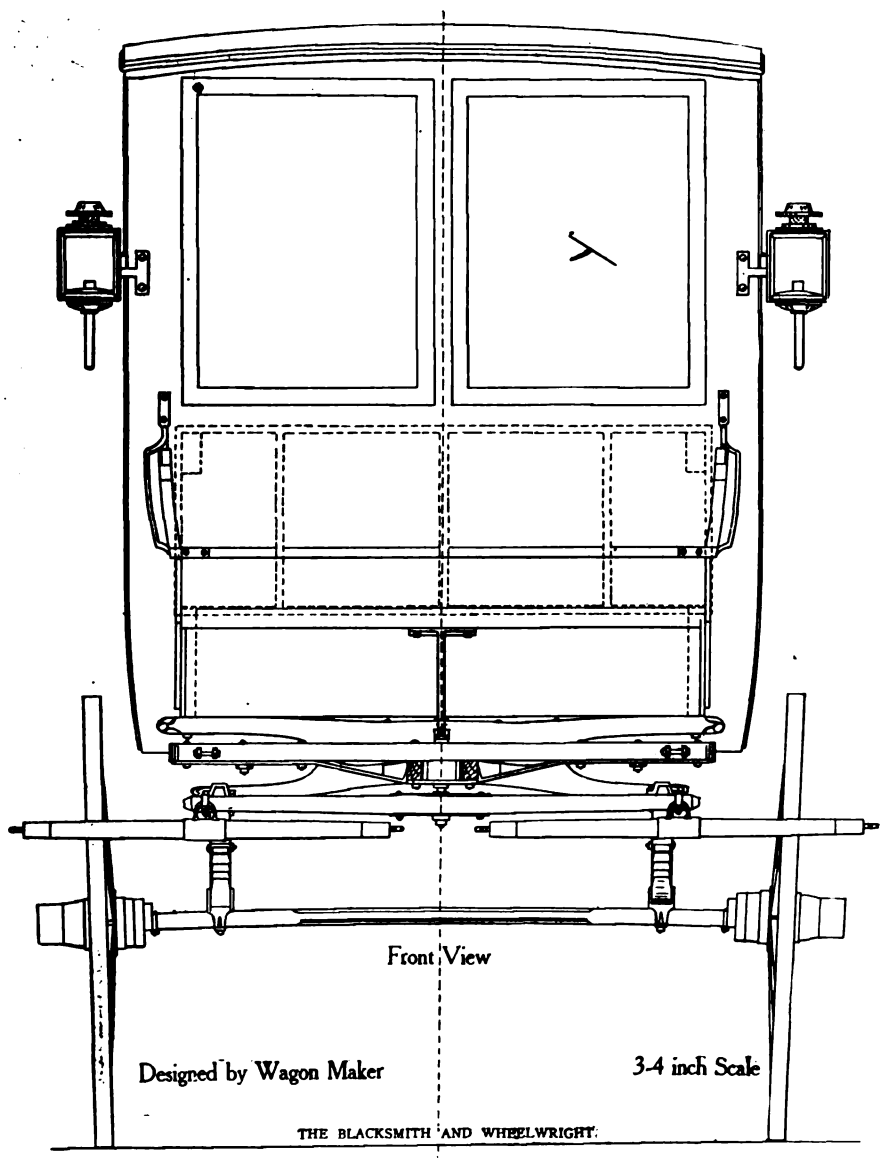
Length from centers of bolts, 37½ inches.
Open from out to out, 9½ inches.
Width of plates, 1¾ inches.
Number of plates, 5.
Thickness of main plates, No. 2.
Thickness of other plates, Nos. 3, 3, 4, 4.
Clipped top and bottom.

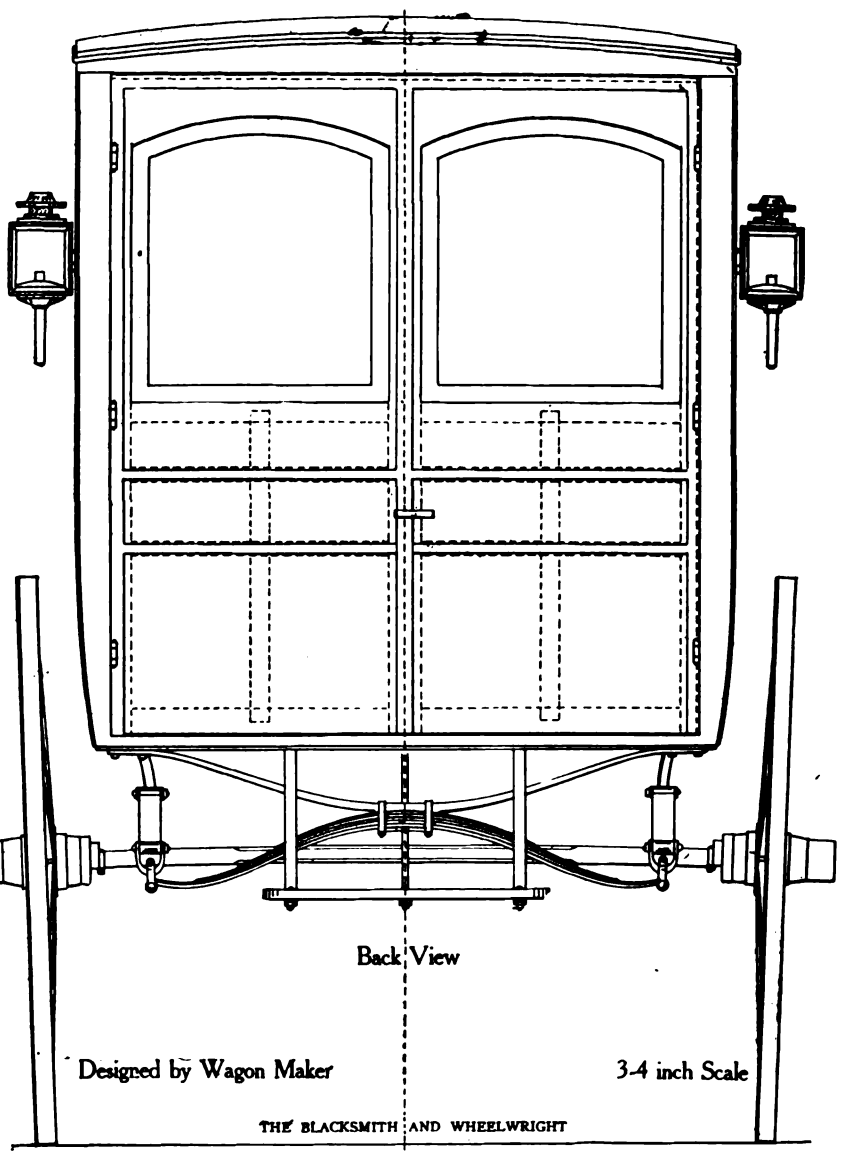
Rear Platform Springs.

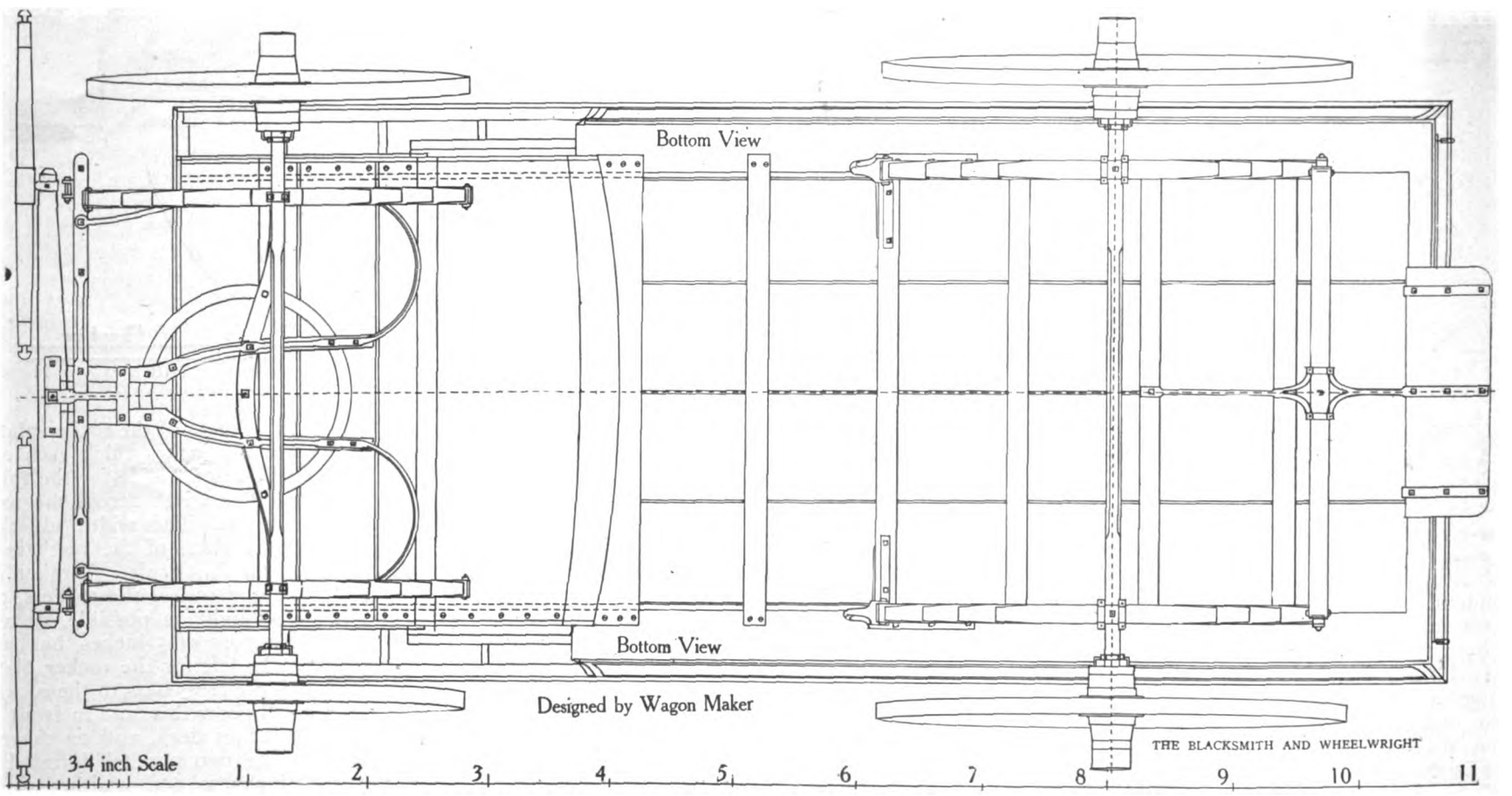
Length from centers of bolts, 42 inches.
Open from out to out, 6 inches.
Width of plates, 1¾ inches.
Number of plates, 5.
Thickness of main plates, No. 2.
Thickness of other plates, all No. 2.
Clipped to axle.
Length, size and number of plates and cross springs are same as on side spring.

Axles.

Size at square end front, 1⅜ inches.
Size at square end back, 1½ inches.
Dimensions for a medium size.







Patent Wheels.

Diameter of wheels without tires, 37½x47 inches.
Diameter of hub at center, 4⅝ inches.
Diameter of hub bands front and back, 3⅝x 4⅛ inches.
Length of hubs, 7½ inches.
Width of spokes at square end, 1 7-16 inches.
Thickness and depth of rims, 1½x1⅝ inches.
Thickness and width of tires, 9-16x1½ in.

Front of Elliptic Springs.

Length from centers of bolts, 37½ inches.
Open from out to out, 9½ inches.
Width of plates, 1⅝ inches.
Number of plates, 5.
Thickness of main plates, No. 2.
Thickness of other plates, No. 2, 2, 3, 3.
Clipped top and bottom.

Rear Platform Springs.

Length from centers of bolts, 40 inches.
Open from out to out, 6 inches.
Width of plates, 1⅝ inches.
Number of plates, 5.
Thickness of main plates, No. 2.
Thickness of other plates, Nos. 2, 2, 3, 3.
Clipped to axle.
Cross spring same as side spring.

Axles.

Size at square ends front, 1 5-16 inches.
Size at square ends back, 1⅜ inches.

CARE OF WOOD STOCK.

The Drykiln and What May Be Accomplished By Air Drying.

Lumber stock often comes to the woodworker in anything but a dry condition. He may specify that the stock must be from twelve to eighteen months old; and he may test it by weighing it at the factory to determine whether or not it has lost as much moisture as it should have done in order to be seasoned sufficiently. In spite of these precautions, however, the chances are against his getting the stock just as he would have it.

The situation is due to the constant effort on the part of the consumer of lumber to force the lumberman to carry the stocks until he is ready to use them, and on the part of the lumberman to get rid of his material as rapidly as possible. Each wants to have as little capital tied up in lumber as he can. Everybody is trying to cut the corners, the lumberman by getting out stock which is not thoroughly dry, the user in putting it through the machines before he has kept it on his yards or in his sheds for a sufficiently long time to insure thorough seasoning.

All admit the value and the necessity of the drykiln, but it is certainly not wise to expect it to do everything. A lot of the defects which develop in lumber which has been rushed into the kiln and subjected to a high temperature are not the fault of the kiln, but are due to the lumber not having been old enough in the first place and in being held in an atmosphere superheated and lacking in moisture.

The wheelwright who wants to have a factor of safety, therefore, should do everything possible to determine approximately the age of the stock which he gets from the lumberman. Giving the latter credit for the best intentions, he may make a mistake. Weighing the stock is a good plan, though not absolutely accurate, and the tables prepared by the lumber experts are usually pretty close to the truth.

Lumber should be carried in stock, under cover, but in a place where the air can circulate through it, until it is at least twelve months old, and the older the better. Eighteen months is the limit fixed by many who prefer to give their stock a little longer time to season rather than to take a chance with defects.

When it has been air-dried for that length of time, the kilns may be used before the wood is machined. It has been pointed out frequently that the most effective kiln-drying is that which dries the stock gradually, at a comparatively low, rather than a comparatively high temperature, and which does not have an atmosphere entirely devoid of humidity. The higher the temperature used, the more moisture should be present, so as to prevent too rapid drying out.

It has been found to be the universal experience that lumber piled in narrow stacks dries much more rapidly than when wide piles are used. For instance, it was reported by an authority on this subject recently that 1-inch oak, piled in 12-foot stacks, weighed 4,240 pounds in four months, while the same character of stock, piled in 6-foot widths, weighed 4,020 pounds. Here was a proof of the fact that the better circulation of air through the pile the more rapid the drying process.

Lumber piles should be kept covered and in the case of thick stock, which checks readily and causes a proportionately higher loss, an additional precaution should be taken by sizing the stickers which are used and keeping the ends of the plants absolutely even. This will tend to prevent both warping and checking, and will enable the thickest stock to be carried without damage, even though it is not used for many months after being piled.

Woodworkers who use much lumber would do well to devote attention to their pile foundations. If the site of the yard is in low ground, posts should be driven upright and the foundations built over them. The foundations should be sufficiently high to enable the air to get under the stack and to prevent the lumber from taking up too much of the moisture from the surface of the ground. Concrete foundations are coming into more and more general use, and if the wheelwright carries a considerable amount of lumber in stock, the expense of building piles of this character would probably be low enough to justify their use.

When piles are broken for the purpose of taking out material for a special job, it is essential that the lumber which is not used be repiled immediately. A lot of damage can be done to valuable stock merely through neglect and allowing it to lie around without protection. With lumber prices high, and likely to go higher, this is waste for which there is no excuse.

Staining in the pile is not likely to happen to stock which is carried by the user if it has had anything like adequate seasoning at the mill. Nevertheless, this sometimes happens, and it is, therefore, worth while, in the event that the manufacturer does not regard his stock as being well seasoned, to use 2x4's of hemlock, or some other hardwood, thoroughly dry, instead of the usual 1-inch piling sticks. This precaution is especially valuable in the case of basswood, buckeye and sap poplar, which seem to stain readily.

The best machines and the best workmen cannot make really high-grade wood products out of poor material. The best lumber ever turned out of a saw mill can be ruined by careless handling and in order to insure satisfaction from the time it leaves the saw until it is set up in the completed piece, it should be given careful and painstaking attention.

Standard Wheel Hubs.

Hub makers for farm wagon hubs, says the Wood Worker, are now working with the wagon manufacturers to the end that a lot of the useless sizes and patterns may be cut out and this class of hubs reduced to a few standard sizes and patterns. This will make for both greater efficiency and better satisfaction in the work. It will enable machine-makers and operators to concentrate on the standard sizes and get them down to a finer point of perfection, while at the same time making them at less cost. The cutting out of useless sizes will also cut out the need for certain extra equipment for lathes and mortisers, and save many of the changes at machines that take up time and cost money. Nor will the good of this work stop here. It will be felt in the spoke business, too, for the cutting out of useless sizes in hubs will reduce the variety in spokes, save time, and simplify the work of making spokes for the hubs. It is a good idea, and should have the support and co-operation of every man in the business.

Gas mantles that have become black may be cleaned, a "Scientific American" note states, by sprinkling salt upon them while burning. Caution, of course, must be used in this experiment, or the experimenter will lose both salt and mantle, for the latter is a most fragile article.

SHOP WORK IDEAS.

Cheap Varnish, Truing an Emery Wheel, and Laying Down Angles.

BY JAMES F. HOBART, M. E.

Contrary to a more or less prevailing opinion, there is a method of using cheap varnish by which fairly good results may be secured. The method in question consists of placing the varnished articles in a dry house, similar to the ones used for curing lumber. It is claimed by several large users of paint and varnish that they can obtain certain results with much cheaper material where the dry house method of curing is used than they can by curing in the usual manner.

It is not advisable to put painted or varnished articles in a dry house with green lumber, or to turn on the heat hap-hazard in any old way. Indeed, a far different course must be followed. The dry room must be specially prepared for proper curing and the temperature and humidity must be very closely regulated. It must not be too hot or too cold, too dry or too damp, and neither extreme may be permitted or the varnish will surely suffer. The temperature and humidity are kept at the point which will not allow the wood to shrink or warp. The heat thus applied seems to cause the varnish to cover the surface much better than when cured in the ordinary way.

It must be kept in mind that paint and varnish are very nearly alike in composition. The only difference being that the oil in paint carries a pigment, while the oil in varnish carries a resin or gum. In either case it depends entirely upon the oil and not upon the pigments or the resin. The theory of the dry-house method is that the surface be kept at a temperature so that the oil of the varnish or paint will spread readily and easily over the surface, fill the cracks and holes and makes an even and level surface. Varnish and paint cured by the dry house method shows an almost entire absence of brush marks. This gives a clue to the manner in which the work is improved by the dry house method.

It is suggested that profitable experiments can be made along this line. Linseed oil is getting so scarce that four times as much is used in the United States as is produced. The manner of making up the deficiency is best understood by the paint makers and the oil producers.

The above is a good fact to present to paint manufacturers who stick to the statement that he "uses nothing but the very best linseed oil." The fact that only one-fourth as much is made as is claimed to be used may explain why we have so much trouble with paint and varnish, but if by the dry house method we can handle other mixture and get along with some other vehicle than linseed oil, then let us work the dry house method for all it is worth.

Rounding an Emery Wheel.

In the September Blacksmith and Wheelwright, page 338, Abe Hocker, Indiana, asks for a method of truing up an emery wheel which has worn out of round. There are several tools for rounding an emery wheel and the nearest hardware dealer will probably supply you with one. For nice work, a black diamond is commonly used, the diamond being set in a handle by means of which it is placed against the wheel, and the wheel turned down exactly as if it were a piece of wood in the lathe.

Another tool which is much used, consists of several corrugated washers set loosely upon a short pin, which in turn is fastened between jaws attached to the handle of the tool. An improved form of this tool is shown by Fig. 1. This is a cheaper tool than the diamond and will true up a wheel very quickly, but it does not leave as smooth or as true a surface as the diamond. While the diamond cuts the emery from the stone just as the diamond cuts glass, the rotary tool breaks off particles from the wheel in much the same manner that a wheel cutter cuts furrows in glass.

If Mr. Hocker has neither of these appliances, but has a metal turning lathe handy, he may put the emery wheel in the lathe just as if it were a piece of iron, grind up a stout lathe tool, then harden the point of the tool as hard as fire and water can make it. Run the emery wheel very slowly and you can turn the surface of the wheel with the tool in

exactly the same manner that a piece of cast iron is turned off.

The tool just considered will wear, but not as much as will be expected, for it seems to break off particles of the stone instead of cutting them. But the diamond or corrugated washers are far preferable to the lathe method.

The writer has upon several occasions, when he found it necessary to give first aid to an emery wheel, procured several cut washers such as are used upon ½ inch bolts. These were mounted loosely upon a pin driven in a piece of metal. The washers when presented to the surface of an emery wheel, run upon its surface and with a good leverage taken over the tool rest, can be made to cut away the surface of the wheel nearly as fast as can be done with the corrugated tool as mentioned.

If an emery wheel is in very bad condition, and an ⅛ or a ¼ of an inch must be taken off of each side, then it is well to cut a narrow space on each side of the wheel making a continuous cut entirely around the wheel on each edge of the face. Next, remove the wheel from the mandrel. Lay it flat upon plank or block and with a small cold chisel you can easily chisel that portion of emery that exists between the two turned down sections. This method works as well with a grind-stone as with an emery wheel, but care must be taken that the emery wheel has a good bearing on the block when the chipping is done. The wheel must bear full and heavily out to its very edge. If not, you will be apt to break a piece out of the side of the wheel.

Do not run the emery wheel too fast. Experiment a little and find the rate at which the wheel cuts the best. Some wheels do better work when running faster than other wheels. There is one particular rate at which each wheel will do better work and more of it, than at any other rate. Usually this has to be learned by experiment.

Another thing; every wheel should be selected for the work that has to be done. A wheel may be too hard or too soft for the work expected of it, in which case as good results cannot be obtained as when the hardness of the wheel is just right. Where a wheel glazes over when doing a certain kind of work, then you may be very sure indeed that the wheel is of too hard a nature for that particular work. Try a softer wheel and see if you do not do much more work than with the hard one. A wheel cuts much faster when it wears away a trifle of its surface than when it shows no sign of wear but retains upon its surface portions of matter which it is cutting away, and becomes glazed over.

CARRIAGE BUILDERS.

Meeting of the Executive Committee of the National Association.

The Executive Committee of the Carriage Builders' National Association held its annual meeting at the Hotel Astor, New York, on November 22. The members present were: C. A. Lancaster, South Bend, Ind., chairman; C. C. Hull, Connersville, Ind., president of the C. B. N. A.; W. H. Roninger, St. Louis; Lewis Straus, Newark, N. J.; W. A. Sayers, Cincinnati; C. O. Wrenn, Norfolk, Va.; O. B. Bannister, Muncie, Ind.; Theodore Luth, Cincinnati; Carl P. Schlamp, Henderson, Ky.; J. D. Dort, Flint, Mich.; Daniel T. Wilson, New York, and Henry C. McLear, Mt. Vernon, N. Y., secretary of the C. B. N. A.

C. A. Lancaster was unanimously re-elected chairman for the next year. Report was made on the progress with the St. Joe Valley Traffic Association agreement to audit the freight bills of the members of the association. Several of the members have availed themselves of this arrangement, with profit to themselves, and it was the general opinion of the committee that others of the association would find this a good plan to use on these matters.

In consideration of their large contribution toward the support of the association's technical school, it was voted that the Automobile Manufacturers' Association be invited to name two of their members as honorary members of our board of trustees of that school with full powers.

Consideration was given to the growing habit of some of the exhibitors at the annual exhibition of having only an office in their spaces, which would result in having a hall full of offices instead of an exhibition of the productions of the exhibitors, and which would not be a very attractive exhibition, nor in accordance with the purposes for which the exhibition is held. It was ordered that this matter be brought to the attention of the exhibitors and a request made to them to exhibit their goods, so the members and visitors will have something to look at and pay them for the expense of coming to see the exhibition, and not have to look at partly empty spaces, with a table and two chairs. The handy reference book was endorsed, and the publication ordered for next year, with such additions and changes as may be necessary.

H. B. Staver was elected a member of the committee, to fill the vacancy made by the election of C. C. Hull as president of the association.

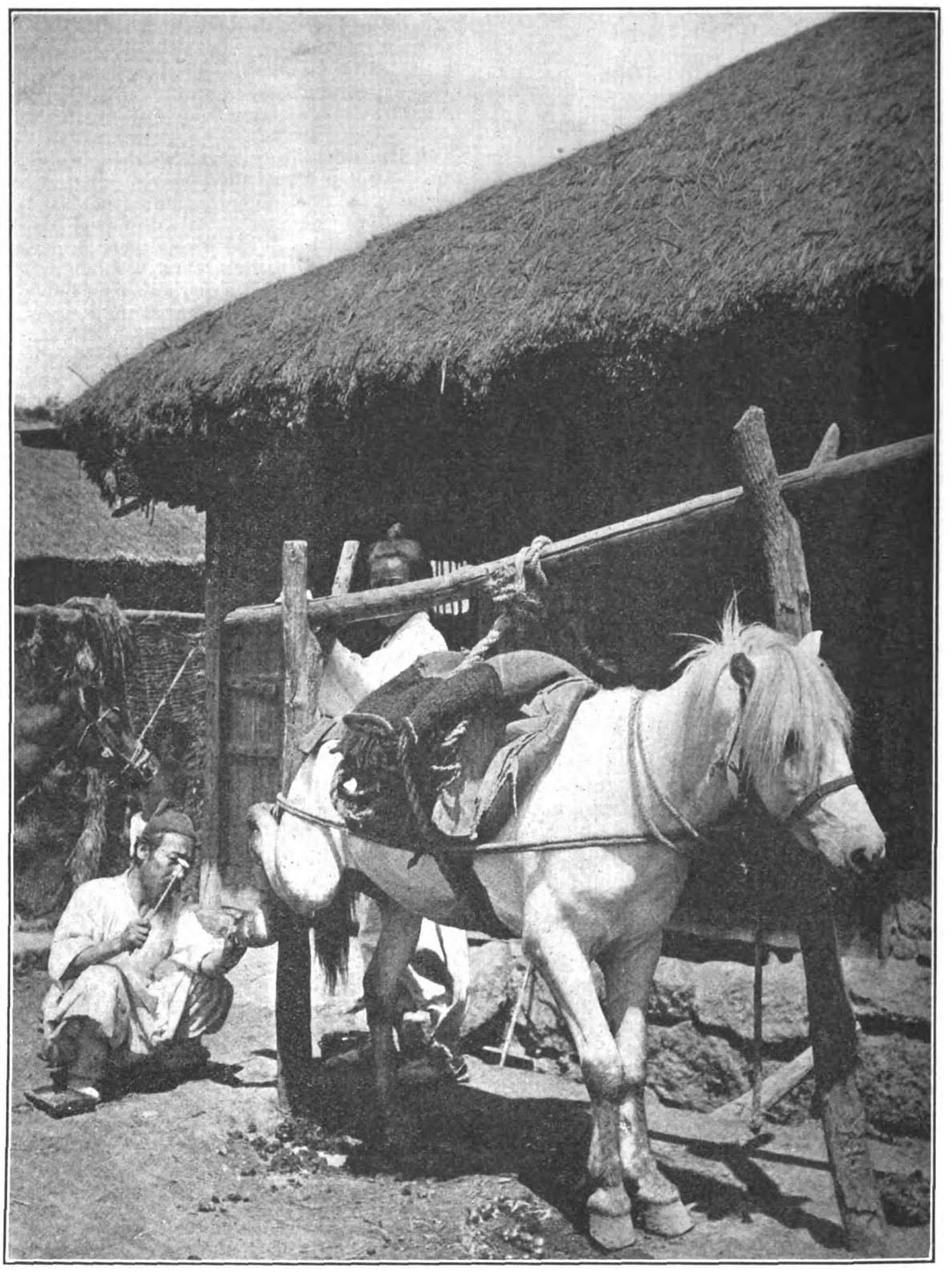
The date for the convention next year was left to a sub-committee, so they could discover upon what dates the hall in St. Louis could be obtained, probably early in October.

Horseshoeing in Korea.

The illustration shows a horse being shod in Seoul, Korea. It is claimed there is reason for these extraordinary precautions on the blacksmith's part, for this beast, like most Korean horses, is a bad tempered brute and likely to flourish his heels inconveniently, if not securely tied up first. And it is no wonder that his temper is vicious for hardly a man here has any notion of treating an animal decently. The beast has probably been overworked, loaded so carelessly that his back has become covered with undressed sores, and atrociously abused until his disposition has naturally soured. The sight of a tiny Manchurian pony trussed up to the heavy timber framework is ludicrous, however, and one American tourist termed it "horseshoeing on the safety plan."

White costumes would be extraordinary for a blacksmith's use almost anywhere else, but here all men wear white, it is not immaculate but it averages cleaner than one might expect, thanks to the unending labor of the women at the creeks where the washing is done.

Notice how the young man's hair is screwed up in a hard knot on top of his head. That shows he is a married man. Everybody marries young here, for the people worship ancestors and it is a fearful thing for a man to die without leaving sons behind him.



Shoeing a Horse in Korea. Copyright, Underwood & Underwood.

Vehicles in Mexico.

From Consul Wilbur T. Gracey.—Merida, the capital of Yucatan, and the only city in the State where wheeled vehicles are used to any large extent, is very well supplied with excellent roads. A few years ago a considerable sum of money was set aside for local improvements, and the roads of the city, which had before been exceedingly bad, were all paved with excellent asphalt, locally manufactured from the high quality of limestone which is found in this country.

Prior to the paving of the streets a carriage peculiar to Yucatan was in use, and many hundreds of these are still seen. They are not unlike an open cab, the driver sitting on a high seat forward with his feet on the dashboard. Four people can occupy one of these carriages, but are somewhat crowded. Four

strong posts support a flat roof, and in the old days were convenient to hold on to when passing over the rough ruts of the streets. The utility of these vehicles has largely vanished, however, since the improvement of the paving, and a type of French Victoria is slowly taking their place.

There would appear to be an excellent opportunity to introduce American-made Victorias here, especially if they could be placed on the market at prices to compete with those now here. A few American carriages are seen, but by far the largest number of vehicles on the streets are of the open-cab type described, and are manufactured in Yucatan. It would probably well repay some energetic American manufacturer to investigate the possibility of manufacturing this type of vehicle for export to this city.

In the country districts about Merida, and in fact throughout Yucatan and the near-by States of Campeche and Quintana Roo, another vehicle typical of the country is in use, known as a volan. This consists of a body supported on two wheels with strap springs. It seems probable that a type of buckboard such as is used on the rough roads of the United States might find a sale for this country travel.

Blacksmiths Wanted In the West.

According to The Crowbar, the scarcity of blacksmiths in the Northwest is becoming a serious problem. With every prospect for a big year, business activities are more in evidence than for several years. Many shops are short of hands and in some towns there is no blacksmith at all, and men cannot be secured for love of money.

In the cities there seems to be plenty of help. At least the condition is much more settled than in the country. But the city smith does not make a good country smith. The work is very different. In the city carriage and wagon shops we find men who can do nothing but woodwork. In the horseshoeing shops the men are capable of horseshoeing only. The country shop in the Northwest needs men who are good horseshoers, can do the ordinary line of wood shop repairing and do an acceptable job of plow work.

No doubt there are plenty of smiths in the eastern part of the country who could qualify for the country work in the Northwest, and, perhaps, they would be better off if they came out west where prices are good and living comparatively cheap.

The Northwest has depended upon immigration from the European countries in the past for mechanics, but during the last few years immigration seems to have lessened from Germany and the Scandinavian countries and increased from the Southern European countries, the latter being mostly agricultural folk or laborers.

New towns are constantly springing up throughout the Northwest, due largely to railway extensions both real and proposed and there are many splendid opportunities for opening up new locations for blacksmith shops. This is not only true of the Northwest but of the Southwest also. It seems strange that some of our Eastern brethren don't get next to this condition, and come out and join in a real prosperity, unaffected by the whims of Wall Street and the money markets.

The Horse's Age and Teeth.

From P. Harvey Flynn, New York.—It is really surprising the limited knowledge expert horsemen possess regarding the horse's age, which we must admit is quite a science and requires a great deal of study.

I notice one writer claims that the different qualities of food have a great deal to do with the condition of the horse's teeth in determining the horse's age. I must differ regarding such conditions of the teeth, should it be a fact that the different kinds of food could wear the ends of the teeth to such an extent that it would be hard to tell the age. There are different methods of telling the horse's teeth from the colt's. The faces of the colt's teeth are far different from the horse's teeth. This should be taken into consideration as well as the cups. The colt teeth are wide and thin, while in the older horse the teeth are narrow and thick.

In telling the horse's age from nine to twenty years of age I never look at the lower teeth. Furthermore, let me say in regard to the different kinds of food wearing the teeth, a horse does not chew his food with the front teeth. Nature has given the horse twenty-four grinders with which to grind his food, and we never look at them, their location being such that it would be very hard for any one to discover a wear on the grinders or molars of a young horse. The horse has forty teeth. Years ago when I taught the age I used six teeth to determine the age to nine and only two thereafter. By this you will see it is much easier to tell the age of the older horse than the young one. A three-year-old colt has four horse teeth and eight colt teeth. A five-year-old has a full mouth of horse teeth; then there is no change in the form of the teeth except length until ten years of age.

OF INTEREST TO HORSESHOERS.

Federal Suit Against the Master Horseshoers' Protective Association.

A civil anti-trust suit was filed in Detroit, December 12, 1912, by the Federal Government, against the so-called "horseshoers' trust."

In a petition in equity, Attorney-General Wickersham seeks injunctions against the Master Horseshoers' National Protective Association, its officers, and manufacturers of drilled horseshoes, adjustable calks, and rubber hoof pads from continuing an alleged combination and conspiracy to confine the sale of those articles in this country and Canada to horseshoers and prevent their sale direct to horse owners.

It is charged that through unlawful agreements and contracts, the defendants have seriously interfered with interstate and foreign commerce in violation of the Sherman law. The following are named as defendants:

The Master Horseshoers' National Protective Association of America, New York; the Master Horseshoers' National Protective Association of America, Michigan; the Williams Drop Forging Company, Pennsylvania; the Rowe Calk Company, Connecticut; Diamond Calk and Horseshoe Company, Minnesota; the Giant Grip Horseshoe Company, Wisconsin; Air-O-Pad Company; Revere Rubber Company, Rhode Island; Walpole Rubber Company, Maine; Wliliam Killian & Sons Company, Massachusetts; the Firestone Tire & Rubber Company, Ohio; Octigan Drop Forge Company, Illinois; Dryden Hoof & Pad Company, Illinois; Hoopeston Horse Nail Company, Illinois; William E. Murphy, Philadelphia; Harry T. Baldwin, Grand Rapids, Mich.; Charles E. Craft, Florisant, Miss.; Charles Kelso, Baltimore; Charles McGinnis, Brooklyn, N. Y.; Jeremiah C. Buckley, Detroit; Michael Hallanan, New York; Charles P. Dryden, Chicago; Carl A. Judson, Chicago; Edward Fitzgerald, and W. W. Todd.

The petition, filed by Clyde I. Webster, United States Attorney, is signed by Attorney-General Wickersham, James A. Fowler, assistant to the Attorney-General, and Stanley D. Montgomery, special assistant to the Attorney-General.

Almost all horseshoeing, the Government says, is now done at shops conducted by members of the defendant Horseshoers' Association, organized in 1903 to succeed a voluntary association, also declared to have entered into an unlawful combination.

It is alleged the verbal agreements between the Association and manufacturers of drilled horseshoes and adjustable calks provide that such manufacturers will market their product through hardware jobbers under a sales contract which empowers the manufacturers to fix the price at which the jobber sells to retail hardware dealers.

The agreement stipulates, it is charged, that, in States other than Montana, Utah, Washington, Wyoming, and Idaho, horseshoes and calks will be sold at a price 33 1-3 per cent. above the price charged to horseshoers, while in the five States mentioned, the price should be 50 per cent. above that charged to horseshoers. The Government asks the annulment of the agreements and the prohibition of the alleged discriminations and practices.

GERMAN BLACKSMITHS.

They Have, as a Rule, Better Shops Than are Found in the United States.

BY DR. GRIMSHAW, DRESDEN.

Although I object to the word "stepmother," as used in connection with ill-treatment of children, still if the expression "treated like a step-child" is to be accepted, I agree perfectly with those who apply it to two objects about a shop—the grindstone and the smithy.

As a rule, for the latter "any old thing" is good enough; and it is not to be wondered at that smiths change places, and that bad work is turned out from such establishments.

Now what is it that makes a "step-child" of the smithy?

In the first place, insufficient light. This

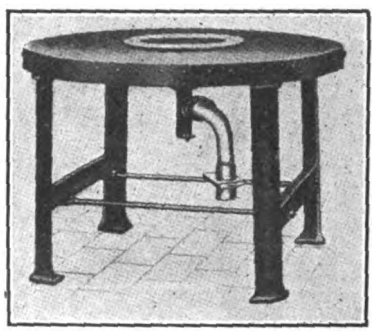


Fig. 1.

can be the fault of the building or of the smiths—for very often there are windows in plenty, but they are incrusted with the dust and soot of years.

The smith should have just as good light as the average mechanic; partly on account of his work, but principally for health's and comfort's sake. The same holds true of ventilation. And then the forges; in how many smithies are they thrown together of rough brickwork, with cracks through which the blast can pour, which causes a direct loss of time and fuel?

I will not go so far as to say that the German smithies are ahead of the best American, but unless the latter have very much changed in the last few years they average up better, just as the average German smith averages up bet-

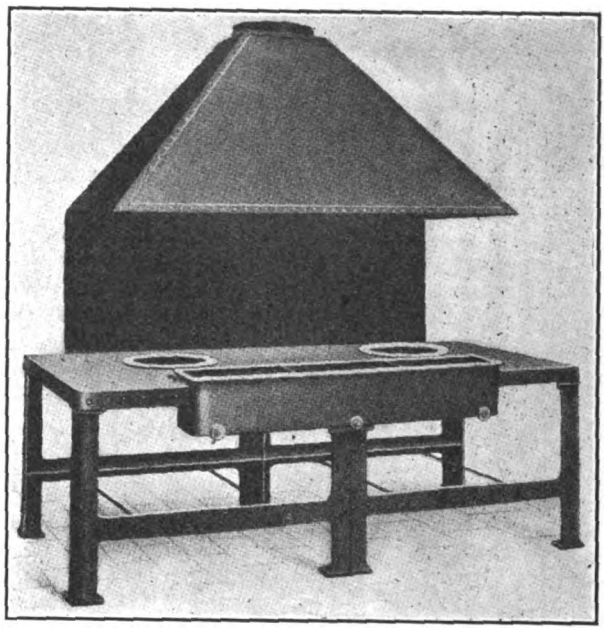


Fig. 2.

ter. The principal reason for the latter fact —and it is a fact—lies in the greater use of cast iron in America; and this is largely due to the high cost of labor, as compared with that in Europe. Americans cast in many cases (too many!) where Germans forge; and there are schools over here where designing and working are taught by high-grade men; so that their pupils turn out high-grade work —mostly ornamental; for the average locksmith's hand work is eighth or eighteenth class.

It might be interesting to show what sort of equipment one finds in the best German smithies.

To commence with the forges. Brickwork is no longer the thing—very appropriately, wrought iron frames and plates, strong enough to stand rough usage. The wrought iron plate stands up against falling forgings and great differences of temperature which

would ruin a casting. The legs, however, are of cast iron, and usually the lower part is open, although sometimes they are cased in and supplied with a sheet-iron ash shelf; the coal supply being kept in the under compartment. In this case there is an opening in the hearth, with cover, to permit dropping the ashes through into their compartment as shown at Fig. 1. Where there is a water box,

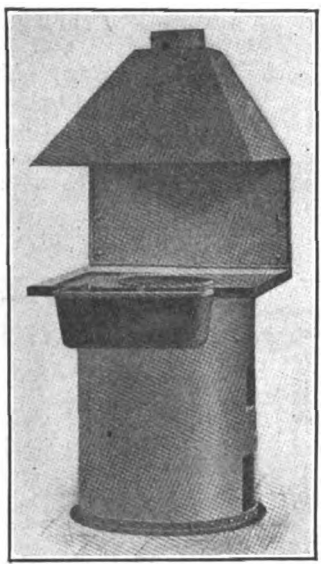


Fig. 3.

it is of cast iron, for a single forge divided into two parts for water and coal respectively; for a double one into three, for the same purposes, Fig. 2. Sometimes the water box is furnished with a heavy rail on which the tongs or hammer may be rested.

A very neat type of forge has an electro-motor with fan blower on the same shaft di-

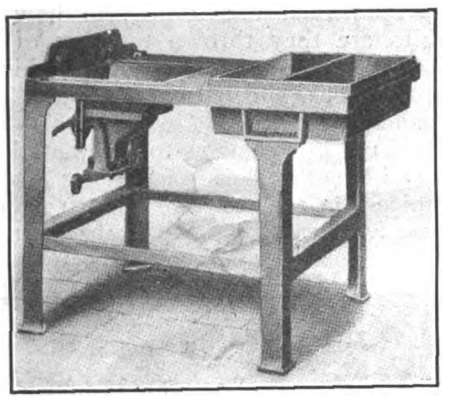


Fig. 4.

rectly under the hearth, and side blast. To protect the motor from the extreme heat of the forge there is a false ceiling of sheet-iron between it and the hearth.

The next type of light forge for small shops, Fig. 3, has a cast-iron fire box and wrought-iron hearth, with a cylindrical column of light

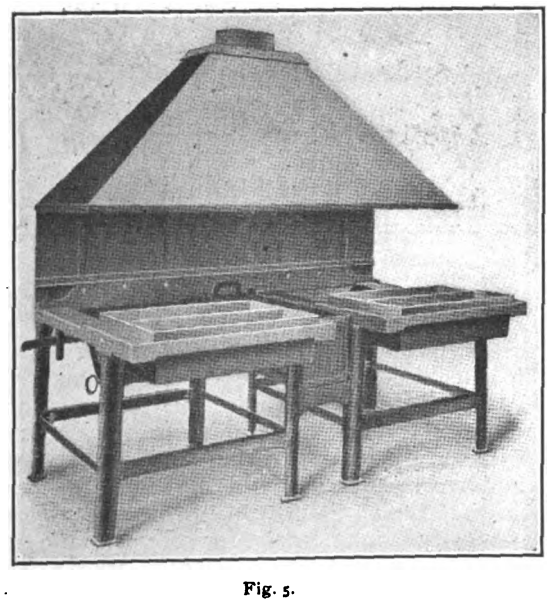


Fig. 5.

boiler plate or heavy sheet-iron. This column or stand is divided horizontally into compartments for ashes and coal respectively. Wind nozzles of different sizes and types may be used at will as they are readily attached, and removed by bayonet joint. The water tank is of cast-iron, and fastened to the hearth. There is a stiff sheet-iron back and a ventilating hood.

For heavier work there are also forges of cast-iron—frame, hearth, and tank—the latter in two compartments for water and coal. (Figs. 4, 5). Incidentally, this arrangement of having the coal next the water tank has the advantage that the coal can be kept wet more conveniently—which makes for economy in

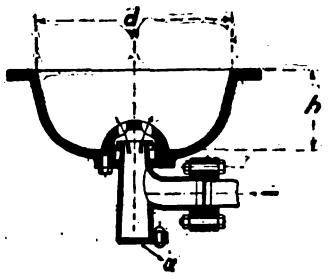


Fig. 6.

the coal bill. The wind supply is regulated by a conveniently placed hand lever supplied with a spring so that it stays put in the desired position, despite the jarring. This type may be used either right-handed or left-handed, as desired.

Two blast arrangements are shown at Figs. 6 and 7, one with round, the other with square

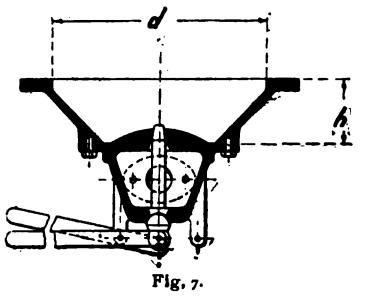


Fig. 7.

fire box. The latter may be used right or left-handed as desired, without any change; and the nozzles may be changed in a minute, as they are attached by a bayonet joint.

As regards ventilation—which is exactly

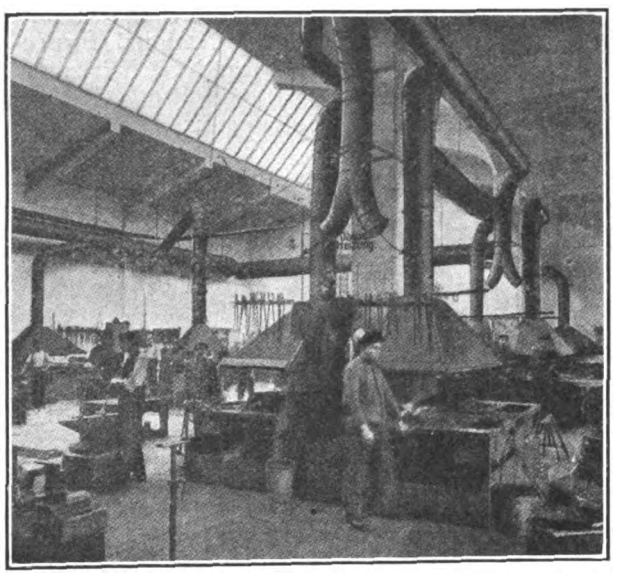


Fig. 8.

the weak point in German dwellings, public buildings and railway and tramway cars—the smithies here are up to American household ideas. Whether the exhaust is above (Figs. 8 to 11 inclusive) or below, depends on

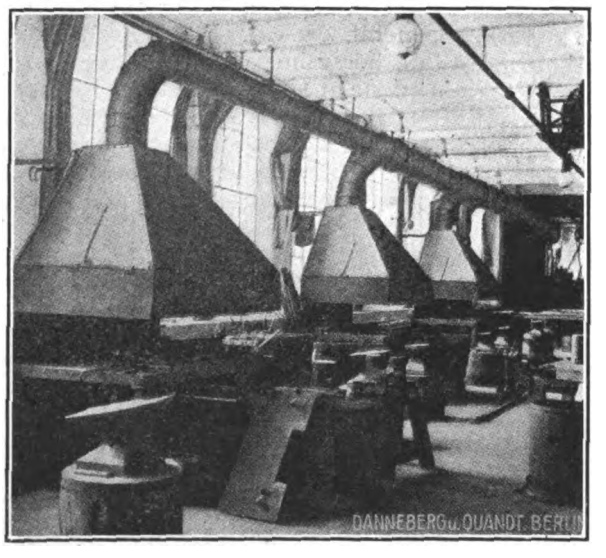


Fig. 9.

several things. Overhead is much cheaper—as underneath exhaust usually calls for masonry conduits; but where the overhead room is needed for cranes, etc., there is no choice in the matter. To lessen the evil of smoke in starting up, the best smithies have an ejector blast in the exhaust; some even have a special fan.

Fig. 8 shows a set of forges with common fan and overhead exhaust. In Fig. 9 the draft is solely by a good high stack. Fig. 10 shows a railway repair shop and Fig. 11 a wheelwright shop with fan exhaust and overhead-pipes.

For exhaust, air pipes are simply riveted with a lengthwise seam; those for wind pressure, welded; the usual thickness for welded pipes being four millimeters (say one-sixth inch full) thick.

WESTERN CANADA.

Claims That Too Much Credit Is An Injustice To Blacksmiths.

We were talking the other day to a member of a large blacksmith's and woodworker's supply house, says the editor of Canadian Blacksmith & Woodworker, a concern that is widely known throughout Western Canada.

During the conversation, the member of the supply house dealt our equanimity a severe jolt when he said: "Perhaps you may think it strange, but we have been receiving letters from our blacksmith customers during the past four or five months—four or five every day and often more—and every letter has the same weary story, that there is no money in the country.

"Well, in order to sort of prove this deplorable tale to be true or otherwise, we made particular enquiries at various mail order houses, and we find that they are particularly well pleased with themselves, as business has been excellent with them throughout the summer and fall, while they reckon their daily

Fig. 10.

drawings from the farming world in thousands of dollars."

Now, when the editor of a blacksmiths' paper comes up against a fact like that, he naturally sits down and tries to look for some

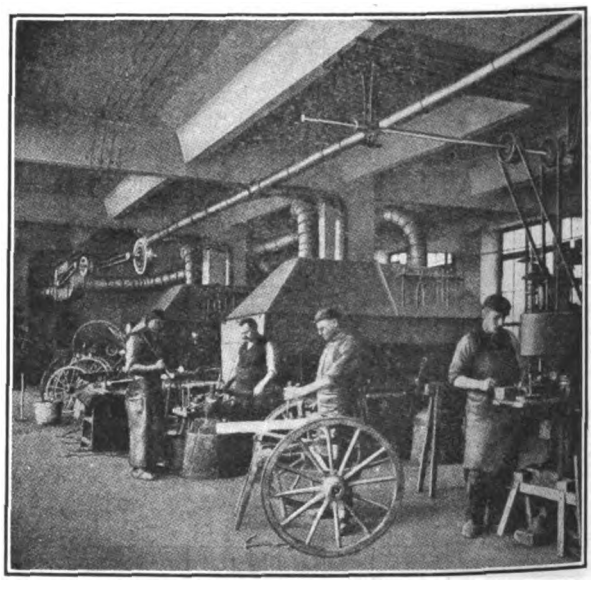


Fig. 11.

logical cause why the farmers of Western Canada should have money for the mail order houses, while the blacksmith has to wait for his account so long that he has to make excuses to his supply house when he cannot

meet their bills—a proceeding that, obviously, is not good for his personal credit.

The whole question resolved itself to this query:

"Are the blacksmiths of Western Canada poor business men, are they not attending to business, and do they think that business is all work and no pay?"

Now we are quite aware that the question is a pretty strong one, but every blacksmith and every woodworker in Western Canada ought to read it over once or twice, then take a good solid think before he answers each of the three clauses in the sentence. It is no use for us to reiterate how we have preached time and again on the benefits of the Cash System, and we long more than anyone for the day when the shop of every blacksmith in the West will bear upon its wall the sign—"Terms Strictly Cash." There is no trade or calling that deserves better money than that of the blacksmith. It is hard physical toil from morning until night, taking a great deal from the physique of a man, while all the time his brain must be alert. To the average individual, the shoeing of a horse looks a simple operation, and they marvel how any blacksmith has the temerity to charge so much for simply nailing a shoe to the hoof of a horse. They do not think that if the blacksmith does not shoe the horse properly it may go lame, may develop foot trouble that entirely ruins its further use for any work.

"The laborer is worthy of his hire;" that was written before Canada was known to exist and that fact is as true today as it was 3,000 years ago. Even so, the blacksmith is worthy of his money. The carpenter, the plumber, the mason, the bricklayer—none of them will do a job and then calmly wait for months for their money. No siree! They are after it even as a coyote goes after a venturesome rooster—by the shortest possible route.

And what is more they get it!

Is a man fair to himself, or to his family if he be married, if he works hard and conscientiously and then does not get due monetary reward for his labor?

Harvest is over in Western Canada. It has been a good year, and even now in Winnipeg we see many Western farmers heading away to the East or to the Old Land to pass the winter. We do not, however, notice any perceptible migration of blacksmiths who intend to pass the winter in the orange groves of Florida.

What then is the reason? The farmers have made money, blind would they be who do not see it. Why, then, should the blacksmith listen always to the same tale that times are hard and money scarce? Does the blacksmith stick to his forge these days? If he does he is a poor, poor business man. Better far to lose all the money—or charge-up jobs—he can make in a day, than to lose the chance of getting what is his rightful due. For the love of Mike—or any other semi-profane phrase you like—get after your old accounts. Be able to tell us before the Christmas bells are calling across the prairie that you have got every cent that is owing to you, and that you have managed to pay all your accounts. "He looks the whole world in the face, and he owes not any man."

Would you have it said that the immortal Village Blacksmith was a better business man than you? I should say not!

For Horse Ailments.

A simple treatment for a sprain, says Dr. F. S. Schoenleber, State veterinarian at the Kansas Agricultural College, is to bathe the injured part in warm water for fifteen to twenty minutes. Rub until dry. Keep a pressure on the part during the process. The rubbing and massaging should be around the joints, and not upon the bony projections. The nerves and vessels are in the hollows and depressions. They need the attention.

Continue the bathing for two days. Use a good liniment, but not too much. Knead the sprained joint or tendon several times a day and bandage tightly. The kneading process reduces the inflammation by stimulating the nerves and vessels.

A cut should be cleaned thoroughly. No matter how slight the injury may seem, it shouldn't be neglected, especially during the inclement weather. It is just such little things that cause tetanus—scientific name for lockjaw.

If a horse has a cut near a hoof, pus often burrows down underneath the hoof and causes much trouble. Many of the chronic conditions resulting from cuts may be avoided if proper attention is given the injury. The treatment for such a case is to soak the foot, if possible, in an antiseptic solution for ten to fifteen minutes several times a day. Otherwise bathe the affected part with the solution. Dry thoroughly immediately following the bath. A good antiseptic to use is a two to four per cent. solution of creolin, or any of the coal tar distillates, and water. Carbolic acid is a good antiseptic, but it doesn't mix well with water.

Another thing neglected in the care of horses in the winter is the feed and water. This causes indigestion and impactions of the bowels. It may be prevented easier than cured.

A heaping tablespoon of sulphate of soda in the feed once a day will help correct the indigestion and prevent impactions of the bowels. Trouble is ahead for the horse used to considerable exercise that is put in a barn and not given any exercise. The salts will keep the blood in good condition.

Livery horses are never sick unless overdriven. Why is this? The feeding methods practiced by the livery man and the exercise the horses get is the secret. A livery horse is fed a certain amount of feed regularly, is watered regularly and curried regularly. A good brushing is received as kindly by a horse as a bath by a man.

Boys Can Do Things.

The illustration is a photograph from life of two boys forging a pair of andirons. To get good work out of boys and good boys out of work, is not common, but we believe the difficulty in nine cases out of ten is because boy nature is not thoroughly understood. It is safe to say that any active lad would like to forge a pair of andirons, but he would like to forge but one pair only. The bugbear of a boy or girl is monotony. Give them some work—work is good for them. But let the work be of short duration and change it as often as possible. Never let a lad do more than an hour's work upon one thing at one time. Monotony is bad enough for the adult, but for the young it is simply killing.

Forging a Pair of Andirons. Copyright, Underwood & Underwood.

A National Temperance Drink.

Home-brewed beer has of late years, says Harold Simpson in his recently published "Rambles in Norway," largely displaced spirits as the national drink of the Norwegians. It is so popular that it is used even at breakfast to wash down the stock dish—fried pork smothered in onions. The first sight of a Norwegian breakfast-table, adds the author, is apt to astound one. It is covered with small dishes, principally fish—fresh fish, smoked fish, fish in tins, fish in miniature barrels; there are also cold meats, and an endless variety of cheeses, of which the Norwegians are very fond.

If you lack confidence in yourself or in your goods, can you blame others if they feel the same way?

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JANUARY, 1913.

PARTIAL CONTENTS.

AFTER 34 YEARS.

This issue begins the 67th volume of The Blacksmith and Wheelwright and the 34th year of its existence. This period is considered rather more than the average duration of a generation—the average life of all who pass the age of infancy.

But if it be more than the average life of human beings, it is so far beyond the average life of periodicals as to permit of no comparison. In fact, of the something like 10,000 periodicals in the country probably not more than 100 are more than 34 years old, and far less than a score have been constantly guided during that period by the same brain and hand.

As we look backward over the long record of effort we naturally wish it were worthier. But that cannot be. The past must stand immutable for eternity. Nor can we pierce the future. We can only try to make this moment as worthy as possible. We can, this moment, command our own effort, our own self-respect, our own conscience, and neither repining for the past, nor wishing to know the future, go on for the few years remaining to us for active work, with a heart full of gratitude for past and present blessings, and especially for more friendly and loyal readers than any publication that exists.

To each and every one of them we extend heart-felt affection. May the new year find them in the enjoyment of health, happiness and hope.

WHAT BETTER PRICES MEAN.

In this issue a reader briefly refers to the "menial" place in which the blacksmith business is held by the public, and he gives low prices for work as the reason for it.

There is not the slightest doubt but that he is right. It is the rule and not the exception that in fixing prices for work blacksmiths take little or no account of the time they have given to fit themselves for doing it, of the capital—be it more or less—that they have invested in their business, of the really non-productive time they are obliged to put into it, or to the wear and tear, not only of physical personality, but of tools and machines, that constantly goes on.

In too many cases, they figure up the time it has taken to do a given piece of work at a certain sum per hour; fifty cents, seventy-five cents, or a dollar—for prices vary as widely in different localities as indicated by these figures—and indulge in the feeling that they are being fairly paid.

It is true that seventy-five cents an hour for the proprietor of the shop and the same for every full priced man in his employ will pay a fair profit in most localities; but in such cases, how often can the full time of the proprietor or of his employees, of ten hours a day, or of eight hours—which is as long as the smith should work—be accounted for at the end of the day? The taking care of the shop, the cleaning up and the consultations with customers, all take time, and this time is just as valuable as that given to the actual work, **but is it always or often taken into full account?**

It makes us weary and indignant to notice the frequent references in the press to instances where men have obtained certain distinctions yet who "begun life as only a blacksmith." In this issue, for illustration, is that somewhat familiar story of the lamented Rev. Robert Collyer, who began as a blacksmith and who closed his life as a distinguished clergyman.

But the blacksmith business is just as honorable, just as dignified, just as useful, as any other, and far more so than many. Why should it not be as profitable? Why should the fact be continually thrown into the blacksmith's face that some one started in life as "only a blacksmith," when he couldn't have made a more honorable or useful start?

"Act well your part; there all the honor lies," says one poet, and "Who sweeps a room as by God's law, makes that and the action fine," says another, and both are absolutely right. A good blacksmith is deserving of just as much respect as a good clergyman, and he should be better paid because he works harder and it requires a longer duration of time to fit him for his work. Understand: We have the highest respect for clergymen, but no higher than for blacksmiths.

The only thing the blacksmith's business needs to put it on the plane it deserves of dignity and character is better prices for work, and the smith who reduces prices or who continues to do work for less than it is worth is an enemy to his own business.

A GREAT LESSON.

A reader requests an editorial on the following quotation from Oliver Goldsmith's "Deserted Village":

"His best companions, innocence and health,
And his best riches, ignorance of wealth."

We do not often receive invitations to write editorials upon any subject whatever, and even if we did, for obvious reasons, they could not often be accepted. Nor do we feel warranted in writing frequently upon topics not intimately related to the specific affairs with which this magazine is concerned. But this poem of Goldsmith's is in its simplicity, beauty of expression and homely philosophy, the second best short poem of the English or any other language, Gray's "Elegy" being easily the first, and no matter how often it be read, it invariably inspires fresh thought and more humane impulses.

The world knows it by heart—the portraiture of the village schoolmaster and his school; the beautiful picture of the country parson, who "passing rich with forty pounds a year"—less than $200—in case of destitution was always controlled by sympathy rather than the question of the cause of the need.

"The Deserted Village" is a classic; its truths are just as absolute today as when written. Its lines beginning,

"Ill fares the land, to hastening ills a prey,
Where wealth accumulates, and men decay,"

have, with the exception of selections from the Bible, been quoted more than any others ever written, and they are absolutely true. The same may be said of the quotation upon which we are asked to comment. No one in his right mind will attempt to deny that innocence and health are man's "best companions," or that ignorance of wealth are his "best riches."

But being true, and admittedly true, why should so many live meanly and selfishly in order to die rich and contemptible? And why is it that when any movement is started to curb wealth accumulations and their consequent decay of men, it always creates strong opposition?

We are inclined to think it is due to two reasons: First, to the adulation that is today being paid to wealth and to mere money-makers; and second, to the fact that those who are sordid and yet shrewd enough to keep within the law, although devoted heart and soul to money-making only, are pretty sure to secure this spurious success which the world not only tolerates but adulates, while if generous and humane their worldly success would be uncertain.

The teachings of Goldsmith's great poem are along the lines that this magazine stands for, namely: In moderate welfare as widely diffused as possible is the key to this or any other country's greatness—to its progress, peace, content and happiness. With innocence, health and ignorance of wealth, no one need fear the "Independent Workers of the World" and their lawlessness, the dreams of the Socialists, or the desperation of labor unions.

Nature abhors extremes, and extremes beget extremes; we cannot have extremes of riches without the extremes of poverty. Thus that moderate welfare of which Goldsmith sings with such touching simplicity may well sink deep into the hearts of all men.

DON'T DO IT.

No blacksmith should think of giving up his regular business to take up automobile repairing, but he will do well to take on automobile repairing in connection with his blacksmith work, for the two go well together.

Each smith must be his own judge as to how much automobile work is likely to come to him provided he is prepared to do it. It depends much upon the locality. In cold districts the automobile is not used much in winter, although its use during this season is

constantly increasing, and in some cases even though the car is laid up, the occasion is taken to have it overhauled and put in shape for the fine weather. Yet much less automobile work is required in cold winter weather than in summer.

On the other hand, winter gives the blacksmith some of his most profitable regular work. Thus both classes of work "dovetail" together, so we urge the smith to repair automobiles by all means.

The blacksmith of all others is peculiarly fitted to repair automobiles because of his unusual mechanical ability. It is work that he ought to be able to do better than any one else.

But by all means stick to your blacksmithing. No matter what changes occur in this country, the blacksmith is never going to be superseded. There is always going to be work for him to do, and in some directions plenty of it. It may be different in some respects from the work he had to do years ago, but he need never fear that he is going to be out of a job.

THINKING AND DOING.

As a rule blacksmiths and wheelwrights spend too much time working with their hands and not enough with their brain.

Not long ago the writer remarked to a most successful dentist in this city that it must be very gratifying to him to know that he could perform operative dentistry better than any other man engaged in that profession. He replied that the doing of the work was the least of his troubles. The manner of treating a patient, the general appearance of his office, the little details of that business which have absolutely nothing to do with the work itself, he said, were of the utmost importance. This man would have succeeded in the dentist business even though he knew absolutely nothing about dentistry.

We know men who would succeed in the blacksmith business even though they were never inside a shop. We know others who are the most skilled and experienced workers, and yet they have made failures of their business.

Now it will readily be assumed that we are minimizing the advantages of being a good workman. Indeed, if there be anything that deserves the highest admiration even in this age, when knowledge is as free as water and as common as air, it is a thorough workman; and on the other hand, a "botch" deserves no consideration whatever.

But the good business man with absolutely no experience or talent as a worker will succeed in running a shop better than a first-class workman who has absolutely no business ability. Now we hear some one remark: "How can any one turn out good work if he does not know how to do it?" We reply: "If he be a good business man he will hire some one who is sure to do good work, even though he cannot himself do it." We may add, likewise, that being a good business man he will also see that the man he hires to do the good work will also be able to pass upon the quality of all the work turned out at his shop.

The point we wish to make clear is, that in many cases the smith does not give the study and thought to the general features of his business that it deserves. Work should be done right and the prices should be made right—this goes without saying, so to speak. But methods of increasing business, and methods of doing work at less cost and with the consequent less time, should be given the most careful consideration.

THE EXCHANGE OF IDEAS.

Nothing tends more to progress in any business than an exchange of ideas among the men engaged in it. We can teach each other. No one knows it all.

The exchange of opinions between members of the blacksmith craft is of great advantage. This applies to ways of doing repair work, to the fitting up of shops, to the question of prices, and concerning employees and apprentices.

In many cases, business men meet in conventions to talk over the affairs that concern them. In that way, one man gives several hundred—perhaps a thousand—the results of his experience and his opinions as to trade needs. But blacksmiths cannot easily get together this way, much as it may be desired. They live all over the country, they make small profits as a rule, and they have no money to take long journeys and pay expensive hotel bills.

But the technical paper representing them reaches a wider field, and entails no expense whatever to those who would talk to other members of the trade. We believe they should use it freely, not alone to gain information but to give it.

Paint Brushes.

The demand for white bristle paint brushes is not a wise one. In most cases such brushes are bleached and the bleaching process does not help the durability of the brush. They are expensive, and as far as one can judge they are no better than a colored or even black bristle, excepting perhaps that they show the dirt and hence to some extent make it compulsory that the paint brush be cleaned after use. Black bristle brushes, particularly for varnish, are coming into favor, as they are in every respect as good as white bristles and cost less. They are made with a beveled edge in the process of manufacture. The bevelling is, or never should be, done by grinding down the ends of the bristles, which should be left intact. This bevelling is effected in a very simple manner by placing the bristles in a little box-like arrangement which has a bottom beveled to the shape required, forming in fact a little pyramid. The painter should give black bristle brushes a trial, and be warned not to purchase at a very low price. If a black brush is bought at say half the price of a white bristle brush it is nearly certain to be adulterated, as the black bristles give great facility for using horse hair intermixed. From a cursory glance one can hardly tell one from the other, yet the horsehair is very deficient in the all-essential quality in a bristle, namely, elasticity, and it can be detected without a great deal of difficulty if a magnifying glass is used such as is employed for reading. The end of a true bristle will be found to be flagged, giving two distinct points. In other words, the true bristle tapers in its length; the horse-hair, however, is practically the same thickness throughout its length, and the end will be found to be cut off square. If a pure bristle is burnt it will curl, giving off a peculiar smell and leave no ash.

Personal.

Mr. James F. Hobart, for many years a contributor to this journal, and for the past year an inventor and designer in the research department of The Diamond Match Co., Barberton, Ohio, resigned his position with that company December 5, to become superintendent of the Hanna-Breckenridge Machine Co., Fort Wayne, Ind. This concern builds new and rebuilds used woodworking machinery and Mr. Hobart will find ample scope for all his skill and ingenuity in handling the multitudinous problems which are continually arising in his new field. The application of electric, direct connected, individual drives, will be a feature of the machines for working wood and building wheels and bodies, that are put forth by the Hanna-Breckenridge Co.

Color in Horses and Mules.

Lieut.-Col. Charles H. Woodruff, chief surgeon of the western division of the army, maintains that gray and white horses live much longer in the tropics than dark-colored horses. Almost the only ones that survive ordinary ailments in Manila are said to be white, gray, roan and light yellow; among these, the white horses predominate. Of 100 Chinese mules bought for the Philippine constabulary in 1903, only four lived more than seven years, and these had milk-white hair and jet-black skin.

Colonel Woodruff says, " There is some unknown relation between color and nervousness. On review, the grey troop-horse is actually phlegmatic, the sorrel quiet, and the bays excitable and restless. Although, like all colors, black horses are sometimes quiet, they are believed to be the most excitable of all."

THE "BLACKSMITH PREACHER."

Death of Rev. Robert Collyer at the Age of 88 Years.

The death of Rev. Robert Collyer, well-known as the "Blacksmith Preacher," and for many years pastor of the Unitarian Church of the Messiah in New York City, occurred November 30 last, at the age of 88 years.

He was long known as the "blacksmith preacher" because of the fact that he had spent the early years of his life working at his father's forge in Yorkshire, England. He emigrated to America in 1850, but before that he had abandoned the blacksmith shop for the pulpit, and had spent some months as a preacher in the Methodist Church at home. He did not remain long a Methodist. Before he had been many years in the country he became a Unitarian, in which faith he remained to the end of his life.

At the end of eighty-seven years, it was Dr. Collyer's boast that he had never been ill a day of his life. He had, however, grown too old to preach, and his congregation, refusing to allow him to resign, had made him pastor emeritus. He attributed his long age and good health to temperance—"temperance in all things," as he once said to an inquirer.

"Take good exercise, whenever you can," he added. "Don't drink to excess. Don't eat too much. When I turned forty I learned how to smoke, and I'll tell you a secret—I'm not proud of the achievement. Still, I remember the advice given me by a friend more than sixty years ago. 'One cigar a day is a good thing; two won't hurt you; three is one too many, and four is a debauch.' I never go beyond the 'hurt you' stage of smoking, and I am better for it physically."

Dr. Collyer had a quaint way of putting things, even when talking about himself. Many years ago, he gave this brief sketch of his life in a private letter:

"Born at Keighley, in Yorkshire, December, 1823. Father a blacksmith. Got some schooling at Fewston before I was eight years old, then had to work in a factory until I turned fourteen. Left the factory in 1838 to learn the craft of blacksmith at Ilkley, in Yorkshire (Olicana of Ptolemy), with the man who had taught my father. Learned the trade, buried the old blacksmith and his wife, managed the place a while, got married, joined the Methodists 1848, became a local preacher among them 1849, found the land too strait for me, and emigrated April, 1850. Got work at once at Shoemakertown, Pa., to make hammers; stuck right there until 1859. In January of that year the Methodists declined to renew my license to preach; reasons, heresy and abolitionism. Only heresy was given. Unitarians in Chicago heard of me, and invited me to quit the anvil and come out to take charge of a mission to the poor. Went out February, 1859. Unity people heard me preach and said: 'Be our minister.' Built the little wooden church that year, big stone church 1867. Fire 1871. Went to New York 1879."

The exact date of his birth was December 8, 1823. It is said that a gentleman once pulled up his horse in front of the Yorkshire village smithy, and on entering had some trouble trying to get the attention of the boy who tended the bellows. The stranger then observed that the youth had propped a book on a cornice, on a level with his head. The pages were held back by two bits of old iron. Each time he brought down the bellows, or released them, the boy caught a sentence from the book. In that fashion Collyer acquired his early education.

Four years in a little Yorkshire school was all the schooling he had. His blacksmith father was not well-to-do, and the boy, like most of the children of the neighborhood, first went to work in the linen mills. To the twelve years subsequently spent at the forge as an apprentice, he doubtless owed his strength of lungs and robust frame. All the money he could save was spent on books, for he was a great reader. Incidentally, he proved to be an excellent blacksmith, and it was often said of him in the latter years, when preaching was his vocation, that he could turn his hand to the making of a horseshoe with the best of them.

When he first began to preach it was cus-

tomary for country preachers to support themselves, and for ten years he did so. His salary as he himself once expressed it amounted to "one almanac, various little household necessaries, and ten dollars in money." At about this time his faith in Methodist doctrines began to waver. He began to form strong friendships with Lucretia Mott and Dr. Furness, heard them lecture on the Bible and rational religion, and soon found himself agreeing with their views.

"I thought the doctrine of total depravity and eternal damnation was untrue," said he, referring to that period.

Dr. Furness recommended him to the First Unitarian Society of Chicago. For twenty years he preached there, and then, in 1879, he accepted a call to the Church of the Messiah in this city. One interesting incident occurred during his ministry in Chicago. A parishioner, traveling abroad, happened to visit the birthplace of Collyer in Yorkshire, and stumbled across the old smithy, almost hidden among the newer houses of the growing town. The visitor inspected with some interest an old anvil standing in one corner of the shop.

"How long has that anvil been here?" he asked of the proprietor.

"Why," said the blacksmith, "it must have been here nigh thirty or forty years."

"Well, I will give you twice as much for it as will buy you a new one."

"Certainly," replied the puzzled smith, "but I would like to know what you want with this anvil."

"I will tell you. There was formerly an apprentice in this shop who used to work on it. That boy has now become a prominent man. Thousands love and honor him as a friend and teacher, and I wish to carry this anvil with me to America, as a memorial of the humble beginning of his life."

The bargain was completed, and the anvil is now carefully preserved by the Society of Unity Church.

Upon his eighty-fifth birthday Dr. Collyer was the guest at dinner of the Unitarian Club, in New York. Among the speakers was Andrew Carnegie, who, after pointing out that he had been born nearer Dr. Collyer than any one else present, went on to say that both he and the blacksmith-preacher had come to America about the same time.

"He became a teacher of men," added Carnegie, "and I went into business determined to make $600 a year. We both followed the prophets, but I, with my well-known preference for simplified spelling, spelt them 'profits.'"

One of the stories Dr. Collyer liked to tell was about his early life as a Yorkshire preacher:

"The text of my first sermon was, 'As I live, saith the Lord, I have no pleasure in the death of a sinner.' Oh, I thought I had a capital sermon, though. It was in three parts, each of course indispensable to the other. They didn't allow a man paper in those days, either. Well, I preached, and their curious eyes were all wide open. I thought I had done splendidly; but when half way back to Ilkley I recollected that I had left the 'secondly' out entirely. I was terribly put out about it. But the joke of it was that I had stolen my 'secondly' from a fine sermon preached by a Presbyterian clergyman named McChine! I felt the weight of that judgment upon me so heavily that I have never stolen a sermon since.

"Then they were bound to hear me at Ilkley, and the next Sunday I preached from the text, 'Some men's sins are open beforehand, going before them to judgment; and some men's sins follow after them.' All the boys were there, and the girls, too, and I thought I had made a great impression.

"The next morning, as I was going to the forge, and thinking over what a grand effect my poor little sermon had had, the old cobbler was hammering away in the shade of his porch, and he called out to me:

"'I say, lad, come here; I ha' summat to say to ye.'

"I went up to the door with a great feeling of pride within me, expecting his congratulations.

"'I heard thaa preach last night,' said he, with a broad grin on his face.

"'Did ye?' says I.

"'I did; and I think thou'll never make a preacher as long as thaa lives, Bob.'

"This was rather crushing, as the cobbler was a sort of village oracle. I think he saw it in my face, for he immediately added:

"'Now, doan't mistake me, Bob. Thou wants to reason too much. They'll never let thaa do it among the Methodists. Thou may'st lecture, but thaa can never be a preacher.'"

One of the last services over which he presided was the funeral of his old friend, H. H. Rogers, in May, 1909. Rogers had been a member of Dr. Collyer's congregation for many years. He said this of Mr. Rogers:

"Henry Rogers was one of the truest men that I ever met in my life—a man full of desire to be doing things, a man full of desire to be doing good things. I think I am sensitive to words of double meaning, cross words, words which we used to call in our boyhood 'bad words.' Since the sad news of two days ago I've been searching through my memory to find whether I had ever heard Henry Rogers say one hard word, one pained word, one unworthy word, and I stand now in this place holy to me and tell you that never in my memory did I hear him utter such a word. He was what the Holy Book calls 'A man of clean lips.'"

Correspondence

PAST AND PRESENT.

Reminiscences and Observations by a Veteran Member of the Craft.

From J. T. T., Arizona.—I have read, I believe, every issue of The Blacksmith and Wheelwright since 1890. Several times I have been tempted to try to join the long list of your contributors who are desirous of receiving and imparting information for the benefit of the craft, but, as you have no doubt already observed, my orthography—*I think that* is the word—is not all that could be desired, even by one who has no hankering after literary distinction. My knowledge of rhetoric is limited to a definition of the word and does not include any of its rules and the application of them. Writing with a pen, too, for a blacksmith, presents some difficulties. "The pen may be mightier than the sword," but I think there is yet some doubt as to whether it has been mighty enough to satisfactorily describe how that implement was made. Penmanship and blacksmithing, like whiskey and business, won't mix.

The typewriter comes in as a possible solution of the difficulties, but I am a novice in the use of one and while I am told that with practice the errors will disappear, little things are always coming up that the only remedy for would seem to be a lick with a sledge-hammer.

I "started out" as a machinist, so long ago that it almost scares me when I think of it, drifted into blacksmithing because I liked that class of work, and from that to mining through having taken up, years ago, assaying as a sideline in connection with the shop. My experience has been of wide range, varied in character, and covers a long period not entirely free from as many "downs" as "ups" incident thereto, from which I have emerged with a fair degree of satisfaction. I might suggest an idea or impart information that would be of interest, from some standpoint or other if I possessed the ability to "deliver the goods" in a condition to be of utility.

Every one is said to exercise some influence, for either good or bad. It rests with those of wider experience and consequent better judgment to draw the distinction between the two, eliminating the bad and serving as a medium for the dispensation of the good. The editor's position in this respect is not sufficiently realized, but it is a position involving responsibilities far superior in importance to any position affecting social and moral conditions.

But it was not along these lines that I intended to write. In fact, I had no particular subject in view. Sometimes when I pick up a particularly interesting copy of some trade journal and read over the correspondence or contributions, which, as is often the case, contains the very information that I want in connection with some work that I happen to be engaged in, I become enthusiastic, or, self-conceited, I don't know which—and wind up with a determination to "say a few words" myself. The result is usually a long string of apologies, none of which "fit." Not having written for publication before, the "first attempt" is disgustingly dumped into the fire, and that is the last of it.

If this escapes a similar fate at the hands of the editor it will be due to the fact that he is the character of man I have him "sized up" to be. For, in looking over the very old files of some trade journals, and noting the material that manifestly should not have escaped the waste basket, and the display of lack of information on common-place subjects he must certainly possess a patience that would make that proverbial feature of Job's character resemble, by way of comparison, the flash of a lightning-bug in the light of the Statute of Liberty.

However, laying all jokes aside—and I guess that is what will become of this one—the perusal of a twenty-year-old copy of The Blacksmith and Wheelwright, in comparison with one of late date is an interesting pastime. But one objectional feature, which to me seems to grow more apparent every year, is the fact that it is not published often enough. On the principle that half a loaf is better than none, I have stuck to it and believe that a large percentage of its readers are doing the same thing. We just go merrily hammering along, thankful for what we get, pleased with the rapid advancement in our line generally, and consistent enough to credit no small part of our improvement to ideas derived from such publications as The Blacksmith and Wheelwright.

Referring again to a comparison of the old and late copies, improvement is marked everywhere. Subjects are discussed in a way indicating that they have been given thought, with a view of bringing out the principles involved, and not summarily disposed of with a flat statement that a proposition is this, that or the other way, without assigning any reason or advancing an idea as a basis for arriving at such conclusion.

Even the editorials (apologies to the editor) seem to possess a wider range of view. Topics are treated in a manner that indicates a more practical knowledge of the subjects under consideration and a desire to impart that knowledge in the interest of the craft.

And the advertisements. I have often wondered if the average reader of the popular trade journals realizes and appreciates the fact that some of them are veritable "bonanzas" of useful information in that respect alone. The extent to which it is conducted is one of the evidences of the advancement that is so gratifyingly evident in all trades, especially, in that of the long over-worked, under-paid but faithful blacksmiths.

However, after all, "the world is just about what we make it" and as a rule, treats each individual just about as he deserves." If we poor begrimed, toiling, unpolished mortals come in for more than our just allotment of satire, either good naturedly or otherwise, we are, in the main, responsible for it because we persisted too long in depending upon main strength and awkwardness to lift us out of the rut, and in clinging to methods because "dad" did it that way.

For Driving Spokes.

From Graham Welch, Missouri.—I enclose sketches of a machine I made myself for filling wheels with spokes. At the point A, in Fig. 4, is shown a crutch head bolt, with the thread cut well down towards the head. B shows the spoke; C is the hanger; D, the lever; E, trigger; F, foot treadle; G, anchor bolt; H, catch for foot treadle; J, top piece, 2x4, made of any hard wood; K, fulcrum, and L short foot treadle (points G, H and J are separately illustrated). See Figs. 1, 2, and 3. I use this machine by first taking a pair of dividers and measure from nose of hub, and see if it is the same distance to mortise all around the hub;

if not, I make it so by driving down the "nose band" until it is the same distance from the "band" to the "mortise" all around.

Put top piece J on hub, bolt the fulcrum K on the top piece, put the trigger E in slot of

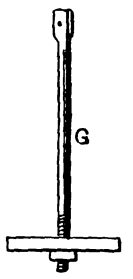


Fig. 1.—Anchor Bolt.

the top piece, put lever D in fulcrum, hang spoke on hook at end of lever, hang a wire in eye and hook end of hanger C to foot treadle L. When all is ready to work, press down on foot treadle, put trigger E in notch in under-

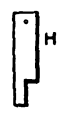


Fig. 2.—Catch for Foot Treadle.

side of lever. After setting bolt A by means of a thread and nut, so as to get the amount of dish you want.

When your spoke is ready to drive place it under the crutch bolt A, bring the hook on

Fig 3.—Top Piece.

under side of hanger C to under side of spoke, release trigger from notch in lever, and your spoke is ready to drive. When you are ready to drive the next on, release treadle from catch for foot tread H, which allows the hub to turn

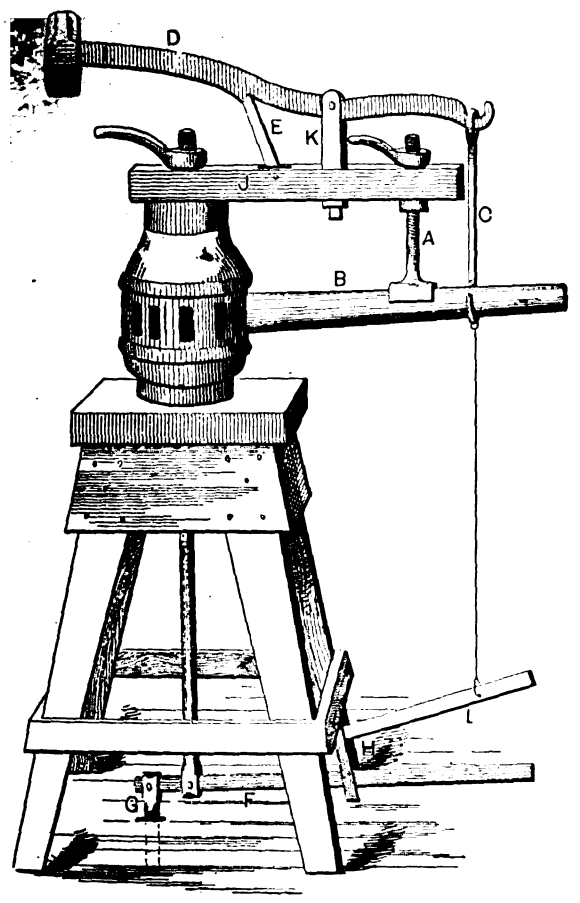


Fig. 4.- The Gauge Complete.

on table, also allows the machine to be set on hub for next spoke. You can drive spokes with this machine as true as can be done with the best machinery.

Knowledge, Tools and Labor.

From Orlando W. Hanks, Vermont.—It is with much pleasure and profit that I have read The Blacksmith and Wheelwright. I would like to say a few words to the brothers of the trade. I wish to speak of increased knowledge, tools and labor.

We may increase our knowledge by observation, study and reading. Examine with care the work which has been done by other mechanics. They may be able to give you some good ideas though they are not the masters of the art. Study the different ideas which you have about doing work. You may be able to improve them after careful study. Read a good trade paper and thereby learn what others are doing and how they do it. This paper is a good one, pays about 300 per cent. on your investment.

What about tools? Use good ones. Keep them repaired and as good as new. The knowledge gained by reading may help you to make many good tools to lighten your labor or hasten its completion.

I asked the clerk in a general store for a rip-saw the other day and he threw out one for 43 cents. Do you think I would have been satisfied with it? I do not like to gamble on the quality of so cheap an article. One chance in 1,000. It might have been good but I should rather have paid $2.43 and had the stamp of quality on it.

One thing I would advise any brother smith to do is to get power in his shop. Now, I might not say this but I have a 30 h.p. water wheel in our shop, and I know you cannot afford to run drills and grindstones (I might name a dozen machines), with human muscle for the propelling force.

If you are situated where you can get electric current, it is the best source of power in a shop which wants a small power and that at irregular intervals. A gas engine does almost as well. One smith told me he would not have one in the shop for they never run when they are wanted. However, this is not so. They are ever ready to run, or else it is your fault. Should you have trouble, look in the old Blacksmith and Wheelwrights which you have and you will find some information which will help start that balked engine.

I have enjoyed the pictures of shops, also plans, very much and some day will send a plan and picture of this mill over a century old.

Welding Information.

From B. C. Lester, Nebraska.—Well, I see Brother Hobart has again brought up the subject of steel welding. Now Brother Hobart, I have myself read what the so-called experts say regarding file steel and that it is not possible to weld it without ruining it for any cutting purposes. I have also read where they claim that it is impossible to even forge razor steel, but Mr. Hobart I have, and can, take the finest razor blades and weld them together. I have a blade that I took razor steel and soft steel and made. I first shaped my soft steel and then welded in razor steel between leaving the razor steel come down far enough to draw down to a cutting edge with the soft steel in the back of blade, and this steel is just as good as it ever was and makes a fine little razor when ground down and honed and stropped. If Mr. Hobart doubts this statement I will weld a piece of razor steel together or to any other steel that he desires if he will send me the steel and he can judge for himself whether the steel is welded or not or if it is burned and ruined as he said about file steel. And to still further test this point, I have taken a piece of good file steel and a piece of low carbon tool steel and welded them together and I then cut it through the weld and used this end for the bit end of a turning tool for a lathe. After grinding to a diamond point and hardening and tempering it was impossible to tell where the weld was until after being hardened. There was a very faint line that shows where the two steels are united, this line being almost impossible to see with the naked eye. This tool I still have and it stands the work too.

A Home-Made Pressure Drill.

From J. D. Sieberling, Iowa.—I still hold that the blacksmith trade is one of the best a young man can go into today. There are altogether

Fig. 1.

too many young men today who want to get a living by their wits, and that kind of business seems at last to be so much overdone that it is neither profitable nor respectable. The smith

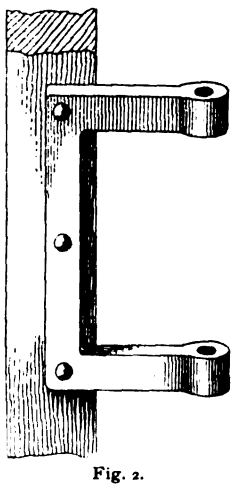


Fig. 2.

who can weld and temper steel and who can make some of the tools used in a shop need never want for a job at good wages, for it is safe to assume he is a good workman and un-

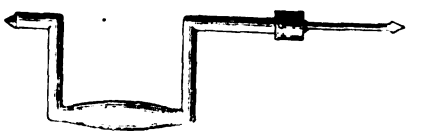


Fig. 3.

derstands his business. Although drills may be bought at less cost than they can often be made, to make one during spare time brings the cost down to very little. I enclose some sketches

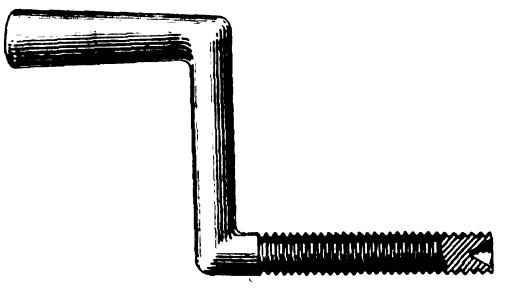


Fig. 4.

that I think will show how to make one, for it is a very handy tool about the shop. Fig. 1 shows the bar for a pressure drill after it is welded. Fig. 2 shows the bar bent to the shape of the frame and secured to the drill post. Fig. 3

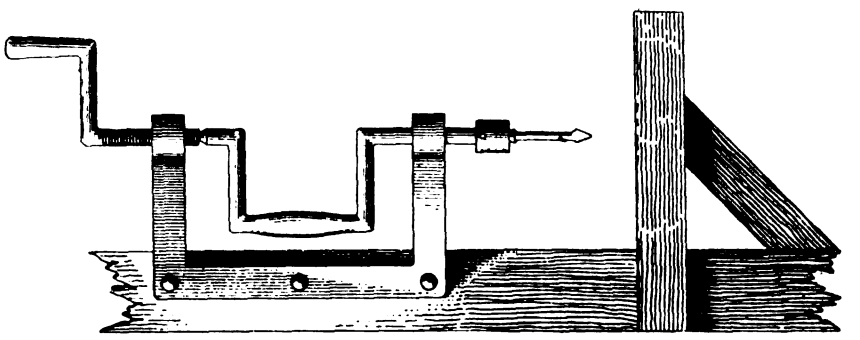


Fig. 5.

shows the drill stock. Fig. 4, the hand crank. Fig. 5 is the drill complete.

How He Became a Horseshoer.

From W. T. Thompson, South Carolina.—My first effort at shoeing was due to the love I had for a young thoroughbred horse that the best skilled smiths had disappointed me in three efforts to shoe properly. After the third shoeing having trotted home a distance of three miles, with occasional stumbling and limping, with his ankles bruised and bleeding, I was disgusted. I said, "I have paid $1.50 three times for what I did not want." I sat down and thought and thought again, and finally reached a decision that I would myself

shoe my horse. With an early start and with very crude implements, I commenced my job. Saying to Mike, the colored boy, "Hold this horse and see a horseshoer born." The first thing I used was a pocket rule. Carefully measuring the hoofs all round from top to bottom, I found them out of balance from ¼ to ¾ of an inch one side longer than the other. I removed the shoes, trimmed the hoofs to an even gauge, then carefully reset the shoes evenly balanced on each side of the crease in the frog pointing straight to the front. I thus discovered the wonderful secret of the necessity of a proper balanced foot and was master of the job. However, I found it hard work and I was bathed in perspiration, but the shoer was born and standing on his feet. It was not my purpose to become a smith but with good success in shoeing my own horses and mules, I received such strong solicitations from my neighbors to do their shoeing and soon entered the field of craftship. Now for the benefit of those who are just entering the field of this honorable profession, I will say a few things on shoeing.

Don't try to see how quick you can shoe a horse. Although dispatch is necessary it is not a matter of time but of quality. Remember, that you are painting a dumb but moving sign that will help or hurt your business. Use the best material always; do your best on every job and charge well for it. People like to pay when they get something worth while but they don't like to pay $1.50 for limping horses. It is extreme cases where it is a necessity to use side and toe weight and bar heeled shoes. You must thoroughly acquaint yourself with the construction of the horse's foot without which you will do some guesswork and jump at erroneous conclusions. You should be able to detect deformed and injured feet for it is hard to turn nature out of her path. Now where the hoof is worn down until it will not permit paring to a level, the side weight may be necessary to balance. To balance the foot it may be better to use a side and a half plate until the hoof can be leveled and a plain shoe put on. Where the horse over-reaches it may be necessary to use toe weight shoes on front and very light shoes behind or plain shoes behind and three-quarter plates in front. Never cut the frog unless it is ragged or torn or of an unnatural growth. Rasp down the horny high heel until you get a reasonable weight—not extreme weight—on the frog then use light plates on the toe until the heel and frog even to a uniform shape then use plain shoes and reset often. Remedies for corns are very few. I will give you the remedy that I gave the college president's wife when she asked me what would cure a corn. My answer was, "Remove the pressure and let it die and scale out." Some smiths take a wall bruise for a corn. The corn has a rich yellow cast but the wall bruise has a dark and bloody appearance. Wall bruises have several causes, but one serious cause is improper trimming of the hoof. The shoe does not have an equal bearing and bruises the inner wall. Remove the shoe a few days and the horse will soon recover from lameness then level the surface and replace the shoe. After looking in the bottom of the horse's foot for thirty-five years I have decided that there is a great deal to be discovered for the good of man's best friend.

I have had sweet communion for twenty years with the craft from the pages of The Blacksmith and Wheelwright which in my opinion is the best journal of its kind published in the world. It is the best that I have seen and I have seen many seeking for the best.

I hope to say something in the future about shoeing deformed and injured horse feet, also toe and side cracks, bar heel shoes and rubber pads. I wish you all a happy Christmas and a prosperous New Year.

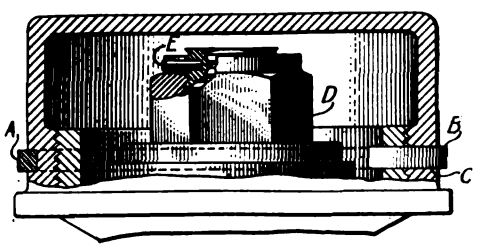
Yes, a Cobbler Could Do It.

From R. K. Powell, Kentucky.—In answer to Coffman Bros. in regard to the proper draw to give their tires, it depends some on the make-up and shape of their wheels, but usually about one-half inch is the proper draw for the wheel they describe.

I will also give the brothers my ideas on shoeing a horse that interferes. It is supposed by the average man that a horse interferes, or cuts his ankles, with the calk of the shoe. This is a mistake that any man ought to be convinced of, if he will endeavor to place the calk of the shoe against the opposite ankle. A horse that turns his toes well out will seldom interfere, but one that walks straight, or with toes slightly turned in, is more likely to do so. These facts alone ought to convince any man that a horse does not interfere with the calk. Now what is the cause and what is the cure? Notice the foot closely and nine times out of ten you will find the inner wall thinner and lower than the outer wall. In other words, the foot is run down and when placed upon the ground the leg is bowed slightly in, and with the fullest part of the opposite foot the horse interferes. The remedy is simple, but a cure cannot be accomplished with a single shoeing without the aid of a special shoe. Rarely level the inner part of foot and pare the outer part all it will bear. Place the shoe straight with the frog. Let it be full on inside with a wide heel. Have the shoe well rounded with no short crooks. See that the foot is well polished and clinches well driven down. It will take several jobs like this to restore the inner wall to its normal size and strength, then the trouble is over. I remember a doctor who came to me with a very fine saddle-mare that interfered badly. Her feet were in the shape I have described. I shod her until such time as her feet were restored but then lost the job, because a cobbler closer to her home could shoe her.

The Hub Caps.

Owing to their insecure fastenings, bolts, nuts and hub caps of automobiles often get lost off. Hub caps are great offenders in this regard, and designers seem to pay little attention to having them properly and permanently fastened. No one should run his car long after a hub cap has been lost off. If he does he is liable to ruin a



To Hold the Hub Cap.

set of high priced ball or roller bearings, and possibly have the additional bad luck of having the wheel part company with the car. The illustration shows a hub cap that will not stay on merely because it is screwed up on the threaded portion of the hub, and it is suggested that a wire lock A in a groove chased in the hub cap, extending around the circumference with a bend W, through registering holes H, will do the work. Nor is it difficult to make this provision in a given case. The best way to lock on the nut D, is to castellate it as shown, and after drilling a hole through the threaded part of the spindle in the region of the castellations, a cotter pin E may be passed through the hole, engaging the wings of the castellation, after which its ends may be spread so that it cannot back out. A matter of this kind is not a momentous one, but if the hub cap or some bolt or nut falls off, there is no knowing what it may lead to.

Cost of Bad Roads.

Investigations have established the fact that the average cost of hauling per ton per mile is 23 cents; on stone roads, dry and in good order, about 8 cents; on stone roads in ordinary condition, 12 cents; on earth roads containing ruts and mud, 39 cents; on sandy roads when wet, 33 cents; on sandy roads when dry, 64 cents. A reduction in the cost of hauling from 23 cents to 12 cents would mean an average saving of over $250,000,000.

The American people are paying about $1,000,000 a day as a penalty for their refusal or failure to get into the good roads movement. The $250,000,000 becomes more significant when it is remembered that it is a loss which comes direct from the pockets of the farmers. The railroads do not pay any particular attention to the condition of the country roads. They take the wheat, corn and other farm products at the railway station and the producer gets the value, or market price, of the shipment. If the farmers of the nation are paying $1,000,000 a day more than they should in the cost of carrying their product to the shipping point, it requires no expert to show that if they had good roads they would be receiving $1,000,000 a day more for their products than they are now receiving, or about $3 a year for every man, woman and child in the nation.

Every cent saved in the cost of transportation is a cent added to the price the farmer receives for his products. The addition of $250,000,000 a year to the income of the American farmers would mean a great strengthening of the purchasing power of the agricultural class and a marked increase of agricultural assets. In addition to this direct gain the good roads add a value to very acre of farm land in the nation.

QUESTIONS FOR OUR READERS

You are invited to ask questions freely on all points pertaining to your work. Our subscribers who have solved successfully the problems which confront you will take pleasure in imparting the results of their experience for the benefit of their fellow-craftsmen.

Rules for Axle Work.

From Theo. Chewning, Missouri.—Will some one tell me through The Blacksmith and Wheelwright a correct and simple way of setting skeins on axles, so the wheels will have the right gather and stand up right. Also, how to get the length of an axle with the different lengths of skeins, so the wheels will track. I would like to have a simple and correct rule for this axle work.

A Steamboat Rudder.

From Emile Alexis, Louisiana.—I would like to ask some of the readers if they can tell me how to build a steamboat rudder. Please give full explanations. I will be very much obliged for information of this sort.

Leaf Springs, Their Characteristics and Methods of Specification. Published by the Sheldon Axle Company, Wilkesbarre, Pa. Edited by David Landau, their consulting engineer. Price, $2.

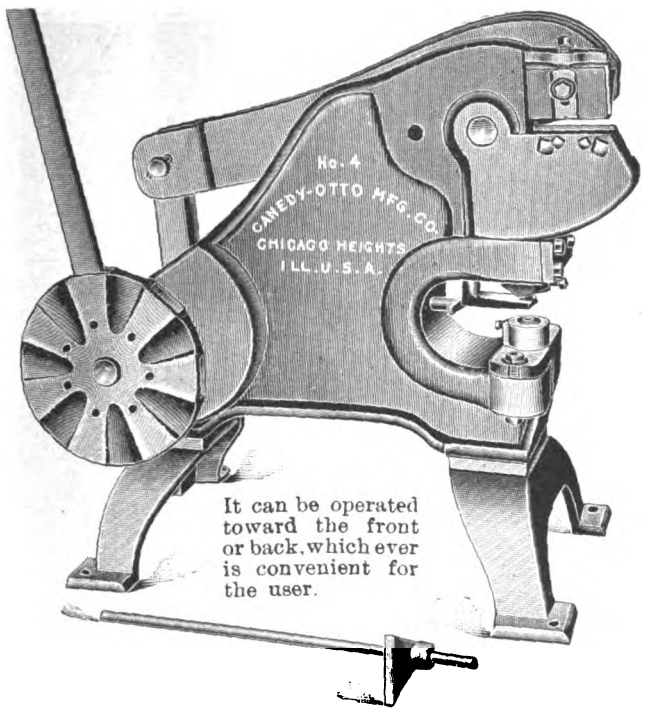
The springs of a vehicle are not only one of the most important parts of its construction; they are possibly the most difficult part to construct, and this is specially true in the case of automobiles where the strain they are called upon to undergo is terrific. This being the case, a scientifically designed spring is not only essential to safety and comfort, but one of bad design and of improper material is expensive even though it costs absolutely nothing.

Yet it is surprising how little printed information is extant concerning this important subject. Not even the Encyclopædia Britannica, that last word of universal knowledge, has anything about springs, or, at all events, if its ponderous tomes contain anything about them, it is so buried up with other subjects as to be lost. This work, then, is not only instructive to the designing automobile engineer and wagon builder, but owners and users will find it of value.

The author says in the preface: "The object of the work is to enlighten the engineer as well as the user, by elementary and logical discussion of the details of construction and the proper form of specification, as applied to leaf springs used on power-propelled vehicles. Impartial treatment has been the aim throughout, and to attain this end, general statements are made. Whenever it was thought that a principle or statement could be made clearer it is supplemented by line cuts, and typical examples taken from practice. Criticisms have been made in their proper places and reasons given therefor. The treatment is thus impartial and, in this respect, the present work fulfills the mission of a text-book. This will enable the subject matter to be applied, as was intended, to the study of any maker's product."

The foregoing gives some idea of the scale of this valuable work. It contains over 100 pages, and is well illustrated, bound and indexed. The price is two dollars net, and it can be obtained by addressing the Sheldon Axle Company, Wilkesbarre, Pa.

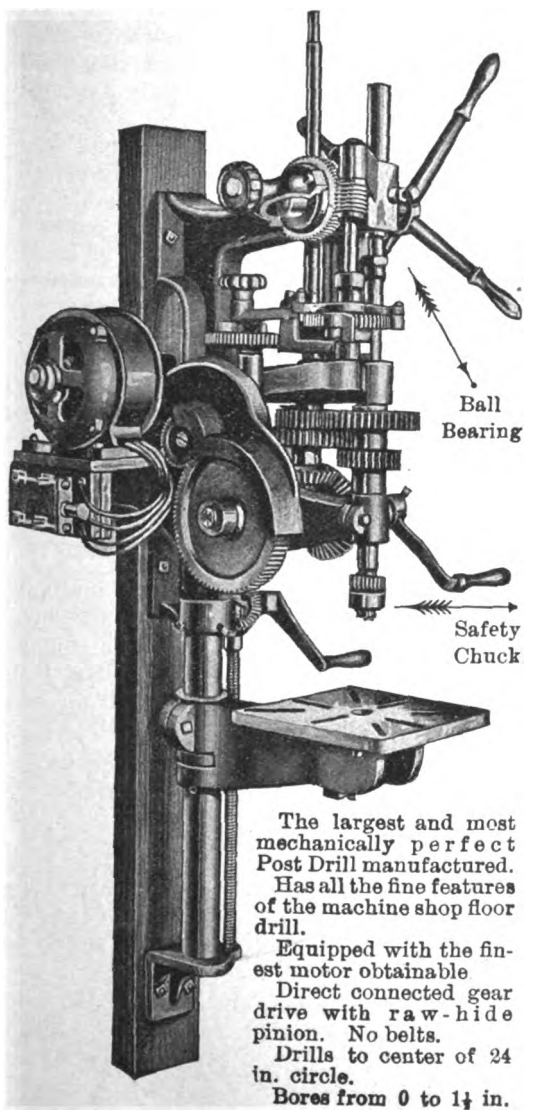
No. 4 Combination Punch and Shear



Will shear ½x4-in. flat bars.
Will shear 1-in. round bars.
Will punch ¾-in. hole in ½-in. plate
Depth of throat 6 inches.
This machine is furnished with ½-in., ¾-in. and ¼-in. punches and dies, also a lever bar.

FORGES BLOWERS

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 raw-hide pinion. No belts.
Drills to center of 24 in. circle.
Bores from 0 to 1¼ in.

When choosing your blacksmith shop equipment why not get the best—

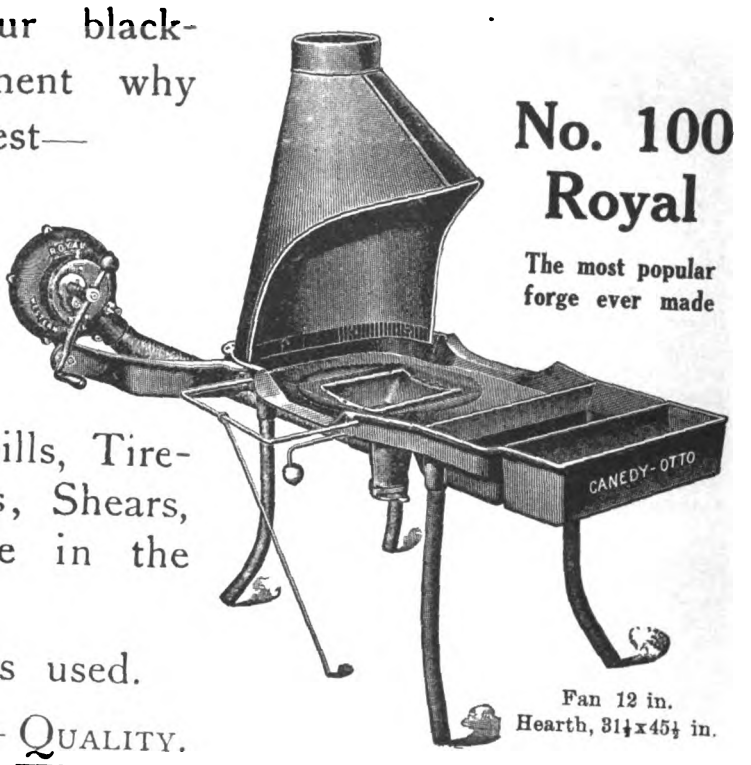
CANEDY-OTTO

It costs no more.

Manufacturers of the finest line of Forges, Blowers, Drills, Tire-Shrinkers, Punches, Shears, produced anywhere in the WORLD.

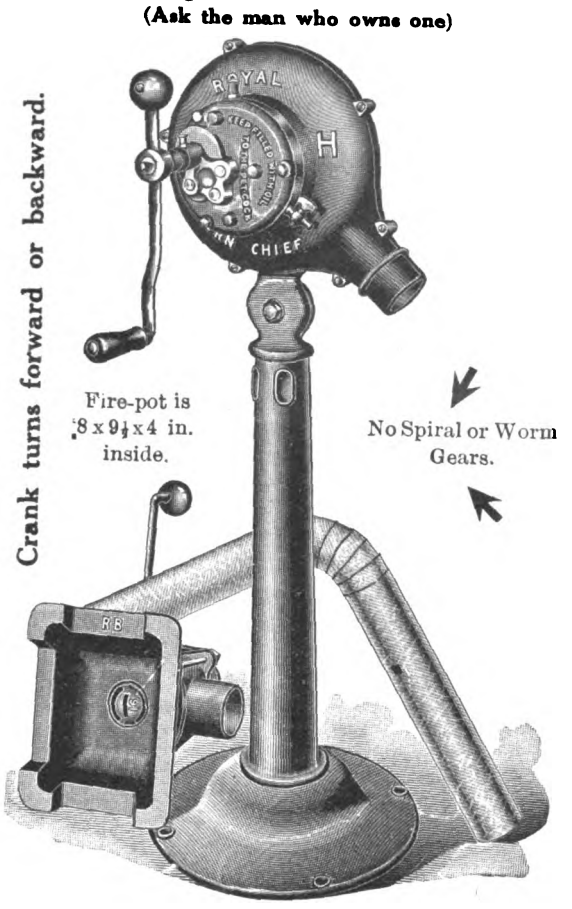
Once tried, always used.

There's a reason — QUALITY.



Royal Blower

(Ask the man who owns one)



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Over 200 different styles of TOOLS. We can suit every need.

Send for Catalogue

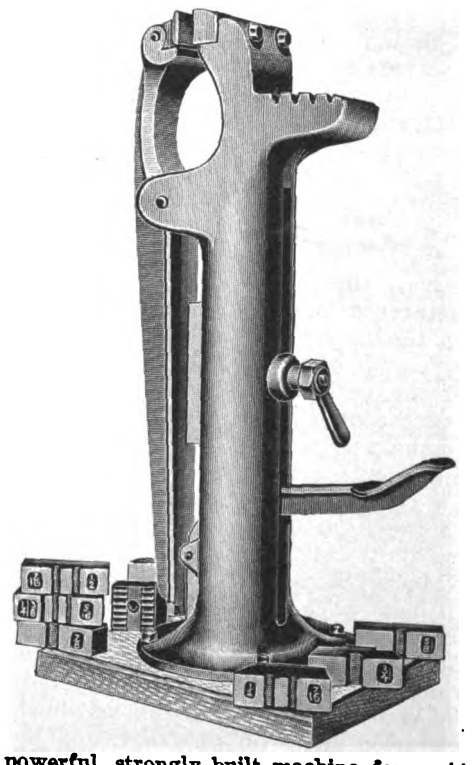
Give name of supply dealer or jobber.

CANEDY-OTTO MFG. CO.

CHICAGO HEIGHTS, ILL.

PUNCHES SHEARS

Canedy-Otto Foot Vise and Bolt Header



A powerful, strongly built machine for making bolt heads, forming calks, shaping tools, and everything where a first-class quickly operated vise is needed.
Furnished with or without dies of the following sizes: ¼ 5/16, ⅜, 7/16, ½, ⅝, ¾.
The best of material and workmanship used throughout.

Blacksmiths' Supplies.

The Dealer, Credits, Business Building, and the Parcels Post.

Although the supply man is an important ally of the blacksmith, the blacksmith is a most important auxiliary to the trade of the supply man.

It is true that he extends to the blacksmith credit that the manufacturer could hardly be expected to afford, but on the other hand, the blacksmiths are perhaps rather more worthy of credit than almost any other class of business men. If they were not as a class substantial and honest they would not be blacksmiths. The trade is not one to attract rogues, speculators, or those who imagine there is, on the whole, a better way to get a dollar than to honestly earn it. Such a class is a good one to deal with.

But there is scarcely any other class of business men who require credit to the extent that the blacksmith does. His customers are largely farmers, and these need credit even more than blacksmiths. It would, therefore, be impossible for him with his limited resources to continue in business at all unless he could buy his tools, machines and other supplies on credit.

The dealer is also useful to the blacksmith because he can visit the dealer's store and personally inspect and select the goods he wishes. This is not the case wtih either the manufacturer or with the mail order man, where purchases, as a rule, must be selected from catalogues only.

The manufacturer has two methods of marketing his goods. One is known as "regular," and the other as "irregular." The regular method is the well established one of marketing his product through the regular retail dealer, and the irregular one is that of selling direct to the customer. It is claimed by some that the goods sold through the regular dealer have to be of a higher type than those sold direct. In the first method we find the dealer with the sample of the tool or machine on hand, which he shows and demonstrates to the purchaser, so that the man sees what he is getting when he buys it. Where they are sold direct, the purchaser buys from the description which flows from the mail order man.

Most manufacturers of blacksmith tools or supplies who have built a high-grade article and have obtained a reputation for high-class goods have them marketed through the supply man, and the mail order way is not used or needed to dispose of the product. Wrong impressions are often made in the case of tools or machines sold through catalogue houses. When trouble arises in the case of a machine a mail order manufacturer is sometimes obliged to write the customer that if he will pay an expert's expenses he will send one to him, or if he will ship it back to the factory, he will try to eliminate his troubles. This proves a very expensive experience to the customer. The troubles of a tool or machine in reality are small when a man thoroughly understands it, and such information is easily gained through the regular dealer.

Moreover, the local dealer will give the manufacturer a larger volume of business in his own territory than the mail order system possibly could, while the local dealer's knowledge of the personal character and financial ability of the man in his territory is of value to the manufacturer.

In addition to this, the manufacturer receives a certain amount of free advertising through the local dealers that he would not get were he to do business on the mail order plan. The advantage of having sample supplies on hand with the local dealer is a great factor in an advertising way. There is no endorsement of a blacksmith tool or machine so strong and conclusive as that of a personal talk with the man who has an established business and reputation in his own locality, and knows what he is talking about. If the local dealer in blacksmith supplies knows what is required and what constitutes merit in any tool or machine, naturally his word goes for something. The local dealer builds up business; in many cases the mail order system tears it down.

In the long run the blacksmith or wheelwright will find that if he wants to get the best value for his money, the best satisfaction in the kind of supplies he purchases, and the opportunity of substitution in case the article purchased is not just what he expected or desired, he must deal with the supply man in his own locality or with some one whom he can meet face to face and not by mail at a distant point.

Just what effect the Parcels Post will have on the supply man it is difficult to foretell at this time, but one implement and carriage dealer says:

"Here is an opportunity coming. Get this Parcels Post worked out to your advantage. We have been fighting Parcels Post out in the open. We thought we didn't want it, and now we have it, and it is the best thing that has happened to us as local dealers. We have a Parcels Post that works to your advantage, and you ought to take advantage of it. For instance, in a fifty-mile zone, 5 cents for the first pound, 3 cents for the next pound, and so on. Take, for instance, Wisconsin. From Chicago to Waukegan, 10 pounds would cost 35 cents. They are paying 25 cents express. There is not any advantage there to you as an implement dealer. Chicago to other Wisconsin points, 10 pounds cost 42 cents. The next zone, the fellows out near Minnesota, 10 pounds would cost 52 cents. Out in Minnesota 10 pounds would cost 62 cents.

"Here is the proposition. For every package you send out to your territory you can send a pound for 5 cents, and 1 cent for each additional pound, and it is up to you to get all that mail order business, because you have the other fellow beat. Let us take advantage of it."

The foregoing is indeed optimistic. Let us hope it will work out that way. In any event, it will put the supply dealer and every country merchant "on his metal." The Parcels Post seems to have been designed to advance the interests of what may be called semi-local delivery, and if it proves really to have this effect, it will help rather than hinder the local supply houses and the retail merchants.

POWER

In this department an expert will reply to any questions our readers may propound as the result of their experience, or inspired by a desire to become acquainted with the value of power in the shop. All inquiries should be addressed to the Editor of THE BLACKSMITH AND WHEELWRIGHT, P. O. Box 654, New York City.

JUMP SPARK IGNITION.

How to Trace Trouble and Insure Constant Working Efficiency.

A. L. Brennan, Jr., in Ignition-Carburetion-Lubrication.—Many owners of small internal combustion motors rely upon their own ingenuity to keep their machines in working order, and in the majority of instances they are rewarded by fairly good results. On the other hand, there are a few who are constantly troubled by a certain auxiliary feature of the motor—say the generator system, for instance. Although high tension ignition is very simple when understood, still there are times when it offers most complicated problems to even the experienced, and so it is but little wonder that it is a source of constant annoyance when not understood.

In learning the why and wherefore of ignition principles, it is not advisable to memorize a lot of fixed rules and then try to recall the proper one in case of trouble, but to acquire a fundamental working knowledge of how, why, and when a spark should occur within the combustion chamber of a gasoline motor. Irrespective of the number of cylinders a motor has, or how seemingly complicated the wiring may be, still there are direct ways to ascertain within a very short time just where the trouble is located.

We will first consider the ignition troubles, their causes, symptoms, and remedies, of jump spark outfits using primary batteries to supply the initial electrical energy.

In tracing an existing trouble in the ignition system the speediest result can be had by following what is generally known as the elimination process. For instance, suppose you are operating a single-cylinder motor which has the ordinary jump spark ignition, that is, a vibrating coil, and you attempt to start but you find, after performing the several duties preparatory to starting, that the motor fails to take up its cycle. Suspecting that the ignition is at fault, you proceed to locate the trouble. Now one might surmise a loose connection in the battery box and go to the trouble of getting at the dry cells, which may be in a waterproof box with the cover securely screwed on; and when one finally reached them he might find the connections in good order. Or perhaps one might attribute the cause of trouble to a faulty spark plug, and on substituting another, fail to get any different results, simply because the fault didn't exist in the spark plug to begin with, and therefore there could have been no other result.

Now to go back a step, suppose when the motor fails to start, one were to turn the engine over until the firing point is reached, and then with switch in contact position, that is, with the circuit closed, note if the coil trembler vibrates. If it does not vibrate, the trouble is probably in the coil itself, or even further back, as will be pointed out later. But suppose the trembler works correctly, then it is evident that the circuit is complete up to and including the coil. Therefore one should look for the trouble in the secondary wiring, spark plug, or distributer, if one is used.

The principle of this method is extremely simply, as shown by the foregoing example. There are other units of the system which will give trouble which might point to the coil or plug, and these are the primary wires connecting the timer to the coil, the purpose of the timer being to close or complete the circuit at the txact time the spark plugs should fire.

There is a great deal of difference between an "open" circuit and a "short" circuit. Suppose one were attempting to start a motor and after repeated cranking he were to find he had forgotten to close the switch—that would be an open circuit. But if the fault could be traced to defective insulation somewhere which allowed the current to "ground," that is, be completed short of its designed destination, that would be correctly called a short circuit. Short circuits are not so liable to occur in the primary wiring when the current is of low tension, but in high tension leads which conduct electricity after it has secondary force, short circuits are very liable to occur, the most mystifying ones being the partial short circuits which sometimes take place when two or more high-tension wires lie together, which situation, if the insulation is weak, will allow part of the current from the wire directly connected to the coil to leak to the other high-tension wire.

Testing Gas Engine Batteries.

Gas engine users, having battery ignition outfits, should test the batteries at least once a week by loosening the wire from the engine igniter, and tapping it on the post where the wire from the battery or coil connects to the engine frame. This tapping should show a fat, bright spark; if not, proceed as follows:—

See that all connections are clean and tight. Examine switch, if one is used, and see that the blades are free from grease and dirt, and make a good connection.

Remember the wire must be clean and bright. The insulation must be off of same where it is attached to a post. There must be no loose joints.

Examine the spark coil and see that the terminals or connections where the wire joins same, do not touch each other. If the coil is wet with oil or water it will not work.

Tuthill Carriage & Wagon Springs.—The Tuthill Spring Co., 770 Polk Street, Chicago, Ill., make a specialty of carriage and wagon springs. This company was established in 1880, so that by this time it knows about all there is to know about the manufacture of springs and it is safe to say that they have kept up with the times as to the quality of their goods. Their prices are reasonable and they deliver promptly. For further particulars write to the company as above.

Witte Engines.—Hardly any reader will fail to notice the attractive announcement in this issue of the Witte Iron Works Co., 2440 Oakland Avenue, Kansas City, Mo. This company makes a 6 H.P. engine, just about the size which can be used to advantage in the average blacksmith shop, for $108.95. But consult the advertisement of this company on another page and write for further particulars, stating just what you want and your letter will receive prompt attention.

Green River Screw Plates.—The Wiley & Russell Mfg. Company of Greenfield, Mass., have an attractive half page announcement in this issue directing particular attention to their Green River Screw plates. They make a great variety of other screw plates and blacksmiths' tools and would like to send their catalogue 350 to every reader who may be interested. Their goods are for sale by the trade in every part of the country.

Ideal Lawn Mower Grinder.—Every one of our readers having power will find it to his advantage to investigate the merits of the Ideal Lawn Mower Grinder manufactured by the Heath Foundry & Mfg. Company of Plymouth, Ohio. See announcement on another page. This machine grinds all makes of mowers perfectly in 15 minutes without removing wheels, ratchets or reel-knife. It will also grind straight blade without removing from mower. It is fully warranted and sold on easy terms of payment. Write at once for full particulars and mention The Blacksmith and Wheelwright.

The Right Tire For Service.—The United States Tire Company, of New York, have an attractive announcement in this issue which should interest every reader. In nearly every blacksmith's shop the putting on of rubber tires is an important part of the business done, and we can recommend the solid tires made by the United States Tire Company as thoroughly reliable and dependable. The old Hartford and Morgan and Wright brands are made by this company, and most of our readers will remember the sterling qualities of these two standard brands. You ought to carry these in stock and recommend them to your customers. Further particulars will be gladly furnished if you will write direct to the United States Tire Co., New York City, and mention The Blacksmith and Wheelwright.

Simonsen Hot Trimming Shear.—This is a tool which ought to be in every blacksmith shop in the land, and would be if the blacksmiths understood its value. Many supply houses sell it. If your dealer does not have it write direct to the manufacturer, the Simonsen Iron Works, Box 671, Sioux Rapids, Iowa. See advertisement in this issue for supply houses selling this tool and for further particulars.

Wet spark coils can sometimes be repaired by putting them in an oven and baking at a heat not exceeding boiling water, until thoroughly dried out. Be careful not to have heat great enough to melt the compound in which coil is immersed, or it will split the wooden heads.

Remember the zinc of one battery cell must connect to the carbon of the next. The zinc terminal is always the post on the outside can or shell on a dry battery and the carbon terminal the one on the black rod sticking up in the middle. If batteries are connected up any other way, they will not work properly.

To test the batteries to see if they are strong enough, take a very fine copper wire or a pin and hold it very firmly against the post on the zinc. Let the pin point just touch the black part of the carbon but not the brass post. If a small puff of smoke is seen and a tiny spark, or the pin seems warm, it is an indication that the battery is all right. Don't hold the pin on the carbon except for a few seconds. If no sign of spark can be seen, batteries are probably exhausted, and a new set should be procured.

It is always better to have an ammeter or measuring instrument for testing batteries, **and they should be tested every week. Batteries showing less than 6 to 8 amperes will not give good service.**

Read your engine instructions carefully and don't try to use more batteries in series than the makers recommend.

A slow speed engine-timed magneto, built into the engine, eliminates all battery, switch, and wiring troubles. It costs a little more than the batteries but requires no attention nor renewal and is as much a part of the engine as the crank shaft. Many of the leading makes of engines are furnished with "built-in" magnetos with simple external means for timing, if the purchaser specifies same. The magneto is a device whereby the engine makes its own current as long as it runs.

Gas Engine Ignition.

Gas engine "ignition" is the production at the proper instant within the engine cylinder, of an electric spark whereby the charge is ignited. Without good ignition the best engine will not run satisfactorily.

Batteries are commonly used for producing the spark. These wear out in time and require renewal. When the engine begins to miss, and there is plenty of fuel and oil, it is reasonable to suspect the ignition, and the batteries should be the first thing examined.

Some of the latest types of engines have built-in engine timed magnetos, and batteries are unnecessary, the care and expense incidental to their upkeep is being eliminated, as the magneto is an actual part of the engine that furnishes current as long as the engine runs. So the engine furnishes its own electricity, and the magneto wears as long as the engine.

As a comparison of the cost of doing work by mechanical and animal power, it is estimated that on the basis of one cent per kilowatt hour, and the use of 10 h.p. hours to plow one acre, the fuel cost for the mechanical power is under 20c. while the cost of the equivalent horsepower would be $1.00.

Magneto ignition has removed the last objection to the use of the gas engine on the farm.

Effect of Low Prices.

From H. C. Chandler, Texas.—I heartily endorse the publication of price lists and would give a nice sum to any one that will furnish me with a list that I could adopt as correct. I pay more attention to articles of this kind than any other part of your paper. This matter of low prices is the direct cause of the menial position which our trade is held in by the public at large.

How to Track a Wagon.

From H. K. Russell, Wisconsin.—Some of my neighbors have, from time to time, asked me why their wagons do not track. They often suggest it is because the hounds are not the same length. It is doubtful if an unequal length to the hounds would have the slightest influence whatever upon the track of the wagon, but it might increase the draft if the difference was sufficient to throw the pole much out of line. Fig. 1 shows the fore axle, hound and pole, in which the hounds A are of irregular length, and the axle B and center line of the pole C at angles with the line of the track D, the angles being exaggerated in order to more clearly define the proposition. The point of draft is at E, and as the double-tree swings upon the draft bolt, it is evident that but little influence would be exerted on the axle. The tendency would be for the pole to swing to one side without producing a noticeable influence upon the axle.

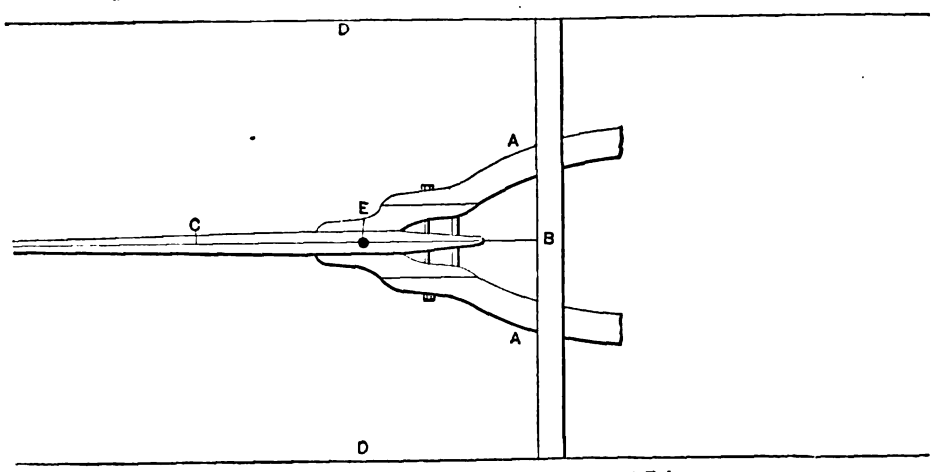


Fig 1.—Showing the Fore Axle, Hounds and Pole.

The trouble must be looked for in another direction, viz., that of the location of the king bolt in the front axle and the hound bolt in the back hounds for a loose perch or the center line of the stiff perch. Fig. 2 shows a carriage part with the axles, perch pole and tread of wheels in correct positions, that is, the axles A at right angles with the tread B and the center line of the perch C and pole D on a parallel with the tread B and exactly in the center. When these conditions are all maintained the track is sure to be correct. But here is the difficulty, as there are so many points to be guarded and a deviation from any one will affect the whole.

One important factor, and one that is too often overlooked, is the dish of the wheels, by which the track may be thrown out. During the process of manufacture the woodworker makes up his axles, centers from the shoulders of the arm and locates his king bolt. The wheeler makes up his wheels, giving them a uniform dish as nearly as possible. The smith sets the tires, and a fourth man puts in the boxes and fits up the arms. It is a well-established fact that it is almost impossible to set the tires upon a set of wheels and secure the same dish in all cases. Then, too, the same difficulty exists with putting in the boxes and fitting up the arms. The man who does the latter sees that the wheels run true upon the arms and that the track is correct, but he does not trouble himself about the center of the axles nor the dish of the wheels; he sets up

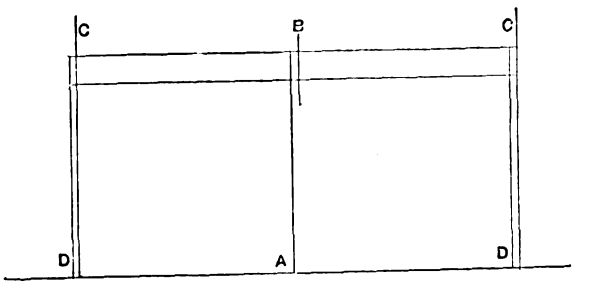


Fig. 3.—Finding the Axle Center.

the axle as shown by Fig. 3, in which B represents the center between the shoulders C C as the axle comes from the woodworker, but if perchance the dish of the wheels differ, or from some cause the shoulder lines are changed so that the spokes stand on the lines D D, he does not trouble himself about other matters, providing the wheels run true on the arms and the tread is correct, and yet there may be a quarter of an inch or more one side or other of the center. Should this occur with both axles, and the difference be on the opposite sides, it is self-evident that the wagon will not track correctly. Years ago, when wood axles, short boxes and steep skeins were used it was the custom of the builders to fit up the arms, set the skeins and box the wheels before fitting in the hounds or centering for the bolts, then the axle center was determined by squaring from the center of the track on the ground as

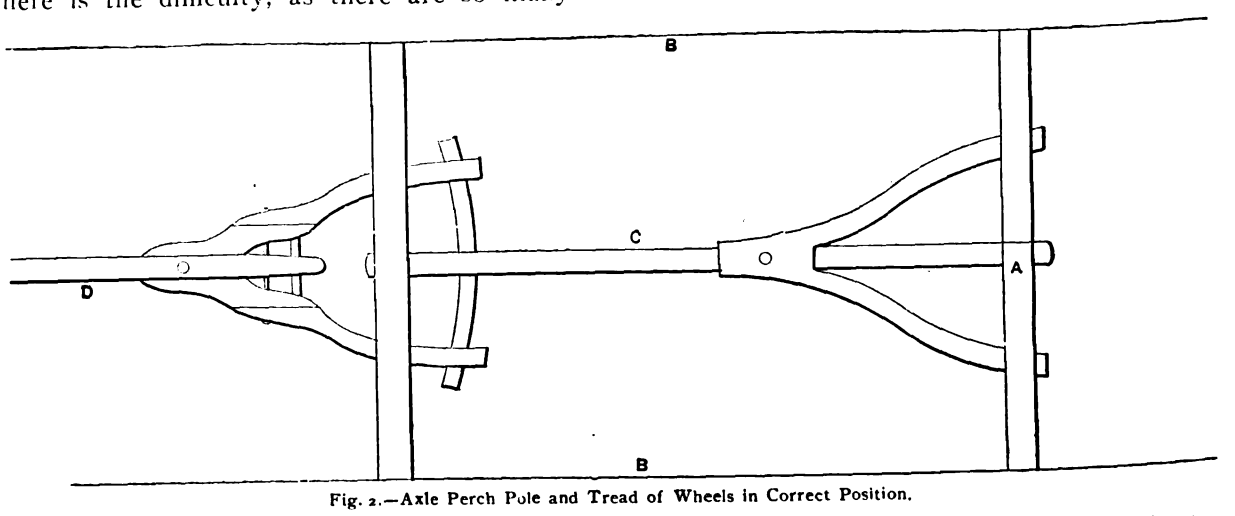


Fig. 2.—Axle Perch Pole and Tread of Wheels in Correct Position.

at A, Fig. 3, and there was seldom any trouble from wheels not tracking. In the large factories the machinery is so perfect that trouble from any cause that would interfere with

the track is not looked for, and yet on a trial of four farm wagons, built by one of the leading houses, not one tracked correctly, while with one the deviation was three-quarters of an inch, and a further test showed that the entire trouble was due to king and hound bolts not being centered from the track, though absolutely in the center as measured from shoulder to shoulder of the arms.

The builder cannot be too careful as to fitting up his hounds correctly and centering the draft bolts of the pole and perch. There is no reasonable excuse for the hounds being of irregular length. When they are so they are ample evidence of themselves of the carelessness of the workman, and warrant the condemnation of the vehicle. Accuracy is the keynote to success, and without it failure is certain.

DIVINING RODS.

No Virtue In Forked Sticks or Any Other Mechanical Device.

The United States Geological Survey states in Water-Supply Paper 255, entitled "Underground Waters for Farm Use," just reissued, that no appliance, either mechanical or electric, has yet been devised that will detect water in places where plain common sense and close observation will not show its presence just as well. Numerous mechanical devices have been proposed for detecting the presence of underground water (ranging in complexity from the simple forked branch of witch hazel, peach, or other tree to more or less elaborate mechanical or electric contrivances. Many of the operators of these devices, especially those who use the home-cut forked branch, are entirely honest in the belief that the working of the rod is influenced by agencies—usually regarded as electric currents following underground streams of water—that are entirely independent of their own bodies, and many people have implicit faith in their own and others' ability to locate underground water in this way. In experiments with a rod made from a forked branch it seemed to turn downward at certain points independent of the operators' will, but more complete tests showed that this downturning resulted from slight and, until watched for, unconscious muscular action, the effects of which were communicated through the arms and wrists to the rod. No movement of the rod from causes outside of the body could be detected, and it soon became obvious that the view held by other men of science is correct—that the operation of the "divining rod" is generally due to unconscious movements of the body or of the muscles of the hand. The experiments made show that these movements occur most frequently at places where the operator's experience has led him to believe that water may be found.

The uselessness of the divining rod is indicated by the facts that it may be worked at will by the operator, that he fails to detect strong water currents in tunnels and other channels that afford no surface indications of water, and that his locations in limestone regions where water flows in well-defined channels are no more successful than those dependent on mere guess. In fact, its operators are successful only in regions in which ground water occurs in a definite sheet of porous material or in more or less clayey deposits, such as pebbly clay or till. In such regions few failures can occur, for wells can get water almost anywhere.

The only advantage of employing a "water witch," as the operator of the divining rod is sometimes called, is that crudely skilled services are thus occasionally obtained, for the men so employed, if endowed with any natural aptitude,. become through their experience in locating lells shrewd, if sometimes unconscious observers of the occurrence and movements of ground water.

A Powerful Brazing Forge.

This is one of the most useful and money-making devices that can be used in the shop. The National Rubber Cement & Rubber Co., Toledo, O., also

Brazing Forge.

make welding compound, brazing compound, and brazing spelter. Send for catalogue and prices. Nothing will add more to the income of the average blacksmith than an equipment to do brazing and welding quickly and well.

Important to Hoseshoers.

Anything that will not only help to shoe a horse quicker but better than it has ever been done before is of interest to the trade. The Shoemaker Vise for turning heels on shoes both winter and summer, which cannot be beaten for hot

The Shoemaker Vise with the Tapping Attachment.

filing, and which is the best of all vises for the shoeing shop, will be found advertised on another page. Read the description given and send for full particulars to Shoemaker & McCauley, Fostoria, O.

Large Profits in Tire Repairing.—The Williams Foundry and Machine Co., Cherry Street, Akron, O., direct attention in this issue to the large profits in tire reairing which blacksmiths can make if they will take hold of the matter. It requires very litle capital to equip a shop completely with the best tire repairing equpment in the world. Please write at once for catalogue "B" to the address given above and it will tell you all about it. Wherever there are automobiles, blacksmiths can make money repairing tires as well as other repair work, if they will only familiarize themselves with the mechanism of the various cars as rapidly as possible.

WANT ADVERTISEMENTS

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

will be inserted under this head at 2 cents a word, including the address for each insertion, payable in advance; but no advertisement will be accepted for less than 50 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 FOR INVENTIONS.
H. W. T. Jenner, patent attorney and mechanical expert, 608 F. St., 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.

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.

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.

PATENTS.
C. L. PARKER, attorney-at-law, and solicitor of patents. American and foreign patents secured promptly. Handbook for inventors sent free upon request. 926 G street, Washington, D. C.

BLACKSMITH.
Here is your opportunity to be an expert blacksmith without help. As life is short, get Toy's Modern Methods of doing hard jobs easy, forging and welding all kinds of steel solid. Also tempering all tools to a standard by colored charts. This is real plain information, not theory, all for $1.00. Send for free samples first. W. M. TOY, Sidney, Ohio.

BROTHER.
Accidentally have discovered a root that will cure both tobacco habit and indigestion. Gladly send particulars. No drugs. G. S. STOKES, Mohawk, Fla.

MECHANICS.
Send for a circular describing "Mechanics' Companions," a tri-square, a centering square, a caliper, rule and protractor. Address J. O. HESS, Oran, Mo.

WANTED.
WANTED—Traveling men who visit the carriage, implement and livery trade make big commissions selling our steel and rubber tired wheels, poles and shafts as a side line. Why don't you try it? THE BOOB WHEEL CO., Cincinnati, Ohio.

Auto Cylinders rebored. Pistons and rings fitted $8.00 to $12.00 per cylinder. Gear cutting in nickel, steel, brass, fiber, etc. Crank shafts, connecting rods, cases and axles reproduced like original. Send old or broken parts to go by. McCADDEN MACHINE WORKS, St. Cloud, Minn.

POWER USERS.
We offer one fine 8 H. P. stationary Milwaukee gasoline engine for only $115.00. Have also 50 other sizes and styles. State your power requirements before you buy. We can save you money. BADGER MOTOR COMPANY, Milwaukee, Wis.

CASH FOR YOUR BUSINESS OR REAL ESTATE.
I bring buyer and seller together. No. matter where located, if you want to buy or sell, address FRANK P. CLEVELAND, 975 Adams Express Building, Chicago, Ill.

FOR SALE.
Blacksmith shop. Well equipped. Good surrounding country and nice town. If interested write for particulars and price to H. W. OTTE, Isabel, Kansas.

FOR SALE.
General blacksmith shop, tools, material. Two lots. Four-roomed house. Only shop in town. Going on a farm. Address for particulars and price. A. S. VERRELL, Memphis, Nebraska.

FOR SALE.
McGovern and West power tire shrinker, Moyer and Defiance hub boring machine. All as good as new at one-third the price of new ones. Address, 554 Freeman Ave., Cincinnati, Ohio.

FOR SALE.
General blacksmith's shop. Stock, tools, dwelling and land. Good proposition for right man. For particulars address R. C. SCHAUER, Cost, Texas.

FOR SALE.
Blacksmith shop. One lot. Stock and tools. With or without auto tools and supplies. Good residence. Two lots. Good business. Growing community in the Great Grand Valley. Most healthful place. Reason, cannot shoe horses. Address AUG. A. BALLMER, Loma, Colorado.

FOR SALE.
Power blacksmith shop, stock and tools. Good location, no opposition. Address for particulars, J. O. BENEFIEL, Hume, Ill.

FOR SALE.
11 to 30 inch lathes, drills, shapers, millers. Also woodworking machinery. Shop equipments. Garage supplies. Address BICKNELL MFG. & SUPPLY CO., Janesville, Wisconsin.

FOR SALE BY FRANK P. CLEVELAND.
Blacksmith and wood working shop in Delaware County, Iowa; net profits average about $100.00 per month; a bargain at $1200.00.

Blacksmith shop and one lot, also six-room frame house and four lots at a good point in Carroll County, Neb.; business well established; will sell house, lots, shop and business for $3500.00.

Blacksmith shop, business and property located in city of 2000 population in Dent County, Mo.; plenty of work at good prices. Price $5000.00; terms $3000.00 cash.

Two-story frame factory building containing 6000 feet of floor space located in Elmer, New Jersey; fine place for light manufacturing business. Price $2000.00; terms one half cash.

Write me for detailed descriptions.

I bring buyers and sellers together. No matter where located, if you want to buy, sell or trade any kind of business or property address FRANK P. CLEVELAND, 975 Adams Express Building, Chicago, Ill.

FOR SALE.
Blacksmith and wood shop 20x65, also buggy room 24x30, stock, shop and tools. All machinery run by 6 horse power engine. Good as new. Good town; high school; seminary. Reason for selling failing eyesight and rheumatism. Work for two men. For particulars address S S. FOLEY, Onarga, Ill.

FOR SALE.
Blacksmith shop, power equipment, tools and small stock of material in small town in central Nebraska. Only one shop within eleven miles. Building furnished free. Good paying thing to good smith. Cheap if taken at once. Address for further particulars LESCHINSKY IMPLEMENT HOUSE, Saint Libory, Nebraska.

WANTED.
Blacksmith, horseshoeing and jobbing business wanted within easy reaching distance of a high school and one that has not changed proprietors for years. In the states of New York or Connecticut. Give prices for shoeing. Address BOX 4, Middleton, Mass.

FOR SALE.

7500 acres of virgin timber, hardwood, estimated to contain 32,630,000 feet. Right on the railroad. Price very low. Address F. G. Hoffman, Beta, North Carolina.

OPPORTUNITY FOR A VETERINARY

A good veterinary can work up a fine practice in a good locality in Michigan. I would give him office room and the use of my shop and my Barcus stock rack for operating. Will help him all I can. Address for further particulars, E. J. P., care Blacksmith and Wheelwright, P. O. Box 654, New York.

FOR SALE.

One of the best shops and locations in Eastern Wisconsin. Work for two blacksmiths and a wagon maker. Shop is on good corner. Two-story solid brick building. It will pay any one looking for a good stand to investigate. Address R. R. THOMAS, Chilton, Wis.

FOR SALE.

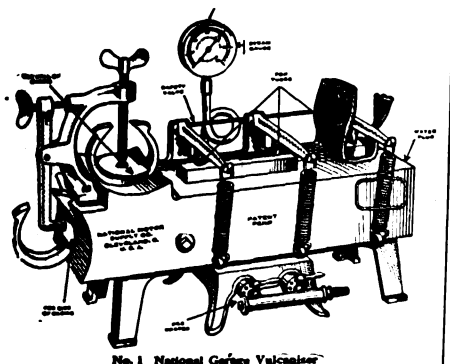
Cheap, 120-lb. Kane & Roach hammer. WEST TIRE SETTER CO., Rochester, N. Y.

FOR SALE OR TRADE.

Have you got a little money or a nice little farm to exchange for a nice little machine shop and repair shop? Shop and tools new. Would dispose separately. Better investigate this. A horseshoer much needed. C. A. Zander, Littleton, Ill.

Vulcanizing for Profit.

"Let the National vulcanizer earn its cost then pay for it." This is an unusual offer, but the manufacturers make it in good faith and will live up to it, just as they do to all other promises and claims. They say: "Send us references and $22.50 and we will ship you promptly a National Garage Vulcanizer with full instructions and small outfit of material. In 60 days (after the profits have paid for the machine many times over), send us the balance $22.50. $2 additional for gasoline heater." Do you know that of every dollar taken in for vulcanizing, about 90 cents is clear profit? Does any other part of your business pay such a large per cent? You say you do not know anything about vulcanizing, and that a machine costs too much. Right here is where the National Vulcanizer, and the National Motor Supply Co. help you. The "National" was designed by a man of long experience in a tire factory,



No. 1 National Garage Vulcanizer

who knows something about vulcanizing and vulcanizers.

The machine is so simple to operate, that with the complete instructions furnished, any one without any experience at all can go right ahead and take in the dollars.

The "National" is equipped with a gas heater for either natural or artificial gas, or it can be attached to a steam line, if one is available.

Why let the big vulcanizing profits go to some other repair shop? Get a good reliable vulcanizer and be up-to-date. People will bring their tires to you for repairs, and then start buying their supplies from you. A good vulcanizer is a money-maker all around. Address the National Motor Supply Co., Cleveland, O., and mention The Blacksmith and Wheelwright.

Three Improved Machines.—The Kerrihard Company, P. O. Box 423, Red Oak, Iowa, has a full page announcement in this issue illustrating and describing their power hammer, their Duplex Disc Roller and their Kerrihard Emery Grinder combined with saw table and disc grinder. Their power hammer enjoys an enviable reputation we understand wherever it has been introduced, and they sell it on easy terms of payment. A special circular giving full particulars of this admirable tool will be sent to any reader who will write for it and also special circular will be sent on the disc roller and emery grinder, but consult the advertisement of this company and write for full particulars.

We are advised that Wood, Smith & Co. (Western Axle Works) of Chicago Heights, Illinois, contemplate materially increasing the volume of their output by adding a Spring Department, as well as increasing their facilities for forgings with a view to furnishing axles, forgings, etc., for Automobiles, Auto Trucks and Vehicle makers generally. William F. Black, well known in the trade, is now associated with this company.

Crescent Universal Wood Worker.—This admirable tool can be made use of by every blacksmith in the country who uses power in his shop. It is made by the Crescent Machine Co., 203 Main St., Leetonia, Ohio. See their announcement in this issue and write for catalogue giving a complete description and telling all about the line of woodworking machinery made by this company.

Hawkeye Helve Hammers.—The Hawkeye Mfg. Company, Cedar Rapids, Iowa, make a helve hammer which can be used to advantage in a great many blacksmith shops. This company has been making these hammers for twleve years and have improved them up to the point of perfection. For full particulars and prices write to the company as above.

Wise Blacksmiths.—Boynton & Plummer, Worcester, Mass., make a variety of blacksmith's tools such as drills, bolt-cutters, forges, tire benders, tire shrinkers, etc. The tools made by this company are first-class in every respect. This is one of the oldest manufacturing firms in the country and prides itself upon the quality of its goods. Send for catalogue which illustrates their complete line and mention The Blacksmith and Wheelwright.

Marsh Horse Shoes.—These are made by Frank Heinig, Beaver Dam, Wisconsin, who is well known to a great many of our readers. With this shoe a horse can go anywhere that a man can, on marshy, boggy or meadow land. They are made of malleable iron and are adjustable. Write for descriptive circular with prices and discounts, or purchase these shoes from your dealer.

A Handsome Calendar.—There seems to be a spirit of enterprise and progress in all of the Western States that we do not always see here in the East. Edward Taft (not claiming to be any relative of the President of the United States) is a general blacksmith and machine repairer in Ilwaco, Washington. He has sent us a very pretty aluminum calendar containing a picture of his little son, Eugene Edward Taft, a bright looking boy, on his hobby horse. Such calendars cost considerable money, but the man who gets one is pretty sure to keep it and a calendar to be of any value for advertising purposes must be preserved and consulted from time to time. We congratulate Mr. Taft.

Sherwood's Combined Woodworker.—This tool will be found illustrated and described in our advertising department. It is made by W. L. Sherwood, of Kirksville, Mo. This device will plane and joint, rip and cross cut saw, bore wood from ¼ to 1⅛ inches, rabbit and groove. A good many of our readers could use it to advantage. Write for further particulars to the manufacturer as above and mention The Blacksmith and Wheelwright.

The Tool-Monger.—We have just received from Montgomery & Company, of 105 Fulton Street, New York City, a new edition of the Tool-Monger, which contains a description of hundreds of tools and machines for all sorts of purposes sold by this company. The pamphlet comprises 394 pages and the various tools are illustrated as well as described. We understand one of these catalogues will be sent to every reader interested in tools who will write for it and mention The Blacksmith and Wheelwright. It is valuable for reference at any time.

Never Slip Red Tip Calks.—The manufacturers of the Never Slip Red Tip Calks give in their advertisement this month several reasons why all horseshoers should sell this celebrated product. One of the best reasons given is because horse owners demand these calks. Never Slip Red Tip Calks are advertised extensively throughout the snow belt. Every year the manufacturers use poster advertisements extensively, besides other forms of publicity on a large scale. They also furnish horseshoers with signs, booklets, etc. There is a premium plan in connection with the sale of Red Tip Calks to horseshoers which all our readers should investigate if they have not already done so. Send to-day for Booklet B to the Neverslip Mfg. Co., New Brunswick, N. J. In all correspondence with them, you are requested to mention this magazine.

Edward's Shears.—Every blacksmith shop ought to have some good shears and such shears as are made by C. D. Edwards will save a great deal of hard work, to say nothing of the saving of time which in some cases is as important as saving money. Write for circular giving full particulars and prices. Mr. Edwards also makes a drilling vise which holds the work while you are drilling it, and will send particulars concerning this tool to anyone desiring to learn more about it.

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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 principles 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
Pittsburg, 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

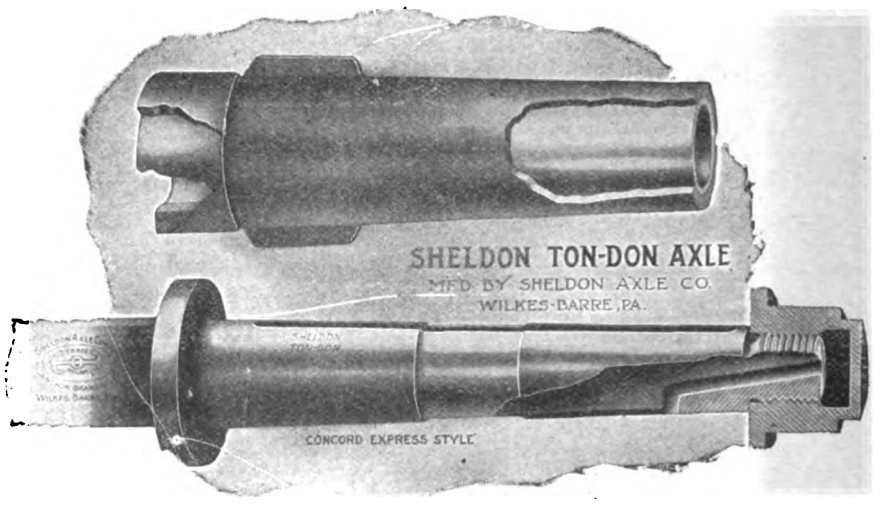
"TON-DON"

CONCORD EXPRESS STYLE

NOT A BALL OR ROLLER BEARING—BUT

ANTI-FRICTION—EVERLASTING—INTERCHANGEABLE

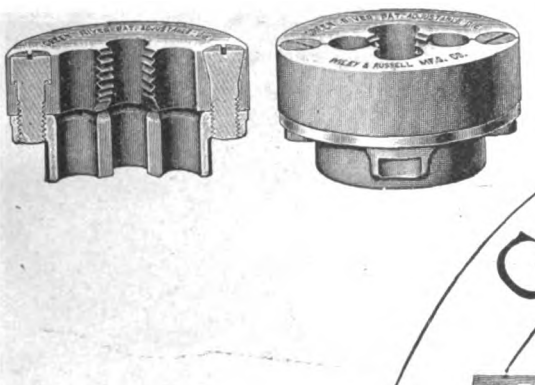
IT WILL NOT CUT, HEAT OR STICK

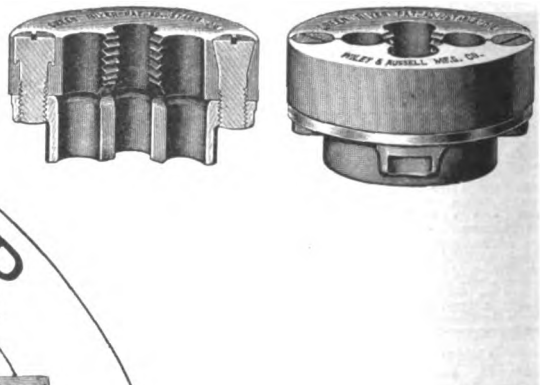


NOTICE THE PATENTED OILING DEVICE
HAS ALL THE ADVANTAGES OF FRICTION AND ANTI-FRICTION AXLES
WITHOUT THEIR DISADVANTAGES
"TON-DON" MEANS KNOWN QUALITY WITHOUT FANCY PRICE
MADE ALSO FOR BUGGIES AND SURRIES

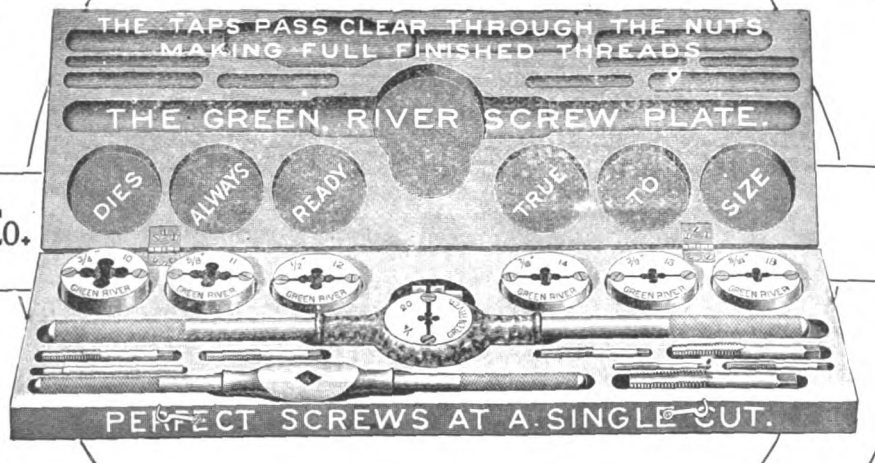
SHELDON AXLE CO..
WILKES-BARRE.PA

LARGEST AXLE FACTORY IN THE WORLD.





GREEN RIVER



Wiley & Russell Mfg. Co. Greenfield, Mass.

Catalog 35 C Free

SCREW PLATES

Handy
Durable
Quick-
Adjusting

Reliable
Accurate
Easy-
Cutting

The Depew Disc Sharpener.—Our readers interested in Disc Sharpeners should consult the announcement in this issue of the J. I. Depew Disc Sharpener Co., Loup City, Neb. This machine is durable, compact, easily operated and is sold at a reasonable price. It is said to be adjustable to any size or shape disc without removal of castings or hubs. It is sold by supply houses. If your dealer does not keep it, write direct to the manufacturers, as above, for further particulars and prices.

Kerosene Oil Engines.—Those of our readers who may be intending to put in power should write the Hatch Oil Engine Company, 8th Ave. & 18th St., Brooklyn, N. Y., for catalogue "W" describing their oil engines which they say are fully guaranteed.

Brace Chuck.—This device is manufactured by I. C. Imboden Mfg. Company, Cleona. Pa., and fits any brace and holds anything from one-half inch down. See their announcement on another page.

Little Giant

TRADE MARK REGISTERED

Combined Punch and Shear

is a genuine money-making tool.

Read the following letter from Mr. Morris, written almost five years ago:

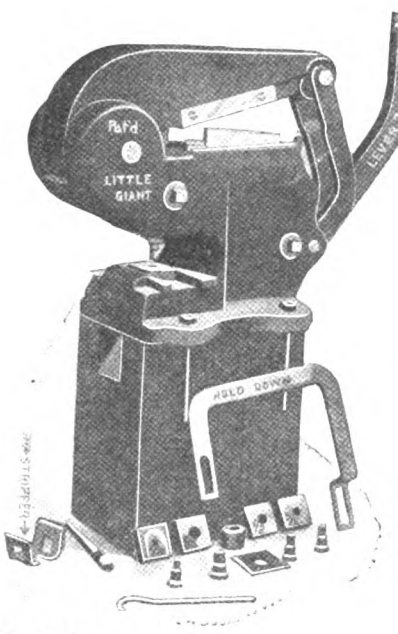
McNeil, Ark., Feb. 8, 1908.

Dear Sirs:—

I bought one of your No. 3 "Little Giant" Punch and Shear about a year ago, and I wish to say it is the best tool that was ever set up in a blacksmith shop. I cannot see how a Blacksmith can do without one of these machines. There is no machine that will equal the "Little Giant."

I have made as high as $20.00 per day with it and I would say to all blacksmiths when you have iron to cut and holes to punch, get a "Little Giant" Punch and Shear, for they will do the work quickly and easily. My machine is worth $500.00 a year to me. I can do a job of work so quick and EASY I can't say enough good for the "Little Giant" machine.

Respectfully yours,
(Signed) R. L. MORRIS.



Don't you think it would be worth the same to you?

Sold by All Jobbers

Send for our Catalogue and Printed Matter.

LITTLE GIANT PUNCH & SHEAR CO.
Box 56 SPARTA, ILL.

The Wonder Disc Sharpeners

Are Sold by Leading Jobbers in the Following Cities:

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Peoria, Ill.
Galena, Ill.
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Alton, Ill.
Pana, Ill.
Pekin, Ill.
Danville, Ill.
Elgin, Ill.
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Rockford, Ill.
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Aberdeen, S. D.
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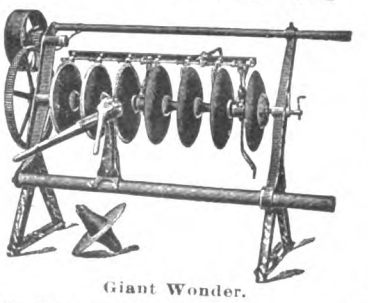
THE WONDER DISC SHARPENERS



Giant Wonder.

are the only machines adjustable to all conditions.

Can shear any part of edge to any bevel.

Can shear back from edge as far as required.

Can use tool on either side of disc.

Can shift from one disc to another.

Can do all this without the turn of a set screw or nut; is a positive feed; automatically adjusts itself to wobbling or bent discs; knives made of best-grade self-tempering steel, will last a lifetime for hand and power.

Fully Warranted. We pay the freight both ways if not as represented.

The Little Wonder will sharpen any size disc up to 22 inches in diameter. Attachments for holding rolling coulters and single discs charged for extra with The Little Wonder.

The Giant "Wonder" is a larger and heavier machine; has holder attachments for rolling coulters and disc plows; will take in discs up to 32 inches in diameter; is a geared machine and will also take in disc harrow sections same as The Little Wonder and do the work equally as well. The only machine on the market with these advantages.

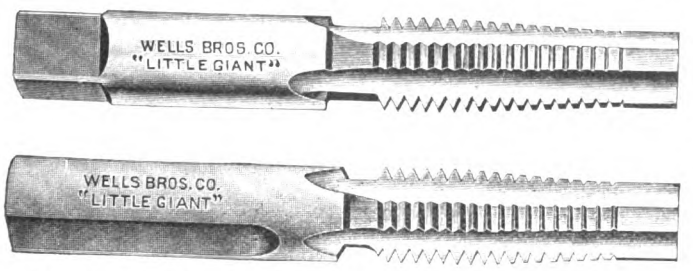
Write to us direct if your dealer cannot serve you, giving his name and address.

I hold the only patent on this Sharpener. Infringers will be prosecuted.

A. E. DURNER, Mfr.,
Evansville, Wis., U. S. A. London, Ontario, Canada.
Head Office: EVANSVILLE, WIS.

Little Giant

HORSE SHOE CALK TAPS



Seasonable Tools at Reasonable Prices.

Begin the season right by using the right kind of taps.

Catalog 30C Free

WELLS BROS. COMPANY Greenfield, Mass.

A Woman's World-Tour in a Motor

Is the title of a book just published, which everyone will enjoy reading.

Harriet White Fisher is the author, and some of the adventures as described in her book are of the hair-raising order.

It seems almost incredible that any woman should have deliberately invited the troubles she encountered, or should have been able to overcome them triumphantly and return to her home in Trenton, N. J., without a really serious accident.

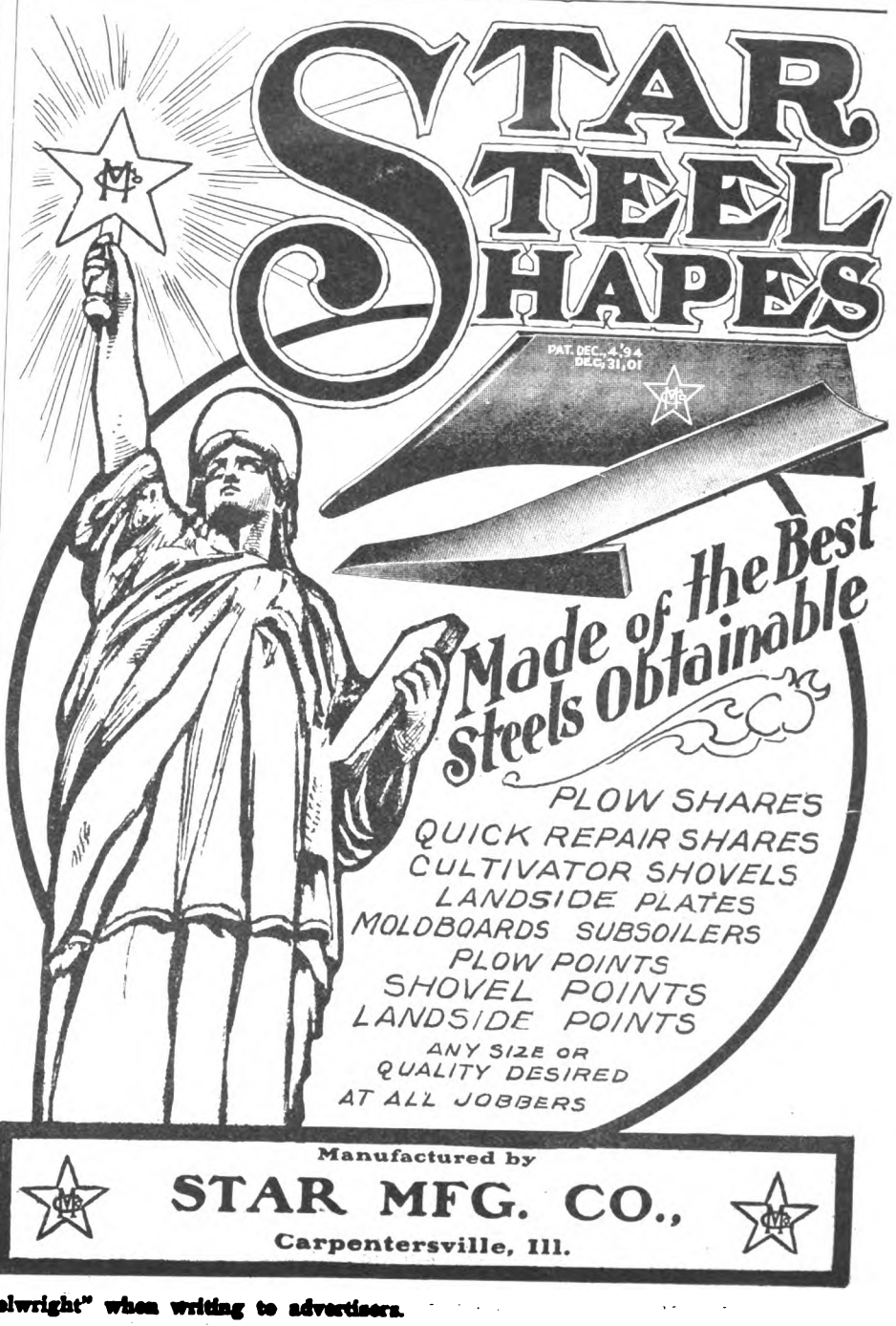
The book is intensely interesting.

It is elegantly printed on fine paper and contains numerous illustrations from photographs taken by Mrs. Fisher or some member of her party.

The book has interested us so much that we have decided to offer it to our subscribers at the publisher's price of **$2.25** per copy, postage prepaid.

Address all orders to

M. T. RICHARDSON CO.
71-73 Murray Street New York City



Manufactured by
STAR MFG. CO.,
Carpentersville, Ill.

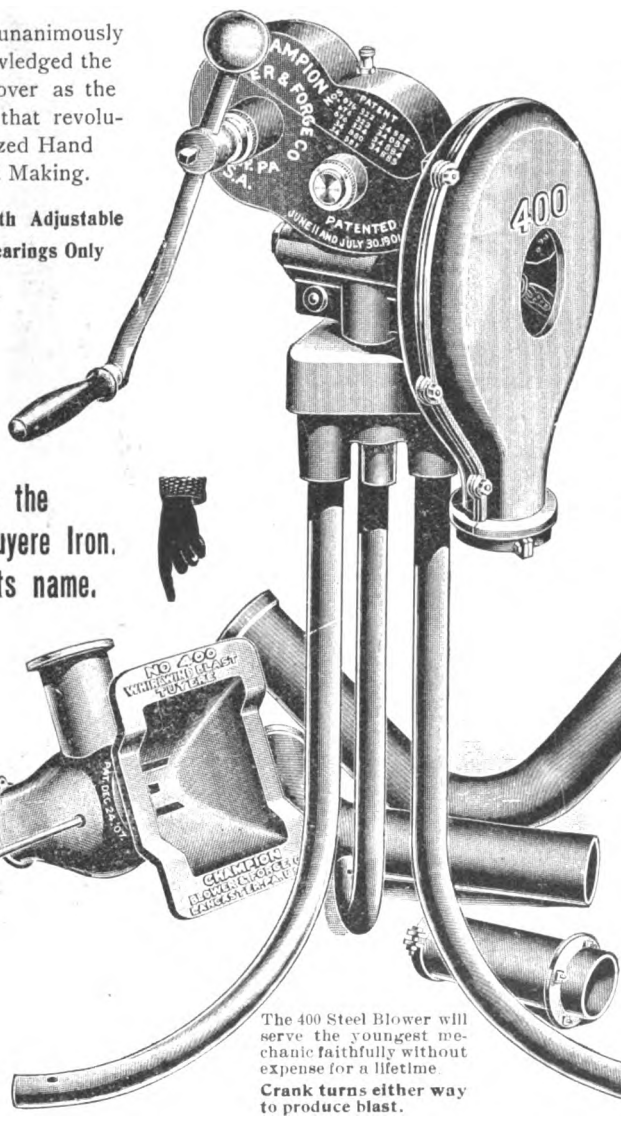
Please mention "The Blacksmith and Wheelwright" when writing to advertisers.

THE 400 CHAMPION

No. 408 Steel Horseshoers' and Blacksmiths' Forge with Half Hood.
Hearth 30x36 in. Fan 12 in. in diameter.

The 400 unanimously acknowledged the world over as the Blower that revolutionized Hand Blast Making.

Made with Adjustable Ball Bearings Only



The 400 Steel Blower will serve the youngest mechanic faithfully without expense for a lifetime.
Crank turns either way to produce blast.

"The Incomparable Blackmith Blower"

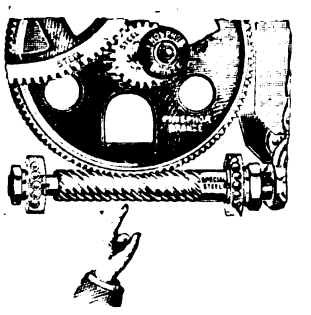
With over ONE-HALF MILLION USERS anxious to testify to its wonderful value. ASK WHAT THE OWNERS SAY, especially those that have used the 400 daily for ten years or longer. It is the ONLY BLOWER ever built that remains as perfect after ten years' daily use as the day it is built. It is the one great tool that will be handed down from father to son for generations.

THE 400, THE BLOWER FOR QUALITY, first, last and always.

No. 400 Champion Patented "Whirlwind" Blast Anti-Clinker Heavy Nest Tuyere Iron goes with the 400 Blower, WITHOUT EXTRA COST.

With the circular rotary feature of the "Whirlwind" Blast the hot blast from the coal is not wasted by being blown up through the fire and out of the chimney, like all other blacksmith fires. With the "Whirlwind" blast circulating between the heavy walls of the nest the hot air is forced to the center of the fire, thus giving the iron in the fire practically all the heating elements of the coal, which save in time and coal consumed, the first cost of a 400 Blower and "Whirlwind" Tuyere Iron many times over every year it is used.

THE FAMOUS 400

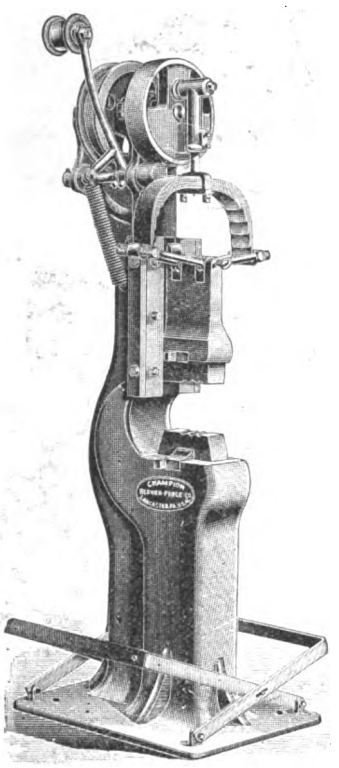


It's all in the Spiral

No. 433 Cast Iron Blacksmith's Forge with Half Hood and Sloop Bottom Coal Box.
Hearth 32x45 in. Fan 12 in. in diameter.

Don't miss the "Whirlwind" Tuyere Iron. It is true to its name.

The Champion "Patented" Automatic Self-Feed and DOUBLE COMPOUND LEVER-FEED UPRIGHT POST DRILLS. Made with Cut Gears and Ball Bearings.

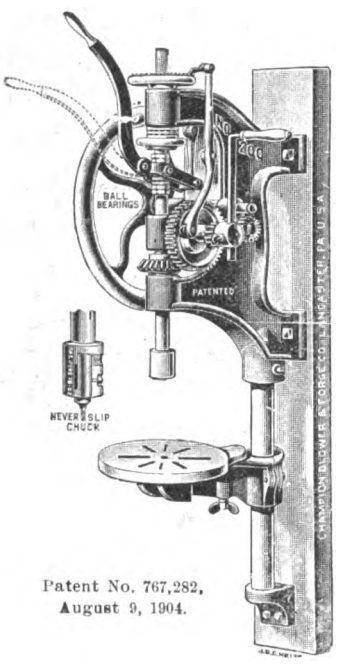


The Champion "Patented" Power Hammer.

Made in Two Sizes.

No. 0 Champion "Patented" Power Hammer, with one regular set of dies for plow work, upper die 3x1¼ inches, lower die 3x2 inches. Size of base of Hammer 18x25 inches. Height over all 5 feet 4 inches. Weight of ram 30 pounds. Pulley 9x2⅝ inches. Speed 400 RPM. Capacity 2 inches, square or round. ½ HP required to operate same. Weight 900 pounds.

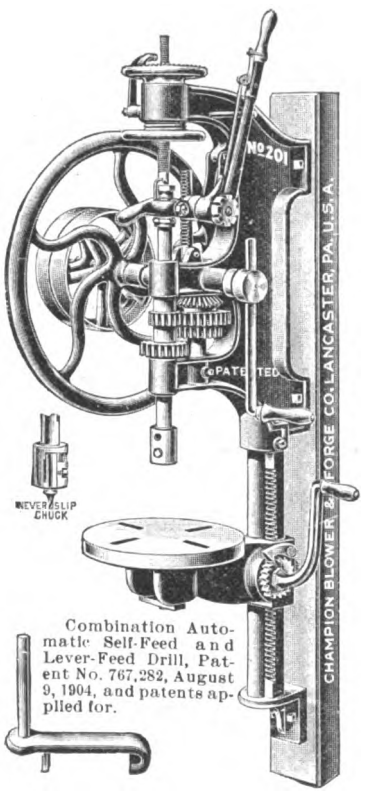
No. 1 Champion "Patented" Power Hammer, with one set of dies 2½x6½ inches, with plain surface 2½x3 inches, and two plain grooves and one tapering groove across one end for forging round iron, straight and tapering. Size of base of Hammer 20x27 inches. Height over all 5 feet 8 inches. Weight of ram 65 pounds. Pulley 10x2⅝ inches. Speed 300 RPM. Capacity 2½ inches round or square. 1 HP required to operate same. Weight 1,250 pounds.



Patent No. 767,282, August 9, 1904.

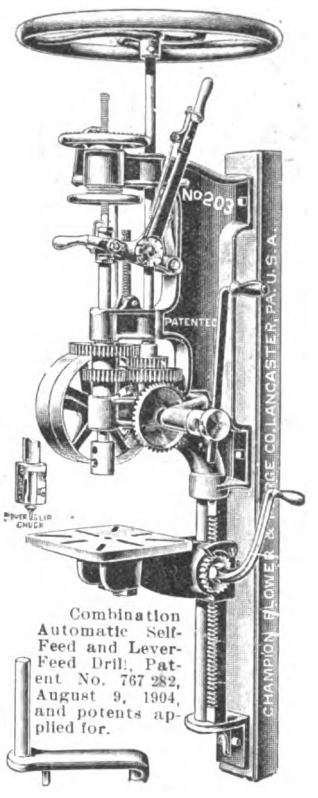
No. 200 DRILL

Combination Automatic Self-Feed and Lever-Feed Drill.



Combination Automatic Self-Feed and Lever-Feed Drill, Patent No. 767,282, August 9, 1904, and patents applied for.

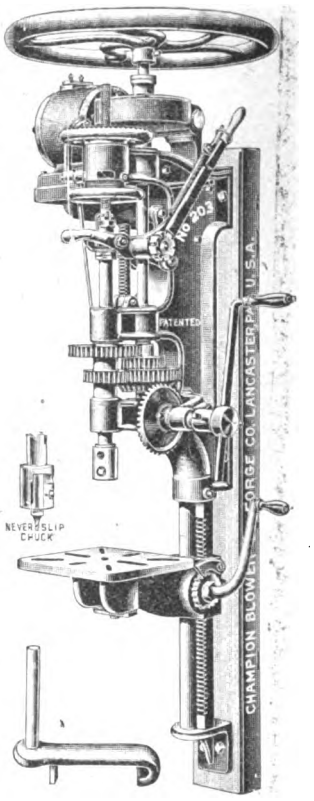
No. 201 DRILL



Combination Automatic Self-Feed and Lever-Feed Drill, Patent No. 767,282, August 9, 1904, and potents applied for.

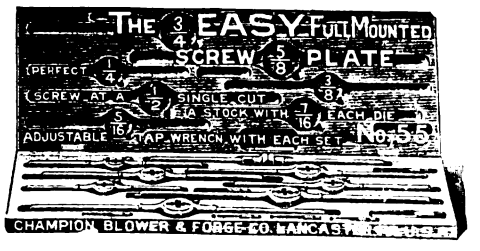
No. 203 DRILL.

The Double Compound Lever-Feed produces 80% more pressure or drills holes 80% larger, with the same labor, than any Lever-Feed Drill



No. 203 Champion Combination Automatic Self-Feed and Double Compound Lever-Feed ELECTRICALLY DRIVEN Upright Post Drill.

This Drill has the motor direct connected to the upright back gear shaft, which represents what we consider a perfect up-to-date Electric Drill and one that is worthy of most careful consideration from the up-to-date mechanic. It represents simplicity, durability and no loss of power.



Screw Plates in four styles cutting up to 1½ inches.

REMEMBER

There is no TURNING BACK of the FEED Screw NUT WITH EITHER FEED.

The DOUBLE COMPOUND LEVER-FEED Saves 200 Per Cent

IN TIME AND LABOR in drilling holes, reaming, countersinking, etc., and makes the drill a first-class Wood Boring Machine.

Our New Catalogue can be had free upon application, showing the very latest and greatest inventions in the blacksmith line in the world on Blowers, Forges, Drilling Machines, Tire Benders and Shrinkers, Power Hammers, Punches, Shears, Screw Plates, Power Blowers, etc. It will pay you to see our catalogue. Write for it.

THE CHAMPION BLOWER & FORGE COMPANY, LANCASTER, PA., U. S. A.

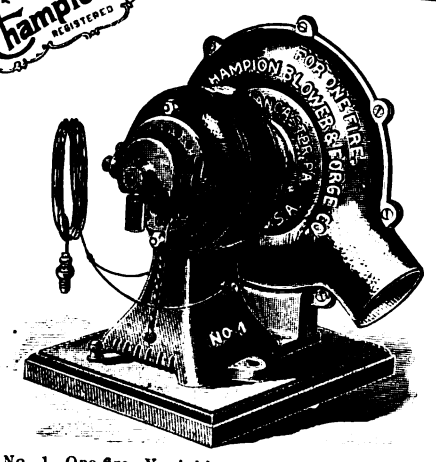
Please mention "The Blacksmith and Wheelwright" when writing to advertisers.

THE CHAMPION ONE-FIRE, VARIABLE SPEED ELECTRIC BLACKSMITH BLOWER

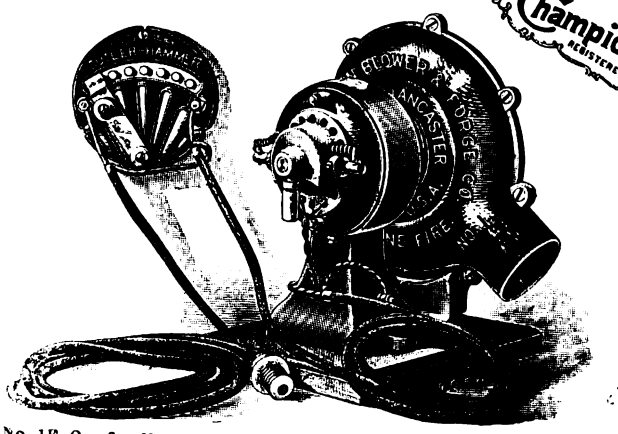
THE ELECTRIC SUCCESS

Motor Capacity 40% above requirements

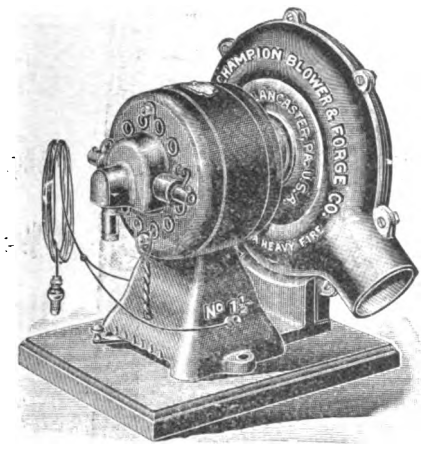
The illustrations show a very complete line of Electric Blowers, running up to nine fires. We recommend, in every instance, each fire to be equipped with its own individual Electric Blower, so it gives each operator full and complete control of his own individual fire and a large saving in the consumption of electric current. The material, workmanship, etc., used on these Blowers are of the very best.



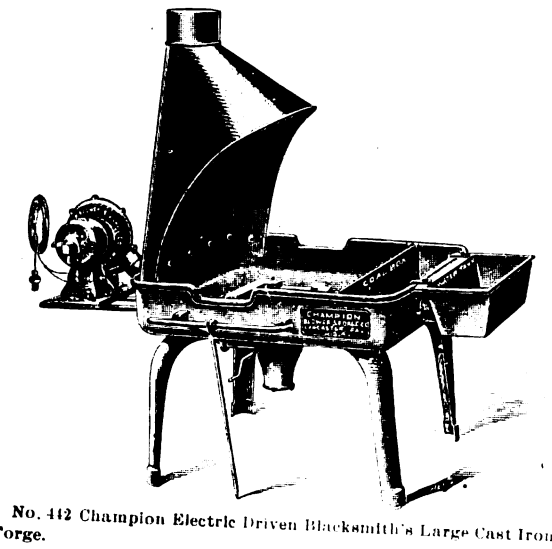
No. 1 One-fire Variable Speed Electric Blacksmith's Blower with six speeds, for light and medium fires.



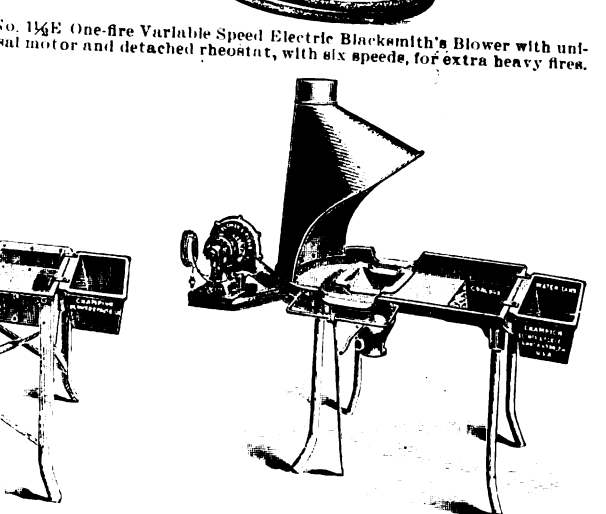
No. 1E One-fire Variable Speed Electric Blacksmith's Blower with universal motor and detached rheostat, with six speeds, for light, medium and heavy fires.



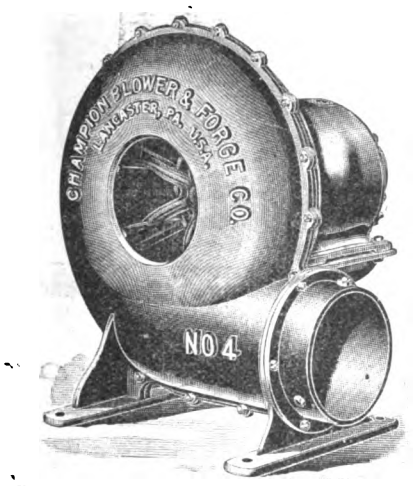
No. 1½ One-fire Variable Speed Electric Blacksmith's Blower, with six speeds, for extra heavy fires.



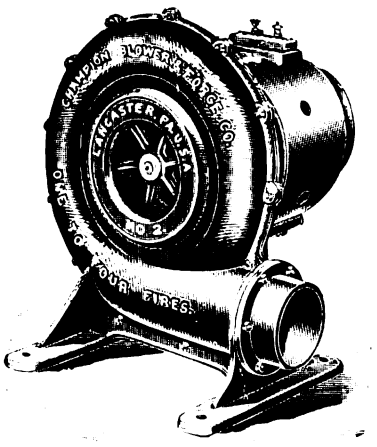
No. 442 Champion Electric Driven Blacksmith's Large Cast Iron Forge.



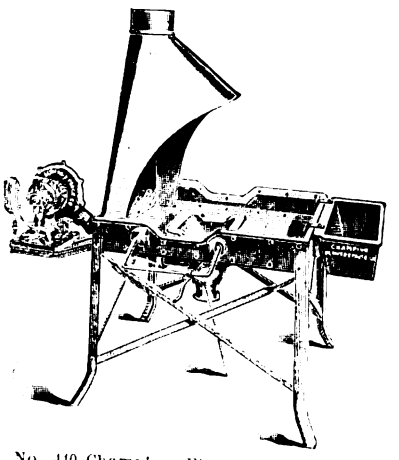
No. 1½E One-fire Variable Speed Electric Blacksmith's Blower with universal motor and detached rheostat, with six speeds, for extra heavy fires.



No. 4 Electric Blacksmith's Blower will blow from one to nine fires.



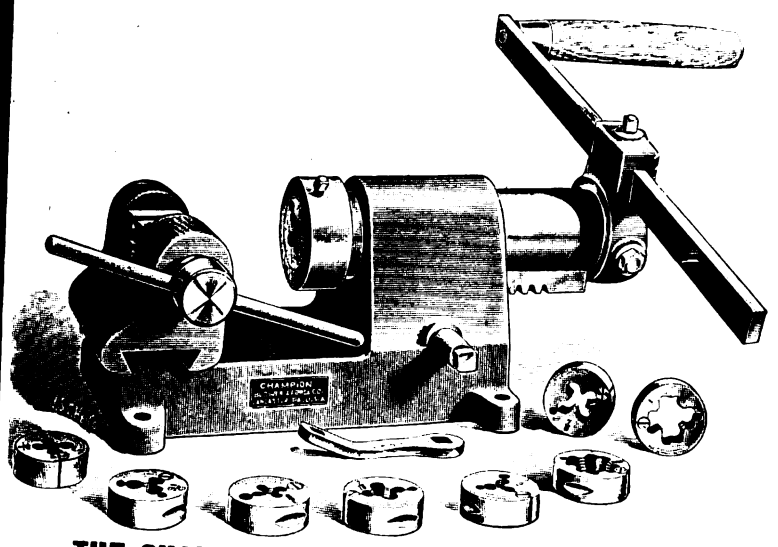
No. 2 Electric Blacksmith's Blower will blow from one to four fires.



No. 440 Champion Electric Driven Blacksmith's Steel Forge.

No. 441 Champion Electric Driven Blacksmith's Cast Iron Forge.

THREE NEW CHAMPION TOOLS

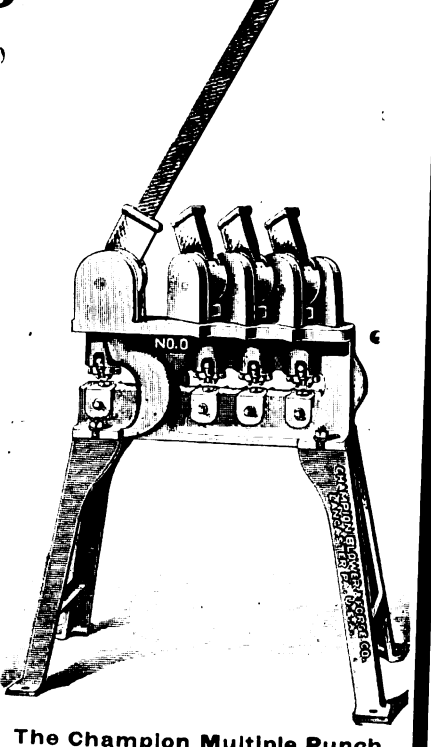


THE CHAMPION THREAD CUTTING MACHINE

Thread Cutter to do Quantity Jobs Equal to Machines Costing Ten Times the Price.

No. 1 Champion Thread-Cutting Machine with Dies Only cutting ¼, 5/16, ⅜, 7/16, ½, ⅝ and ¾ inch. Weight 40 pounds.
No. 2 Champion Thread-Cutting Machine with Dies Only cutting ¼, 5/16, ⅜, 7/16, ½, ⅝, ¾, ⅞ and 1 inch. Weight 45 pounds.
No. 3 Champion Thread-Cutting Machine with Dies, Taps and Tap Chuck, complete, cutting ¼, 5/16, ⅜, 7/16, ½, ⅝ and ¾ inch. Weight 45 pounds.
No. 4 Champion Thread-Cutting Machine with Dies, Taps and with two Tap Chucks, complete, cutting ¼, 5/16, ⅜, 7/16, ½, ⅝, ¾, ⅞ and 1 inch. Weight 55 pounds.

No. 5. Champion American Tire and Axle Shrinker.
HAS TWO SHRINKING LEVERS.
1st Lever for Light Tires. 2nd Lever DOUBLE COMPOUND.



The Champion Multiple Punch.
Regularly furnished with ¼, 5/16, ⅜, and ½ inch Dies and Punch. Maximum capacity ⅝x⅜ inch.

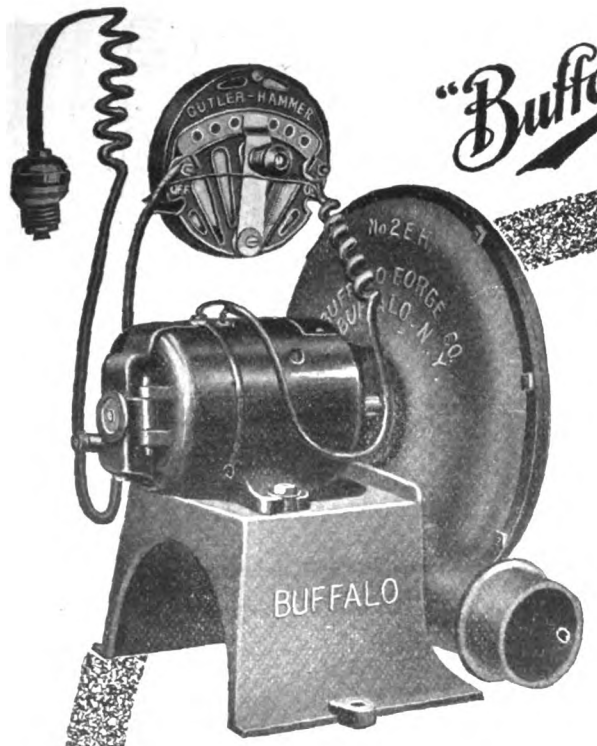
Our 1913 catalogue can be had upon application, showing the very latest and greatest inventions in the Blacksmith Line in the world on Blowers, Forges, Drilling Machines, Tire Benders, Tire Shrinkers, Screw Plates, Power Blowers, Power Hammers, Punches and Shears, etc. It will pay you to see our new catalogue.

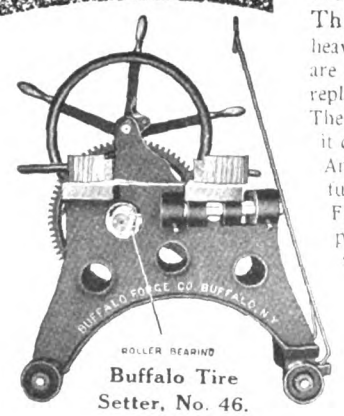
THE CHAMPION BLOWER & FORGE COMPANY, LANCASTER, PA., U. S. A.

"Buffalo"

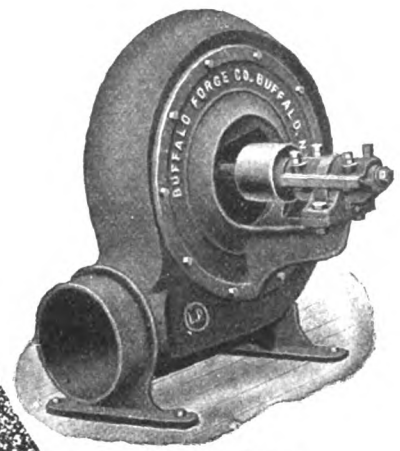
Variable Speed Electric Blower

By all odds, the fan with the *slowest* speed lasts the longest and uses the least current. The slow speed of the Buffalo Electric Blower is the secret of its superiority, and the *large diameter* of the fan the secret of the *powerful blast*. This blower is about twice as large and heavy as other electric blowers, and the brushes are nearly *three times* the regular size,—making replacing necessary only at the longest intervals. The speed regulator is *separate* from the blower, so it can be hung up where most convenient to reach. Any blast, from the gentlest to the most powerful, is obtained, up through six graduations. Furnished complete with 15-ft. heavy wire, and plug, which simply screw into ordinary lamp socket and the connection is made.

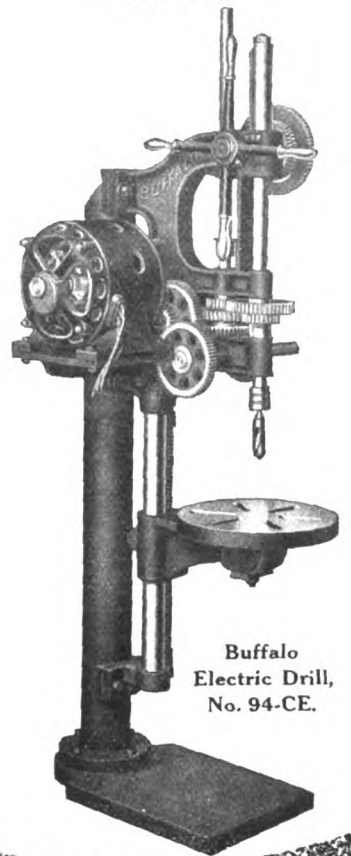




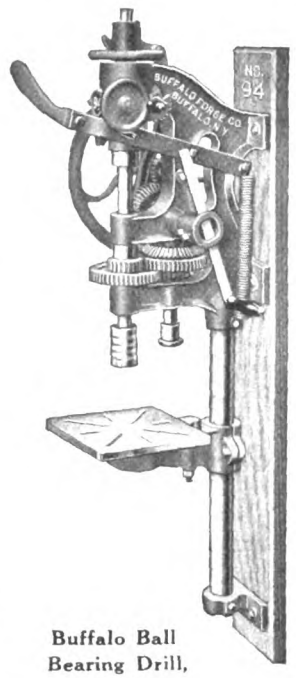
Buffalo Tire Setter, No. 46.



Buffalo Power Blower.



Buffalo Electric Drill, No. 94-CE.



Buffalo Ball Bearing Drill, No. 94.

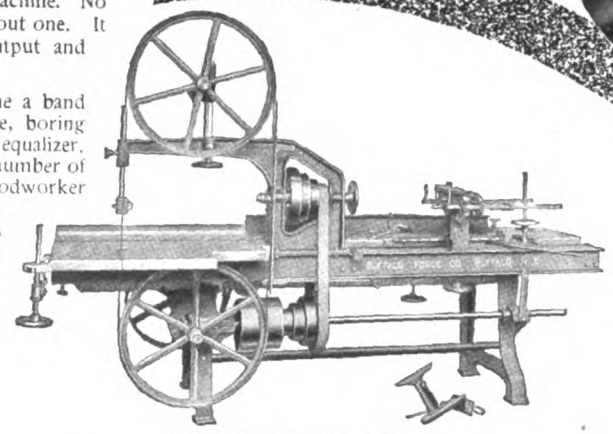
Crain Combination Woodworking Machine

12 Machines in One.

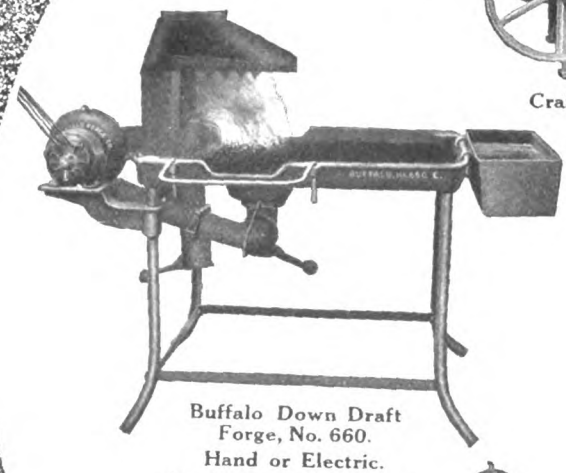
The only combination machine made especially for the Blacksmith and Woodworker.

Strength, capacity, variety and small floor space are the the distinctive features of this machine. No up-to-date shop can afford to be without one. It increases quantity and quality of output and will pay for itself in a short while.

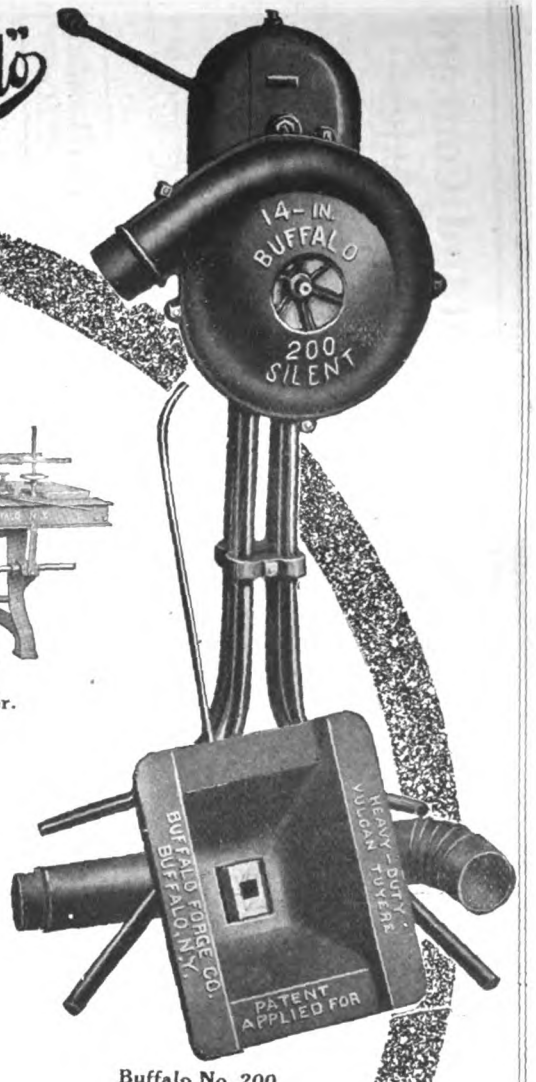
It combines in one compact machine a band saw, rip saw, cut-off saw, planer, lathe, boring machine, drill, shaper, sizer, spoke equalizer, spoke tenoner, and can be used for a number of other operations common to the woodworker and blacksmith, and usually requiring several machines. All without extra attachments—simply change the tools.



Crain Combination Woodworker.
Twelve Machines in One.



Buffalo Down Draft Forge, No. 660.
Hand or Electric.
Removes Smoke and Fumes.



Buffalo No. 200 Silent Blower.

Buffalo Standard Forge, No. 650.

Ask us for **net prices now** on any tool in which you may be interested. First of all, is your blower everything it could be? Do you know that the **14-inch** Buffalo 200 Silent Blower is now preferred by all smiths who do a certain amount of implement and wagon repairing? Even horseshoers find it a great advantage, as it gives **22% higher blast pressure and runs as easily as any 12-inch** blower.

The 200 Silent Blower **14-inch** fan is now furnished on all our heavy blacksmith forges, without advance in price. This gives you a greater value for your money than you have ever been able to obtain in forges. Take a look at the splendid electric blower in the upper left-hand corner and the Electric Drill No. 94-CE. Any shop may justly be proud of such tools and find them highly profitable. But write at once—take the first step **now** and start the new year with your mind at rest regarding that machine you **know** you ought to have.

Buffalo Forge Company
BUFFALO, N. Y.

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

THE

BLACKSMITH AND WHEELWRIGHT

Vol. LXVII. No. 2. NEW YORK, FEBRUARY, 1913. TERMS: ONE DOLLAR A YEAR

STATION WAGONS.

Full Specifications and Instructions for Building Them.

BY WAGON MAKER.

Station wagons are still in great demand in many localities. They are, however, used in a great variety of ways. It is the family wagon, par excellence, for rich and poor alike; a wagon for family shopping, going to church, for a pleasure drive, to the station, or for hotel service. In fact, it is a wagon that can be used for most occasions. It is a most simply constructed wagon and can be made cheaper than any other cut-under wagon yet built. If the buyer wants a more complete wagon of the same style and is willing to pay for it, the body and gear can be easily changed. This body is of the plainest kind. That is, low panels, rails, and open all around. The open parts are closed with curtains. On this body the back is paneled or closed half way up, as shown last on the back view. Some are built without panels or rails, but a gate is hinged to the cross bar. This gate is made to let down in a horionztal position for a trunk or suit case to rest on. In such cases, the rear spring is under the cross bar and the rear corner pillars are made straight to lengthen the body at its base. It is also suspended higher.

If more labor and expense are added, the body is paneled with stationary or glass frames to drop. The same is done with the doors. Another improvement which serves a good purpose is the front shifting doors and shifting shutters, to make a summer and winter carriage. The shifting front has one or two windows to drop and be replaced with two shifting lazy backs which can be turned to seat either backward or forward. The shifting shutters are replaced by curtains, and the doors with glass frames to drop are replaced with skeleton doors, making a complete and closed carriage for winter use as well as for the hot weather season.

The same changes are made with the gear. The most simple of the bodies is hung on two elliptic springs, and the next, as illustrated, with a semi-elliptic added. For a better one the front has one elliptic and the rear two elliptic springs. For the best suspension, two ellipticts are used front and two in the rear, or coach platform springs are used, making the same suspension as used on cabriolets and coupes. All station wagons, on account of the improved roads, are made with a 56-inch wide track.

Construction of the Body.

Carriage bodies laid out square lengthwise and in a vertical direction are easy to build. On this draft the sills are contracted; that is, narrower front and wider in the rear. These sills could be laid out square, but it makes the body in front too wide and a too long dash. To avoid this and for appearance's sake, these bodies are made narrower front and wider in the rear, making a wider and more comfortable seat.

So that it be better understood by those who build such bodies, we have drawn the bottom view in two parts, divided by a center line. The lower part represents the part with body and smith work added while the upper part represents the body only.

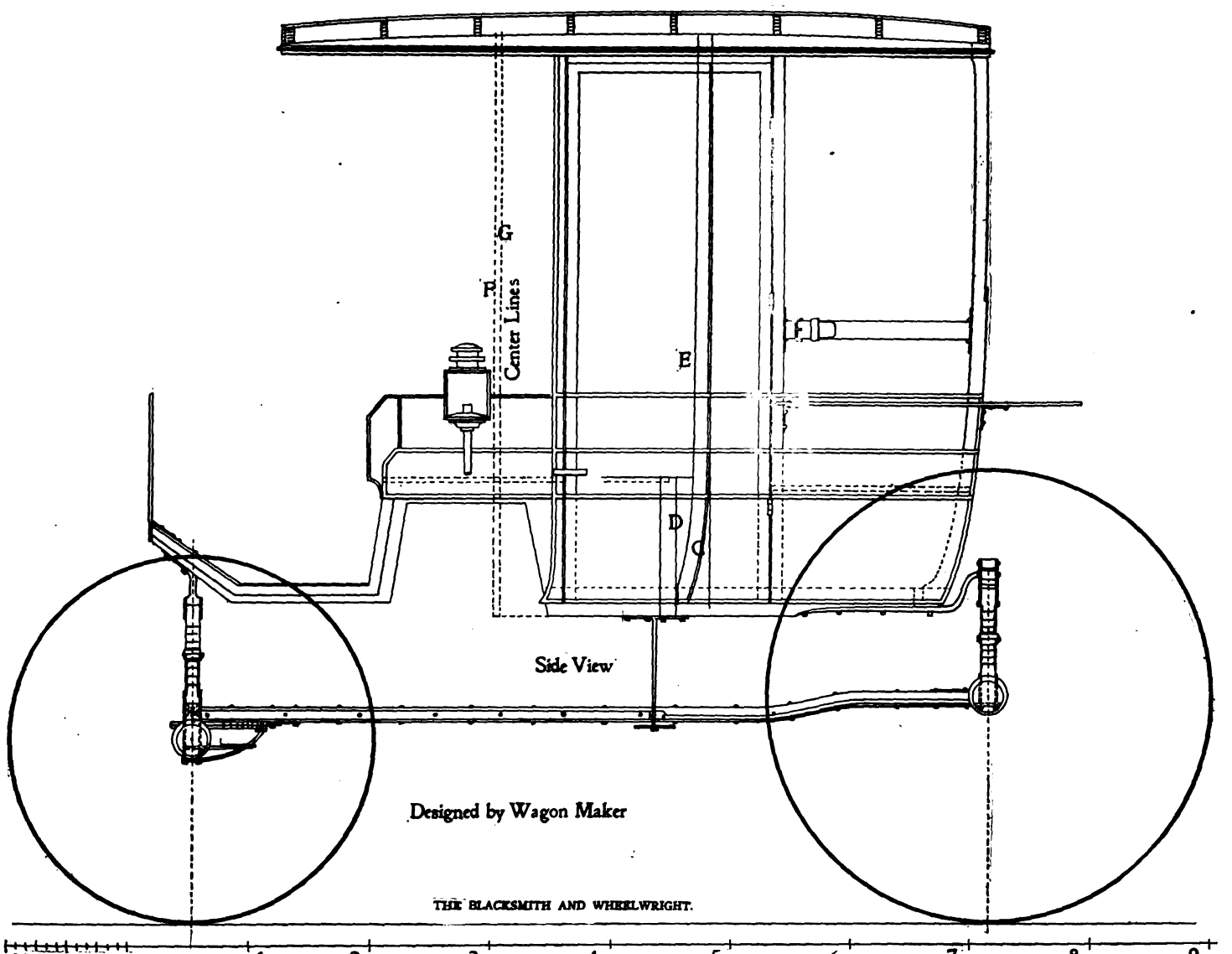
If the body is divided by a center line and we want the width at any place or part, we take one-half and add the other half to the whole width which is the most simple of all systems employed. On this draft the width across the front at the dash is 33¼ inches; across the front of the top rail 39¼ inches, across front of coupe pillar 42 inches; across hinge pillars 43¼ inches, and rear end 42 inches. These four widths are all taken on top rail. The amount of turn under on each side of the body is 2 5-16 inches. The width across the front inside of sills is 29½ inches and to this amount is added the bevel of the constructed line.

On the rear end cross bar the width is 34¼ inches, with a reduction of the bevel. The sills are 1½ inches thick from front to hinge door pillar and from there are squared to the rear end. This is shown on the bottom view "A" and the rest of outside sill line at "B." Both "A" and "B" also inside surface of the sill are square up and down.

The Door Pillars.

There are six pillars in all, the front coupe pillars, the front door pillars, the rear door or hinge pillars, the rear standing hinge pillars, and rear corner pillars. Each pair of these pillars must be treated differently. The coupe pillars must be dressed with a pattern from the side view, and also with one to obtain the turn under line, the thickness across and the one which rests against the sills, shown on C D E, side view. To do this, the pattern used for the side view must be made larger to obtain the two bevels. Square the inside surface first, then bevel the front surface after line B, and square the rear surface of the coupe pillar with B. By doing this it will produce the required bevel for the door. If the coupe pillars are dressed right after the lines D and E, and the sills are perfectly vertical, line E will be vertical on each side of the body and will have the required width on top. The center line for this coupe pillar is on G, while for the hinge pillar the center line is on F, because the body is narrower in front and wider back, hence the difference in the center lines. All four door pillars are dressed square and to one pattern only, and play room must be given between doors and sills. For light bodies, the door pillars are 1 5-16 inches both ways, and on the bottom end, as shown, C side view. The hinge standing pillars are made the same size as the door pillars, without the play room, as they must fit against the sills, and are dressed square also, as they must fit against the square surface A, bottom view.

Two patterns are required for the rear and corner pillars, one for side view and the other



for back view. Face the inside surfaces of the pillars straight and level, mark the pillars after the side view pattern, and dress both sides square. Make the back view pattern 3-16 inch thick only; so as to bend easily over the curve and mark the shape as shown on the back view. This pattern must be correctly done so as to have the right width on the top rail. Mark the top rails 7/8 inch thick throughout and the depths as shown on side view, 1 3/8 inches deep on front end, 2 1/8 at center, and 1 1/2 on rear end.

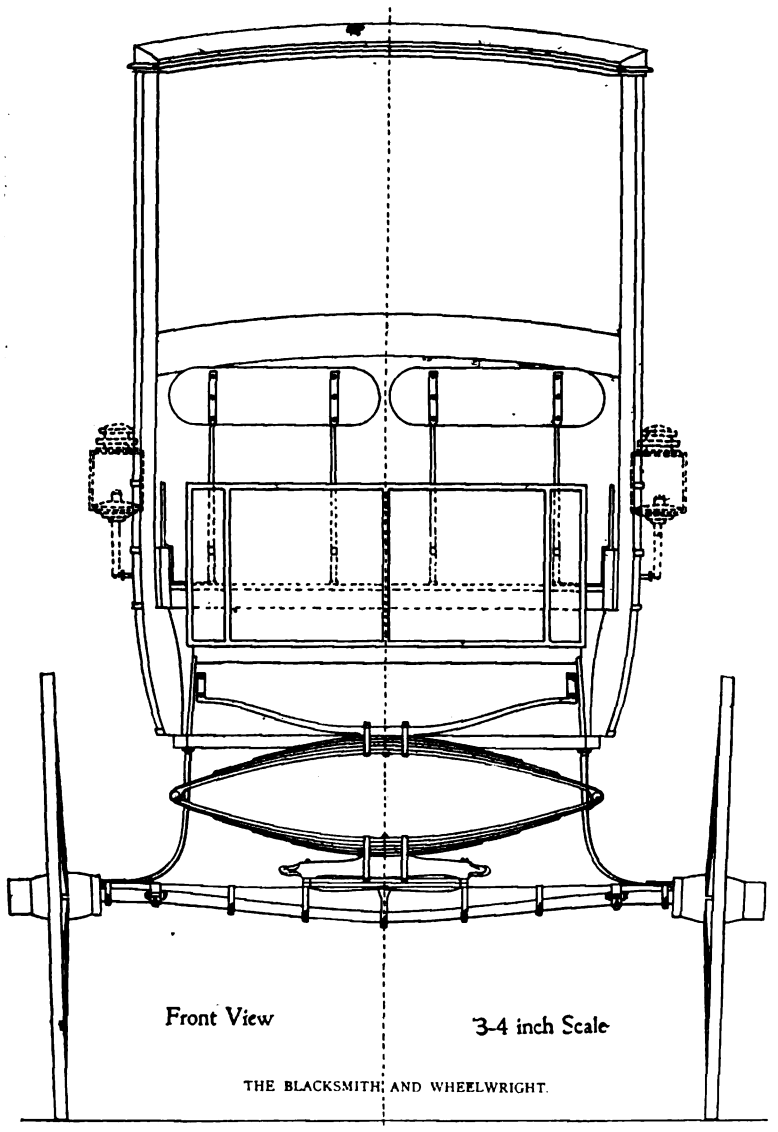
Framing the Sills.

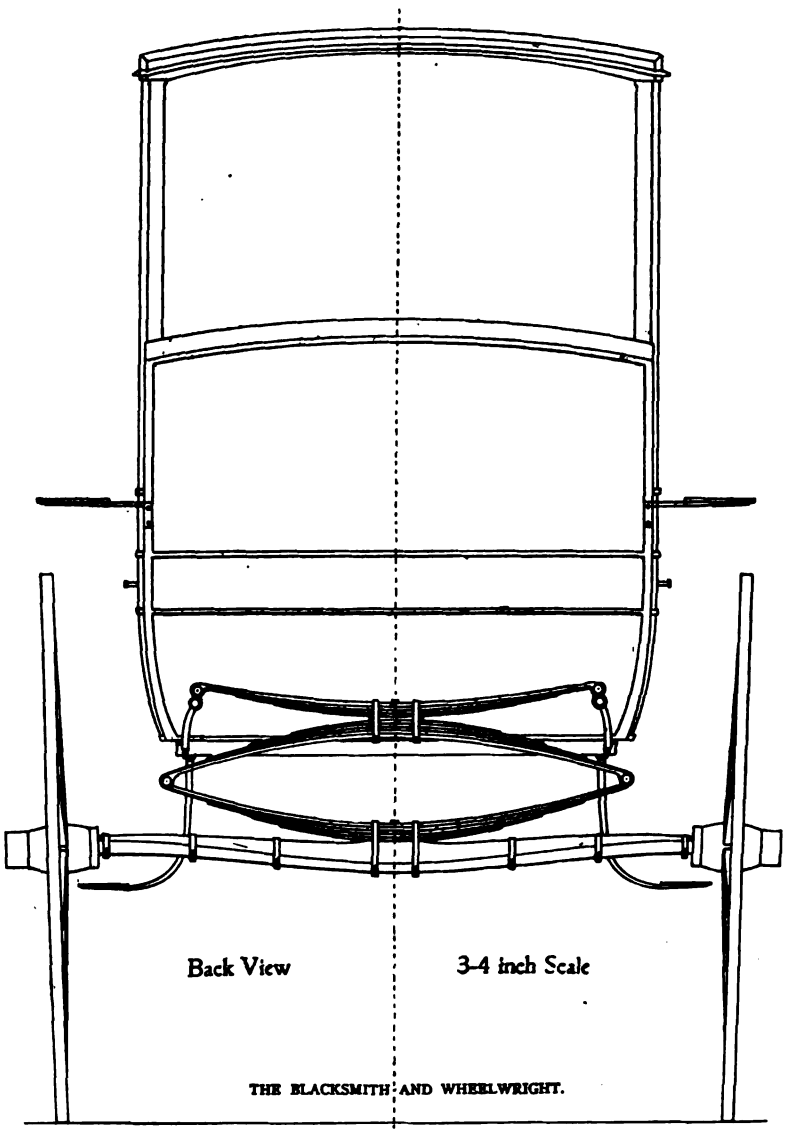
The sill pieces are all straight, except the two front and rear cut under, and each side is composed of five different pieces, and all are dressed square. There are four joints for each side, on which the tenons are on the upright pieces. The front coupe pillars are glued and screwed to the sills from the inside and on top are lapped to the top rail. The rear standing hinge pillars are screwed from the outside and screws covered with the 5-16 inch thick panels; that is, the pillars are lapped to the posts. To save timber the pillars must be inclined as shown by dotted lines on each side and on this account the pillars must be dressed after those lines.

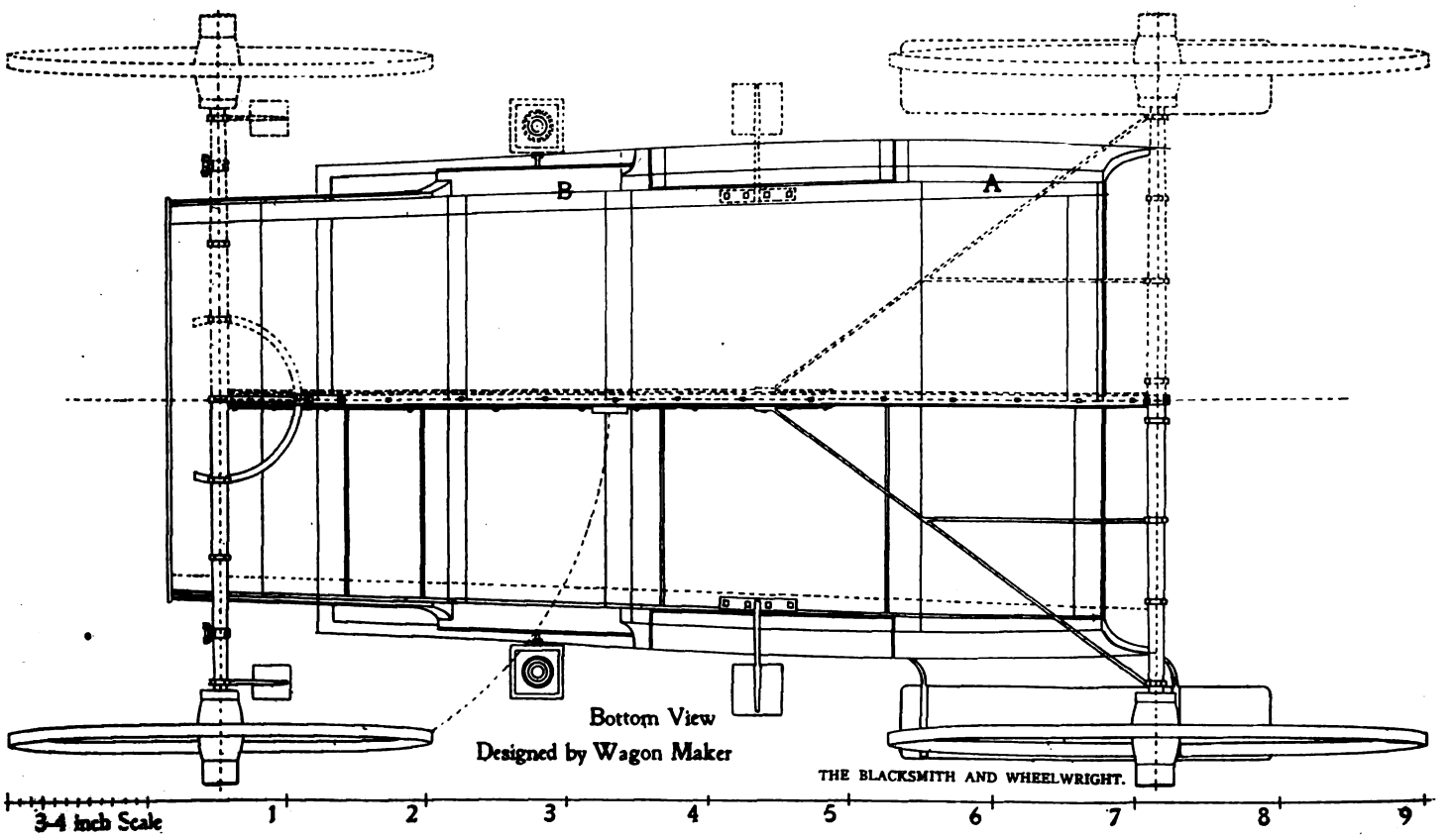
The woodworkers who do not know how to do this had best use the square line, but a great deal heavier timber is needed. The quickest and easiest of all methods is to make a thin pattern exactly to the needed shape. Bend this pattern over the pillars and mark the shape on the rear surface and shape it to the lines, square on inside surface and beveled on the outside after the top rail line. Fit all tenons and laps on the bench. Do not try to set the sills up as it is much easier, better and more correct to fit on the bench and vise. Also put in screws at the base of the pillars and top rail ends.

After the sills have been framed perfectly straight lengthwise and its shape, fit the coupe pillars first to the sills, square up from upper surface of sills and screw fast from inside surface of sills. Do the same with the hinge standing pillars. Those pillars must be parallel with each other both ways. That is, the door must be one width from top to bottom, and on the outside there must be no twist in the pillars. If there is a waist, it must be taken out of the hinge standing pillars, because the surface on the sills is so small that the pillars are liable to turn either in or out, but are easily regulated by taking care.

Screw the top rail to the three pillars on each side and see if everything fits and its positions are correct. When this is done dismount all parts and finish each. Cut the moldings on the coupe pillars and let in the lock plate; let in all the door hinges in the hinge standing pillars, cut in the rails and thickness of panels. On rear end corner pillars cut inside and rear panels, rails and mortise for cross bar, in fact finish all before glueing the sides together. When all is done then glue and screw, and set the body up. It is very easy to do all this on the bench and so difficult and unhandy after the body is set up. Most body makers insist that the door hinges and doors should be fitted when the body is set up. The hinges should not only be fitted to the standing pillars, but also to the door pillars at the same time. The doors should be made at the bench before the body is set up and the locks should be let into the pillars on the bench. This same system holds good with the top rails







and the top rail cross bars, as all should be fitted and the curve notches cut before setting up the body.

The tops are built in different ways to suit the cost of the job. The least expensive tops are made by notching the curves ¼ inch deep for a panel about 9 inches wide on each side. The rest is left open and will make an even surface. Over this rubber cloth is stretched and its edges covered with the drip moldings at the same time covering the tacks which are needed to fasten the rubber cloth.

After the panels are all glued on, the top finished and the bottom finished, finish the side surfaces, and you will have a body which has been built quickly, but thoroughly well made and is a credit to the woodworker.

The same system can be employed for the gear. Buy the axles, springs, fifth wheel, steps, only from the best makers. It costs a trifle more, but there is satisfaction in the shapes and qualities which is a credit to the builder and satisfaction to the buyers and users of the vehicle, and many a builder has increased his trade and made a good living out of it by building honest work at a fair price.

Wheel Dimensions with Plain Hubs:

Diameter of wheels without tires, 36x46 inches.

Diameter and length of hubs, 4¼x6½ inches.

Diameter for ends of hubs front and rear, 2⅝x3 inches.

Size of spokes at square ends, 11-16x1¼ inches.

Number of spokes for front and rear, 12 and 14.

Thickness and depth of rims, 1¼x1⅜ inches.

Thread of rims for tires, 1 1-16 inches.

Size of round edge steel tires, ¼x1 1-16 inches.

One Front Elliptic Spring:

Length from centers of bolts, 36½ inches.

Open out to out, 9½ inches.

Width of plates, 1 9-16 inches.

Number of plates, 5.

Thickness of main plates, No. 2.

Thickness of other plates, No. 3.

Clipped top and bottom and distance apart 3¾ inches.

One Rear Elliptic Spring:

Length from centers of bolts, 37 inches.

Open out to out, 9½ inches.

Width of plates, 1 9-16 inches.

Number of plates, 5.

Thickness of main plates, No. 2.

Thickness of other plates, No. 3.

Clipped top and bottom and distance apart, 3¾ inches.

One Semi-Elliptic Spring:

Length from centers of bolts, 33 inches.

Open from out to centers of bolts, 2 inches.

Width of plates, 1 9-16 inches.

Number of plates, 4.

Thickness of main plates, No. 3.

Thickness of other plates, Nos. 3, 3, 4.

Clipped to top of elliptic spring and distance apart 3¾ inches.

Fantail Axles Front and Back:

Size of axles at square ends front and back, 1⅛x1 3-16 inches.

Size of axles at center front and back, 15-16x1 9-16 inches.

Length of axle arms, for 6½ inch long hubs.

Width of track, out to out, 56 inches.

Advance in Vehicle Prices.

Conditions having so changed during the last two years that those who supply raw materials, and the carriage manufacturers throughout the country appealed to Mr. C. C. Hull, president of the Carriage Builders' National Association, to call a joint meeting of the whole trade, which resulted in a general meeting that was held in Chicago, January 4. Those present represented some ten States whose output reached about 520,000 finished vehicles.

Statistics presented, indicated that 1,200,000 horse drawn vehicles had been built and sold for the season of 1912, but not under very favorable terms or conditions.

Whereupon those who furnish raw materials urged upon the vehicle manufacturers to shorten their selling terms considerably, and to take into consideration the advancing market on hides, hard wood, steel, and the changing conditions confronting the vehicle industry.

It is generally known that the accessory manufacturers had made steady advances all along the line since last June, and it was demonstrated that no decline in raw materials could be expected.

Press dispatches of January 5th in all leading dailies commented upon a 10 per cent. advance in finished vehicles as result of the Chicago meeting. The general opinion prevails that 10 per cent. advance will not cover the advancing costs.

The meeting developed that the accessory people sold their product to the carriage manufacturers on net 30 day terms, after the plan of the Steel Corporation.

The southern, central and western States were well represented, and those who furnished statistics had charts bearing out the changes in advancing costs.

The result of the meeting may bring about a larger and more general meeting in March.

One thing is sure—the selling prices of finished vehicles must advance, but it comes at a time when the dealers can use it as a splendid opportunity to advance their general prices.

CONCRETE.

How to Make It and How to Make a Tire Heating Furnace.

BY JAMES F. HOBART, M. E.

In a recent issue, J. E. L. (Indiana) asks if "cement would make a good furnace to heat heavy tires in, and how to mix it." He further states, "I know it will burn out in a forge where the fire strikes it." In reply it may be stated that while the gentleman says "cement," he evidently means "concrete." Considerable confusion exists by the indiscriminate use of the two terms, but it should be understood that when cement is mixed with water, it is termed "neat cement" and is only used very sparingly for the filling of cracks, setting of machinery upon foundations and similar purposes. Neat cement is too costly to be used freely. When sand is mixed with cement and moistened, the mixture should be called "cement paste or cement mortar." When both sand and gravel, or broken stone are mixed with cement, the mixture should be called "concrete," and the coarse material is usually called the "aggregate" but that term should be rightly applied only to the mixture of coarse material and the fine sand.

Concrete in itself is not a good fire resisting material where it is to be exposed many times to heating and cooling. But where it is to be exposed only once, it resists fire much better than almost any other material used for building purposes. Concrete is such a very poor conductor of heat that a big fire may rage for hours on the face of concrete and the heat will not penetrate more than an inch or two, but let concrete be exposed to repeated firings and it soon goes to pieces. It is for this reason that brother J. E. L. would do better to line his tire setting furnace with fire brick, or with good hard paving brick. The writer has lined boiler furnaces with vitrified paving brick when fire brick were not to be had, and they last for a year at least in ordinarily fired furnaces. A range in the kitchen of the writer's house is at present running with paving brick lining in the fire-box where anthracite coal has been burned for 18 months, and the bricks are still in good condition.

Let the gentleman build the furnace of concrete, but also let him leave a space in the body of the furnace as shown by Fig. 1, where fire brick may be laid in along the surfaces which come in direct contact with the fire and flame from the fuel. It is probable that concrete would last six months if the furnace were not used too often, and if the surfaces next to the fire were made so they could be easily renewed, then concrete might be found cheaper than brick, especially in localities remote from points of brick manufacture.

A convenient way of building a concrete tire furnace would be to build up the lining of fire brick or of vitrified paving bricks as mentioned, and then use the lining as a portion of the form against which the concrete is to be placed. This is shown at A, A, Fig. 2. For laying the fire brick—or the vitrified bricks as well—do not use mortar or cement. Use fire clay which may be procured from the same dealer who handles fire bricks. If no clay is to be had, use ordinary clay and mix with it some pounded fire brick, the dust only being used after it has passed through a screen with at least 16 meshes to the inch. Ordinary mosquito screening will answer first rate. Pound up the fire brick and sift out the fine, then pound and sift until the required quantity of brick dust has been obtained. Mix with clay, about half and half, and lay the fire brick with the mixture wetted to a soft mud. Just "butter" the edges of the bricks, then rub them as closely together as possible. Do not lay the fire brick in mortar as wall bricks are laid. Rub the bricks as close together as possible, so as to use little clay and still give the bricks a good bearing on all sides. Hence the directions to "butter" the edges along the side and end which is to be laid against the bricks already in place. A strip not over 1 inch wide and ⅜ inch thick on the edge, should be wiped upon the brick by the trowel, then that brick is rubbed into place until it can be made to lie no closer to the other bricks.

Build up all the fire-exposed surfaces in this manner. Then put the concrete outside of the fire brick lining, using a temporary wooden form two feet high and the result will be a furnace which will last forever and never wear or burn out. The fire brick lining can be easily removed and a new lining laid in without damage to the body of the furnace. The smith

Fig. 1.—Concrete Tire Furnace.

would do well, however, to take some precautions against the possible cracking of the concrete walls through expansion by heat of the fire lining. It is probable that the occasional use to which a furnace of this kind is subjected would hardly heat the fire lining hot enough to damage the outer walls, but where the furnace is at work continuously for considerable periods of time, some provision should be made for expansion of the inner wall. Lack of such provision is what wrecks so many mill chimneys, cracks boiler settings and raises the mischief with brickwork generally, when it is around heavy fires.

It is then in order for the smith to so lay the fire lining that it cannot crack the outer walls of the furnace. This can be done very easily by packing up against the brick lining, just ahead of the concrete, an inch or so in thickness of wet sand. If the concrete should squeeze up to the brick lining, pry it away a bit and tamp in some sand to keep the concrete an inch or so away from the brickwork. The layer of sand thus interposed between the fire lining and the outer wall, allows the lining to expand and contract under heat without cracking the outer walls. Cover the top of the walls with sand and put the concrete on top of the sand. This makes a "cushion" all around the fire-lining.

There are several things peculiar to this tire furnace, which the smith will do well to note. In Fig. 1, it will be seen that the body of the furnace runs up straight, then steps back squarely, without any slope. This is done to greatly cheapen the cost of forms for building the concrete work. If brick lining is used, build the brickwork up just ahead of the concrete, or a section may be built up before the form is put in place. The form is very simple, just a "wagon box" without any bottom, and clamped

against the furnace by means of bolts at each corner. The form may be three feet high, one foot being clamped upon the finished concrete, two feet projecting upward for the next section, and plainly shown by the engraving.

To put on the roof, just lay four boards around the top, leaving an opening of the size desired. Let the boards lie flatwise and project into the concrete an inch to support them. Then nail up four boards to the size step A is desired. After the concrete has set in this form place more boards across and build another step-form for B. The size of these forms and their height may be arranged to suit conditions and the ideas of the man who builds them. The desired end is to get a roof over the tire furnace as cheaply as possible, without the use of taper forms which are always expensive. The steps, shown at A, B and C, dispense with the necessity for making taper forms and the last form, for C, may be made to serve as a chimney form by placing a wooden box inside for a core. Better not nail the chimney core. Then you can take it out a piece at a time and not have to waste good lumber by burning out the core-form.

The roof may be plastered with concrete, if desired, until the "steps" have disappeared. And if great style is desired, the form A, may be arranged to overhang the body of the furnace and form a cornice, which may also be made as elaborate or as plain as desired.

Fig. 1, shows the opening into the furnace, fitted with sheet-iron doors. There are separate and smaller doors for the ash-pit and this is very desirable as it helps control the fire. The plate between the furnace and ash-pit may be a single casting, which is preferable, or it may be made of pieces of pipe, rods, iron scrap of any available shape, covered with concrete and daubed with fire clay or covered with fire brick. The doors are hung to fixtures built into the concrete.

Fig. 2, shows the interior of the furnace with iron bars arranged to act as grates so that coal may be burned when necessary. If the grate surface be found too large, as probably will be the case, cover a portion of it with sheet iron and throw on ashes, dirt or gravel until the area is reduced as found necessary. Put a couple of irons across to place tires upon. This is a very handy kink when tires are being set so frequently that a coal fire is used. The rod bearers probably won't be necessary when wood is burned, but they are sometimes a great convenience, especially where a great deal of work is being done. Don't set the bearing rods solidly in the concrete walls. Leave holes in the walls and push the rods through afterwards. Pieces of 4-inch pipe set in the walls, are very good for finishing off wall openings. Cast iron will stand better than wrought iron for bearing rods, but either will burn out after a while. The very best bearers are 2-inch steam pipes so arranged that water circulates through the pipes when a heat is on. Only a barrel or so of water will be needed. Just connect the pipes into a barrel same as they are connected to the water jacket and reservoir of a gas engine, and the bearing pipes will never burn out as long as water is kept in the barrel and circulates through the bearing pipes.

Some regular grate bars may be used to make a grate for the furnace. Such bars can nearly always be obtained from the nearest iron-foundry and they will outlast almost any number of wrought iron bars for grate purposes.

Don't forget to arrange a little foundation under the furnace. Dig deep enough to get below frost or surface water and it is well, in clay soil, to fill the entire bottom of the excavation with a few inches of concrete. In sand or loam, this is not necessary as water will drain away, but in clay, put a bottom under the furnace, by all means.

Next, and the most important of all, is the mixing of the concrete. Let the smith ask advice from each man he meets as to the proper proportions for mixing crushed rock or gravel, sand and cement for concrete, and he will be given all sorts of proportions from 1-1-2 (one of cement, one of sand and two of gravel or broken stone) to 1-4-8, and all manner of proportions between these extremes. It has been proven that good gravel is more desirable for concrete making than broken stone, hence gravel only will be mentioned in the following instructions and descriptions. The amount of cement which should be mixed with sand and gravel in order to give the best concrete with the minimum quantity of cement, depends entirely upon the size of the gravel used. If pebbles 2 inches in diameter can be obtained, then much less cement will be necessary than if the concrete must be made from gravel only ½ inch in diameter. And another thing; with less than one-half the quantity of cement, the concrete made from the large pebbles will be much the stronger and more impervious to water.

The writer will give a method whereby the smith will be able to properly proportion concrete for foundations, forges, slack tanks, reservoirs, and the thousand and one uses for which concrete is daily being found appropriate. It will be assumed that a supply of gravel has been laid down at the site of the proposed concrete operation, and that the smith has prepared himself with the following apparatus:

1 piece of wire screen with 30 openings to the inch.

1 piece of wire screen with 16 openings to the inch.

1 piece of wire screen with 8 openings to the inch.

1 piece of wire screen with 4 openings to the inch.

1 piece of wire screen with 2 openings to the inch.

1 piece of wire screen with openings ¾ inch square.

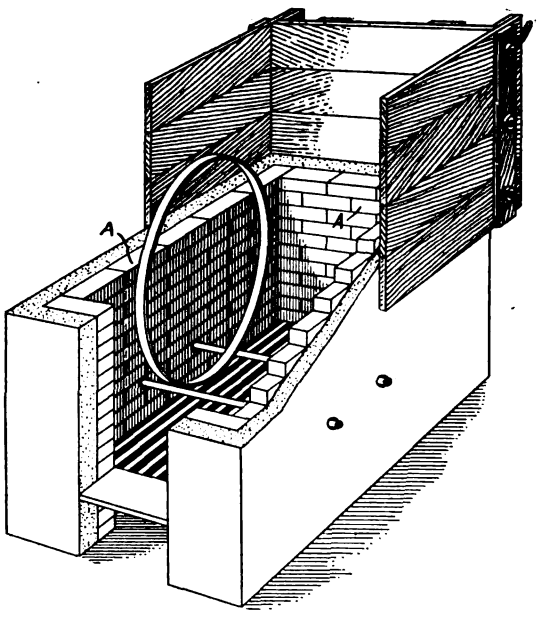


Fig. 2.—Detail of Concrete Tire Furnace.

1 piece of wire screen with openings 1 inch square.

1 piece of wire screen with openings 1½ inches square.

1 piece of wire screen with openings 2 inches square.

1 piece of wire screen with openings 2½ inches square.

These pieces may be of almost any size, from 10 inches upward. They may be fastened to frames of wood or metal, sieve fashion, or they may be flat pieces of wire cloth laid over dishes when in use. If lots of this kind of work is to be done it will pay to rig up convenient sieves, but if only one or two uses are to be made, then elaborate preparations will not pay. The wire with 30 meshes to the linear inch will be the hardest to obtain, but the hardware man often has some of it on hand, or he can get a bit upon order. The screen with 16 meshes to the inch can be found in ordinary window screening. These are made in 12 and 16 meshes to the inch and they are called No. 12 and No. 16, and the latter should be selected. Sometimes poultry netting will supply the size required. If not, these large sieves can be easily made up by stringing wires across the bottom of a box or frame.

There will also be required a weighing scale which is accurate to ounces and which has a capacity of at least six and one-quarter pounds. If such a scale is not at hand one can probably be borrowed for the short time it is needed, or the portions to be weighed may be placed in separate paper sacks and taken to the nearest grocer for weighing.

Select from the gravel, a portion which averages as closely as possible the entire mass. If there is a good deal of large gravel, say 1½ or 2 inch sizes, then 6 pounds and four ounces should be taken as a sample. If the gravel is 1 inch or smaller three pounds and two ounces will answer. The only requirement being that the quantity taken shall be large enough to form a fair sample of the gravel. See that the weighed sample is dry before weighing. Dry over the fire if necessary, then weigh as accurately as possible and pass through all the sieves, coarsest one first, each finer one in succession, and take great care that not a single particle is lost. Work over spread-out newspapers so that not a single grain will be lost.

Put the grade from each separate sieve or screen into a separate can or paper sack and mark each with the number of the sieve through which it passed.

Perhaps the gravel contains nothing larger than what will pass through the No. 2 sieve and upon screening and weighing 6 pounds and 4 ounces were found. The six pounds and four ounces were taken for analysis because that made just 100 ounces and each ounce counts as one per cent., something necessary as presently will be shown. From the sampling of gravel, there has been determined the quantities of each size or grade contained therein, and next we must determine what quantity of each grade must be used to make the best concrete mixture. When this is known, we can compare the percentages with those of the analysis, and find out what sizes should be added to or taken from our gravel in order to fit it for concrete making. It is for this reason that it is desirable to have the quantities come in percentage instead of in pounds and ounces.

The theory of making perfect concrete is to use as large pebbles as possible to fill the space to be concreted, then put in enough of the next smaller size of gravel to fill the larger holes among the large pebbles. Then keep on adding smaller and smaller material until finally nothing more but the very fine cement and the still finer particles of water can be worked between the large pebbles.

A good concrete is composed of 8 parts of sand, gravel and pebbles; 1 part of common earth, burned and powdered; 1 part of powdered cinders and 1½ parts of unslaked hydraulic lime. These materials must be thoroughly beaten up together; their mixture, when properly moistened, gives a concrete which sets almost immediately, and becomes in a few days extremely hard and solid, properties which may be still further increased by the addition of a small quantity—say 1 part—of Portland cement.

Water Power Calculation.

To determine the quantity of water to develop a given theoretical horsepower on a given head, multiply the horsepower by 529, and divide by the head in feet. The result, when multiplied by the mechanical efficiency of the water-wheel, will give the brake-horsepower, or the volume of water to develop a given brake-horsepower on a given fall in feet. The mechanical efficiency of the wheel depends on the type, while the type of wheel depends on the conditions of the stream. For a high fall, an overshot wheel having an efficiency of from 60 to 70 per cent. is employed; on falls from 6 to 10 feet, a breast wheel having an efficiency of from 55 to 65 per cent.; and an undershot water-wheel on streams of high velocity and falls of from 2 feet, the ordinary type having an efficiency of 35 to 45 feet. A turbine is practically suitable for any fall, and has an efficiency of approximately 70 to 80 per cent. For instance, assuming that the head is 6 feet, a breast wheel would be the most suitable type of wheel, having a mechanical efficiency of 65 per cent.

"Room for One More."

We little know what we can do until we are compelled to. For illustration, in 1911 New York City's subway carried more than three hundred million passengers, and they were crowded to suffocation so that it seemed impossible to carry another one. But in 1912 this subway carried twenty-six million more passengers. It does really begin to look as if there is "always room for one more."

A New York City department store appeals to women to take advantage of its offer of a "seven-course dinner, from noon to 2.30, for seventy-five cents," on Thursday, that being "the maid's day out," in order to have "a full day's freedom from housekeeping cares." Yes, but what is the old man to do for his dinner.

PAINTING POINTS.

Three Important Considerations Involved to Insure a Good Job of Work.

From M. C. Hillick, Pennsylvania.—There has been altogether too much slipshod painting applied to the automobile with the result that complaint is being everywhere made that while the American painted car is for a brief time at least, a thing of beauty it is not "a joy forever." Attractive painting of the car does not, therefore, necessarily mean simply beautiful colors protected by a radiant garment of varnish. It embraces a fine measure of surfacing, every new or old coat of paint being worked down as clean and smooth as a hound's tooth, and a just and fair balance given to each individual coat. That's what the term attractive painting means, and it is precisely what the car owner when he put his car in the care of the painter should insist on having applied to his car.

It matters not whether the car is home painted or professionally painted the first essential thing is to clean the mud, and dirt and foreign matter from the surface and then sandpaper the old paint structure—or the new, for that matter—right down to hard pan. Slick off every particle of dozy pigment; work everything down to a smooth, hard under-pinning of paint. Fractures showing decay need to be cut out with the putty knife so that finally, when the work of surfacing is all complete, the remaining paint film is strong and firm and well knit. Then dust off and apply a first coat pigment containing 30 per cent. raw linseed oil which will serve to give a good foundation bound tight and strong to the old. Upon this coat when dry putty all surface defects such as gouges, fractures, coarse patches, etc. Use a quick, hard drying putty that can be sandpapered 24 hours after application.

If the surface is in good condition and not much broken up it will pass along without having more than one more coat of surfacing pigment. For this second coat use white lead, colored up to meet the shade of the final color selected for the car. Work both of these preparation coats very smooth upon the surface, sandpapering each coat separately along with the putty. This will serve for your foundation for the color and for all the coats coming after. In the event of the surface being checked and chopped up some with age and hard usage use the coat containing the 30 per cent. linseed oil, putty in due time on this, and then in as many days apply three coats of rough stuff bought ready to use. Let this foundation of rough stuff dry hard and secure, and then rub with artificial rubbing stone and water. This represents the two principal methods of bringing the old paint surface up to a condition suitable to put color on. They will do more than anything else to produce attractive painting. The car owner should understand that above every other factor the primary surfacing—the working of all the old coats of paint down smooth and fine—counts for most.

Having secured this, the next step is to get the color coats on in nice, clean condition, all brushed out in one direction free from runs and sags. Choose appropriate colors. Above all, do not use too many colors and so spoil the effect. Put on some neat striking lines if possible; if not competent to put the lines on true and uniform omit them altogether. One or two good coats of rubbing varnish, each coat carefully applied and put on without runs or draperies, these topped off with a good solid coat of elastic body finishing varnish should suffice, and will suffice under reasonable conditions, to bring out not only a durable but an exceedingly attractive finish. Each of the two rubbing coats of varnish should be rubbed with pumice stone flour and water, using a half-inch perforated felt pad to rub with. This produces what is technically known as "a surface," i. e., smoothness and levelness which is the object of the rubbing.

The chassis or running parts in the meantime need to be brought along by first cleaning them with turpentine, or some cheaper fluid detergent, sandpapered hard and smooth and given a coat of the oil pigment used for first coating the body. Then putty and in due time again sandpaper. Follow with one coat of color, one coat of varnish color, apply lining work, then one coat of clean rubbing varnish, rub with pumice stone flour, clean up and finish with a hard drying varnish impervious to soap.

DOWEL MAKING.

Simple Appliances With Full Directions to Secure Good Results.

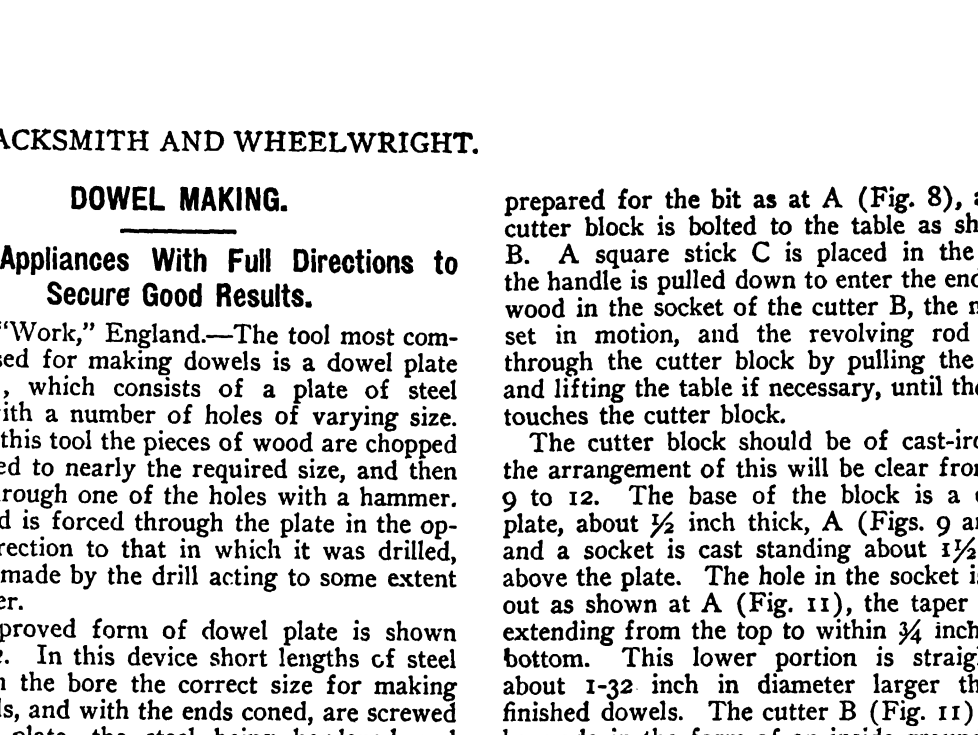
From "Work," England.—The tool most commonly used for making dowels is a dowel plate (Fig. 1), which consists of a plate of steel drilled with a number of holes of varying size. In using this tool the pieces of wood are chopped and planed to nearly the required size, and then driven through one of the holes with a hammer. The wood is forced through the plate in the opposite direction to that in which it was drilled, the burr made by the drill acting to some extent as a cutter.

An improved form of dowel plate is shown by Fig. 2. In this device short lengths of steel tube with the bore the correct size for making the dowels, and with the ends coned, are screwed into the plate, the steel being hardened and tempered, and the cutting edges sharpened with an oilstone.

Generally, dowels made with a plate are not satisfactory, as driving with the hammer upsets the fibres of the wood, thus weakening it, and only small sizes can be made with accuracy. Fig. 3 shows a dowel-rounder or "trap" to be worked by hand. In using this, the wood is first cut to size with a saw, and the edges are taken off roughly with a plane. One end is then screwed in the vice, and the tool entered on the other, and revolved with the hands until the full length has been rounded. The tool may be made of beech or ash from 3 inches to 4 inches square, according to the size of the pieces to be rounded, and about 10 inches long. Handles about 4 inches long are turned out at each end, as shown in Fig. 3, and a hole the size of the dowel is bored through, and this is coned out on one side to the size of the rough timber to be rounded, to within about ¾ inch of the other side (see Fig. 4). The straight portion A (Fig. 4) is required as a guide to keep the tool straight. A mouth is cut through one side of the tool, as shown at A (Fig. 5), and a cutter fixed with a screw as shown, or with a ¼-inch bolt, the nut being in the position shown for the head of the screw. The dotted line B shows the angle at which the bevel of the cutter should be set, and it will be noticed that this line just cuts through the circle. This rounder is useful for finishing the ends of ladder rungs to get them all correct to size for fitting into the holes in the staves. The cutter should be ground to the shape shown in Fig. 6.

A vertical boring machine with a hand feed can be used for turning short lengths of dowelling, a number of which, with the aid of a machine of this description suitably fitted, can be turned out quickly and well. A chuck, as shown by Fig. 7, is fitted in the socket of the machine prepared for the bit as at A (Fig. 8), and the cutter block is bolted to the table as shown at B. A square stick C is placed in the chuck, the handle is pulled down to enter the end of the wood in the socket of the cutter B, the machine set in motion, and the revolving rod forced through the cutter block by pulling the handle and lifting the table if necessary, until the chuck touches the cutter block.

The cutter block should be of cast-iron, and the arrangement of this will be clear from Figs. 9 to 12. The base of the block is a circular plate, about ½ inch thick, A (Figs. 9 and 10), and a socket is cast standing about 1½ inches above the plate. The hole in the socket is coned out as shown at A (Fig. 11), the taper portion extending from the top to within ¾ inch of the bottom. This lower portion is straight and about 1-32 inch in diameter larger than the finished dowels. The cutter B (Fig. 11) should be made in the form of an inside ground gouge with the same radius as that on the top portion of the hole, the bottom corner being slightly rounded to prevent it from turning a spiral groove on the dowel. Fig. 12 gives an enlarged plan of the cutter showing the throat A and the angle for fixing it. The line of the face of the cutter should just cut the circle of the socket at every point as shown by the dotted lines B B and C C. A couple of holes B (Fig. 9) may be drilled through the base plate of the cutter block for securing it with bolts to the holes in the table of the machine, and when it has been fixed centrally, a line may be scribed on the table round the base plate, to which it can be fixed another time after it has been taken off for the machine to be used for other purposes.



Simple Appliances for Making Dowels. Fig. 1.—Common Dowel Plate. Fig. 2.—Improved Dowel Plate. Fig. 3.—Front View of Hand Rounder. Fig. 4.—Section of Hand Rounder. Fig. 5.—Section of Hand Rounder showing Cutter and Angles. Fig. 6.—Cutter for Hand Rounder. Fig. 7.—Chuck for Boring Machine. Fig. 8.—Boring Machine, with Cutter and Dowel Fixed for Rounding. Fig. 9.—Plan of Cutter for Rounding with Boring Machine, etc. Fig. 10.—Elevation of Cutter. Fig. 11.—Section showing Radius of Cutter. Fig. 12.—Angles of Cutter.

Tempering Receipt.

Take 1 oz. sal ammoniac, 1 oz. alum, 1 oz. saltpetre; 1 ounce borax, ½ ounce corrosive sublimate, ½ ounce carbonate of magnesia, ½ ounce oil of vitriol, 1 pound salt and three gallons of soft water; for larger amounts increase in the same ratio. It can be used for any kind of work, such as mill picks, edged tools and plows. It must be kept in a wooden hooped barrel or earthenware; iron hoops would be burst by it. Heat to a cherry red and oil. A few trials will show about the heat for different kinds of steel.

A-Lashing of Its Tail.

Captain Ruser, one of the best-known sea captains of the transatlantic service, states that not long ago he saw a genuine reptilian object, twenty feet in length, close alongside his ship, the Kaiserin Auguste Victoria. This sea serpent was, as usual, a-lashing of its tail. Notwithstanding his statement, it is announced that Captain Ruser will be promoted to the command of the giant steamship Imperator next year.

OXY-ACETYLENE WELDING.

Something About the Practice and How to Make a Cheap Plant.

From J. N. Bagley, Nebraska.—For the blacksmith a good welding plant is not only useful but profitable. The cost of these outfits is heavy, however, ranging from $300 for the cheapest to $1,000, depending, of course, on the capacity of the outfit. The machine I will describe here can be built for considerable less than one hundred dollars and has a welding capacity of from one-half to three-quarters of an inch, depending somewhat on conditions.

I, like many others, have wanted one of the welding machines for some time, and have spent a great deal of my valuable time answering advertisements, in the hope that I would, after a while, find something suitable that I could afford to buy. As time passed on I gave up all hopes and set about to manufacture one of my own. Knowing nothing of the process it went slow and cost me quite a little money in experiments that others need not do.

The combining of the oxygen and acetylene gas in correct proportion gives off a heat of six to seven thousand degrees. With this heat it is possible to melt any metal that the repair man has to deal with. Of course, the size of casting welded will depend on the capacity of the machine, as well as the tip used on the welding torch.

Oxygen is a colorless, odorless, tasteless gas that can be produced in numerous different ways. But for the welding machine, especially on a small scale, it will be well to consider the use of potassium chlorate and manganese dioxide as this can be purchased from the drug houses, or it can be brought quite reasonable from a welding supply house with the rods and fluxes, as we will take up later. These chemicals are heated, thus giving off oxygen in an impure state, and by passing the gas through water containing caustic soda purifies it and leaves it in a condition to be used in the welding torch.

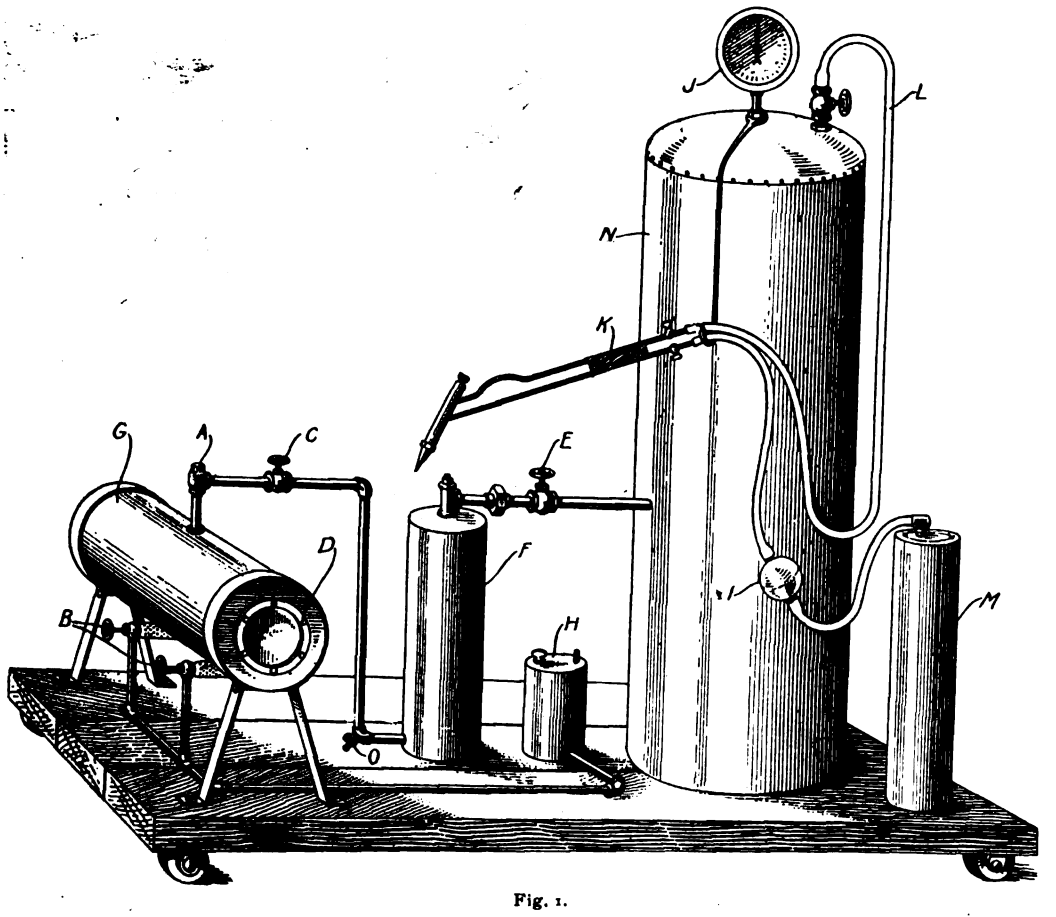


Fig. 1.

Referring to G, Fig. 1, we have the oxygen generator, which consists of a piece of six-inch pipe capped on each end. This can be purchased from a plumbing supply house at a cost of about $3. Into one of the ends should be cut a hole in one of the caps about three inches in diameter to allow of the chemicals to be put into the generator, and this plate should be bolted onto the cap with stud bolts D, so that it can be removed easily. This generator should be set upon legs about one foot from the platform, or floor if it is a stationary affair. Over the top of this generator should be a cover of sheet iron with an asbestos lining to hold the heat to the generator. Out of the extreme top of the generator should come a one-half inch pipe with a check valve on top as shown at A, a short nipple and a globe needle valve C, and from there suitable piping to lead to the filter tank containing the caustic and water F.

Before leaving the oxygen generator we will take up the heating which we will do with two blow-torch burners and a compression tank as shown at B and H. This little tank can be put where most convenient, but should be as compact as possible if the outfit is to be portable. The filler plug in the gas tank H, should be air tight, and into the top of the tank should be screwed a bicycle valve to allow pressure to be put onto the tank. This tank, H, should hold with safety about fifty pounds pressure. Of course, only fifteen or twenty pounds are necessary, but for safety it will be well to have the tank stronger.

The filter tank, or the tank containing the caustic soda solution will be taken in its turn. This little tank should hold three or four gallons, while only one gallon of the solution is necessary to a charge. This tank should have strength to withstand a pressure of two hundred pounds with safety. In the top of the tank F, should be screwed a short nipple and a T fitting. In the top of the T should be screwed a plug to allow of the solution to be put into the tank. In the pipe at the bottom of the tank F should be put a small cock O, to allow of the mixture to be drawn off. After leaving the tank F, there should be a union placed in the line as shown to allow the oxygen tank to be taken out to a job if necessary without moving the entire plant.

Next comes the globe needle valve E, which when closed prevents the gas from coming back from the oxygen tank when it is once stored. The large tank N, contains the oxygen. This tank as shown is a 52 gallon tank tested to 200 pounds. Into the top of this tank should be screwed a gauge J, which will show the pressure of oxygen on hand, and by this can be figured to an extent the cost of the job. Into the second opening at the top of the tank should be placed a needle valve to allow the control of the flow of oxygen to the torch, to which is connected the hose L. The hose I use is what is called "beer hose" and costs about 5 cents per foot. The hose should be about eight feet long to allow of moving about the work while using the torch. The acetylene tank, M, I purchased from the Carbolite Company of Anderson, Ind. In shape and size it much resembles the Presto tank, but it can be charged in a few minutes with carbide and water. This tank I have used for some time and it works to perfection on the welder. A hose the same length should be attached to this tank. To prevent the water from interfering with the torch that accumulates in the hose leading from the acetylene tank I use a small filter I, made from a couple of copper oil cans. I cut the can in half and soldered it together and placed wool inside. This prevents moisture from effecting flame at the torch.

The entire plant should be placed on a plank platform which will allow of it being moved around. Many times it will be very profitable to take the machine to the work rather than to take the work to the machine. This platform should be set on wheels, or casters to allow turning about in any shape. After the platform is finished it adds much to the appearance of the entire outfit to give it a coat of paint. I painted the platform and oxygen

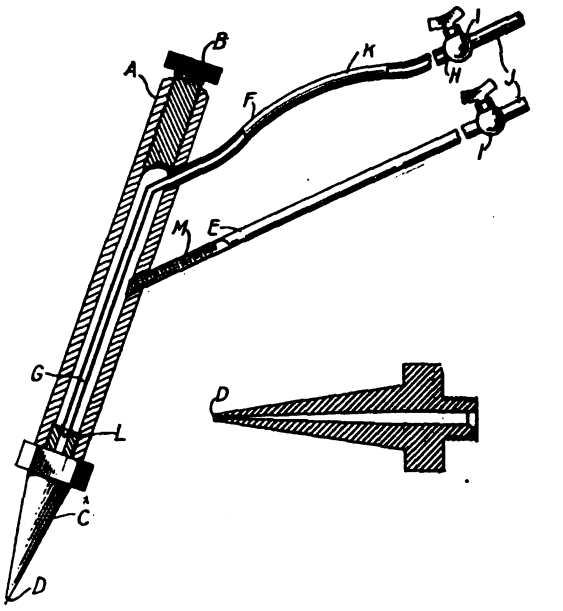


Fig. 2. Fig. 3.

generator black, and the balance of the outfit just as red as was possible to get it. The red attracted the attention of every one that came to the shop and they began to ask numerous questions, and when once you begin to explain the possibilities of the machine to a bunch of curious fellows there is sure to be one or two in the crowd that will have a job for you. What you want to do is to create an interest among the people and your business will begin to pick up. All of the parts used in this machine can be purchased from the dealer who makes the smith territory, unless it is the pipe and caps used in the generator which can be purchased from a plumbing house.

In the manufacture of the torch some little pains must be exercised to get the best results. In the first place the body of the torch A is made of brass ¾ by 6 inches. Through the entire length should be drilled a ⅜ inch hole. Into the top of this should be screwed a cleanout plug B. The bottom of this should be tapped a ⅛ inch pipe thread to screw the welding tip C. Into the side of the body A, should be tapped at an angle of ⅛ inch, brass pipe which the handle is made of as well as inlet passages for the gas to enter the torch. These pipes should be about 1 inch apart. The top pipe F, should be made in the shape shown in the drawing and have a small copper tube in the side to convey the oxygen to the tip before allowing it to be mixed with the acetylene gas G, as better results are obtained the closer to the tip the gases are mixed. The inside tube of the oxygen pipe should be brazed or fastened gas tight at the end of the pipe F, at H, where it enters the control valve. Each of the valves should have a control valve I. While it is not necessary to use the valves at all times, as the gas can be controlled at the tanks, many times a little variation of gas is necessary and it can be made at this point. The little hump in the oxygen tube K, is not a necessity but adds to the looks of the torch. A wooden handle can be fastened to the torch for a hand hold, as shown in Fig. 1 at K. The tip should be cupped to allow of the pointed end of the oxygen tube to come up as shown at L. The acetylene gas comes down tube E, passing through the fine gauze wire M, and passes out at the opening in the tip C, at D. This gauze in the line prevents the fire flashing back. The oxygen gas comes down the tube F, and sprays the oxygen into the tip at L. This action mixes the gases before they reach the tip D.

The tips, as shown at Fig. 3, are also made of brass. The inside opening should start to taper at the point it screws into the torch A, and continue to within an eighth of an inch of the end of the tip. The outlet D, in the tip should be small for light work and increase in size according to the weight and size

of the work to be welded, therefore, it is necessary to have a number of the tips on hand to be screwed on as the different weight jobs come into the shop. It would be a waste of gas to do a heavy job with a small tip and vice versa.

FIXING UP AN OLD AUTOMOBILE.

Some Things May Easily Be Done to Improve Its Appearance.

Much can be done to improve the appearance of quite an old car, and to render its engine more efficient at a small expense.

The first, least expensive, and most effective improvement to an old car is fitting running boards. A stout packing case would furnish the boards, which must be planed up and snugly fitted, and American cloth serves for the valances, tacked beneath the running boards at the back, and tucked between frame and body at the top, or tacked to the body in the neatest manner that suggests itself. The running boards may be covered with a dark linoleum to suit the color of the car, and a brass bead may be run along the edge. The cost of these improvements will probably not exceed $2 for material, etc. Valances may also be fitted between the wings and frame. These, while not adding very much to the appearance, will help to keep the body and bonnet from being splashed in muddy weather; and one of the points of a modern car is its comparatively clean state after a muddy run. The best way to fit the cloth to the wing is by turning it twice round a strip of tin about ¾ inch wide and fixing tin and cloth to the wing with small screws and nuts every few inches. Screws and nuts for this may be bought at any hardware dealer's. They are plated, and do not look unsightly. The lower part of the valance can be secured to the body or bonnet plate with tin tacks; and the underside of the cloth should be enameled or painted to suit the color of the wings.

With regard to the body itself, much depends on the individual case. The average amateur is not equal to extensive alterations, such as converting a back entrance to a side entrance, but whatever is, or is not, done, all body noises and rattles should be as far as possible eliminated. Doors that rattle may have little pieces of rubber tacked in the frames so that they bed in tightly, and in a landaulet body many other places may be found requiring similar treatment.

If a man be skillful with a paint brush, and ambitious, he may paint and varnish the whole car. If properly carried out it is a long and tedious job, particularly if the old paint be much chipped, as this means a great deal of time "stopping" and "rubbing down," and even briefly to describe it would take a whole article. With care and patience, however, very fair results may be obtained, the great obstacle usually being dust in the last color coats and varnish. A coat of enamel is rather less trouble, and will look well enough if the original paint is not badly chipped. If a new color be desired a couple of coats of paint should be applied before the enamel, allowing each to dry thoroughly, and rubbing down with powered pumice after each coat. A good hat is essential, and dust should be kept down as much as possible by sprinkling the floor with water; and if the roof lets in dust a damped sheet may be suspended over the car, about six feet above the floor.

If no painting is to be done, all the body and paint work should be thoroughly cleaned with kerosene and polished. The best way is to clean a portion at a time with a rag well wetted with kerosene, polishing with a clean rag, taking a fresh piece as soon as the one in use becomes soiled, and continuing this process until no more dirt comes off. The pressure on the rag should not be heavy, and should grow lighter as the work proceeds. When the whole is finished, it may be left for a day, lightly polished with a clean rag to remove any last trace of kerosene, and treated with linseed oil or furniture polish. The methods are equally good, but the linseed oil appears to feed the varnish and prevent the spreading of minute cracks. The oil should be lightly and freely applied, left to dry in for a few hours, and then polished off with clean rag. In a few days' time a second dressing of oil may be given and after another week a final gloss with furniture polish.

The upholstery may be cleaned in the same manner as the paint work—kerosene first, and olive oil in place of linseed, finishing with furniture or boot polish. Both the olive oil and the polish may be used plentifully on chafed and worn places, and if the upholstery be really good—as is often the case on old cars—this treatment will freshen it up surprisingly.

As a good deal of the noise of an old car usually comes from small loose parts banging and rattling, it will be advisable when fitting to see that all shakes and rattles in control rods, brake operating mechanism, and the like are taken up where possible. The cylinders may be painted with some of the preparations sold for this purpose, but preferably not with aluminum paint. The piping for induction, water, oil, and cables must be carefully polished in detail, and the frame and all parts seen when the bonnet or floorboards are raised should be cleaned, and painted where necessary, for if the car is to be touched up outside these parts must correspond, or the general result is bound to be unsatisfactory.

It is, perhaps, scarcely practicable within the limits of a short article to furnish general advice of any value with regard to the muffling of an old car. With body noises and rattles eliminated, the chief causes, speaking broadly, that remain will probably be engine, transmission and exhaust. To deal with the least first, many old mufflers are, as such, very inefficient, and the fitting of a modern muffler involves no great outlay, and the effect will generally be satisfactory. A discriminating ear will perceive where the trouble lies in any particular case, and it is then simple to say what improvements, if any, can be carried out. Noisy tappets may be fitted with fiber pads, and—a small item, but sometimes important—the timing gear covers on old cars are not always really grease tight. If they can be made so, and are kept well supplied with a suitable grease, another step toward silencing will frequently have been made. Where small chains are concerned, for pumps or distributer drives, cases can often be fitted with success. With chain-driven cars, chain cases are somewhat beyond the amateur's power to make—nor is there always room to fit them—but chains, if in line and properly cared for, are not so very noisy. The noisiness of chain-driven cars is usually judged from the worst examples one meets, but with shaft-driven cars the reverse is the case.

Coming now to the last, and perhaps most important, point—increasing the power. It is quite infrequent to find the apparatus for ignition incapable of adequately performing its functions, if it be thoroughly cleaned and put in order. The trouble with many old cars may be summed up in one word—carburetion. Piping may be simplified, sometimes with advantage; it is not often that valve lifts can be increased

Photo. Underwood & Underwood.

Servian Blacksmiths of the Allied Balkan Army Shoe ng Oxen for Transport Services on the Rough Balkan Roads

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FEBRUARY, 1913.

PARTIAL CONTENTS.

CAUTION.

Our readers are cautioned to pay no money to a man who signs himself C. Taylor. He has been operating in West Virginia and in Ohio.

He makes extravagant offers of premiums, such as hammers, knives, etc., and has succeeded in collecting money from a great many people. He pockets the money and never reports the subscriptions to us.

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We have agents representing us in various parts of the country, but each one bears with him a letter of authorization signed by the president of the M. T. Richardson Company.

ACT TOGETHER.

The views of Mr. Hilbish of Texas on raising the profession of horseshoeing to a position equal to its importance are recommended to the careful consideration of every horseshoer who reads this magazine.

He has sized up the situation and the condition exactly. No matter if horses were shod for 50 cents each, there would be some who would ask the price to be reduced to 25 cents. No man living in this country can afford to shoe a horse for a dollar. It is an injustice to the horse, to his owner, and to the horseshoer himself.

But it must be admitted that it is not easy to raise the price and the quality of shoeing. Even the fair-minded horse owner is inclined to question any raise in price, and as for the unfair one, he considers it an imposition, so long has he indulged in the thought that it requires little talent to shoe a horse correctly, and that the farrier should work for the same remuneration as the day laborer.

But the remedy is easy. If horseshoers will get together and stand by each other, they can easily remove every just grievance from which they suffer, and they should not and do not ask for anything else. Individual effort can accomplish but little; concerted effort will accomplish much.

If there is the slightest reason for a standard whereby dentists and doctors must be examined and acquire a certain amount of knowledge and experience in order to secure permission to treat the human body, although their patients have the power to secure redress in case of mistreatment, how much more is such a condition needed in the case of the noblest and most useful animals that exist, their only failing being that they "cannot speak for themselves"? The Great Creator, it is true, made them unable to cry out against abuse, but this being so, how much more important is it that the voice of man be raised in protest whenever they see them abused?

The situation is entirely due to the lack of the same restrictions and requirements that are legally enforced in the case of every other similar profession, and we are bound to say that the horseshoers themselves are largely responsible for it.

Pull together, gentlemen. Don't pull apart. It is a bad business policy and a bad business principle. The whole business world is rapidly finding it out. Will you be the last to learn that you can only get what is due you and your profession by acting together?

EASY READING.

It is a source of no little satisfaction to feel that the chief merit of The Blacksmith and Wheelwright is the simplicity of its reading matter.

There is a class of writers in the press, and especially the press of the large cities, who are more concerned in the use of obscure words and fantastical phrases, than in imparting knowledge or information. They are more interested in themselves than in their subjects, and after finishing reading what they write, one may have gained considerable information about the mental quality of the writers, but little real knowledge.

The greatest two writers of the 19th century —the two who have left the most useful knowledge for the great mass of humanity following them—are Charles Darwin and John Ruskin. Yet there is not a line in their published works that cannot be easily understood by a school boy.

Darwin, the world's greatest naturalist, and the founder of the biological theory of evolution; and Ruskin, who so simplified art that the most common mind may understand and admire its beauties and usefulness. With new and accurate knowledge so vast that the reader of their works is lost in wonder that a life duration was enough to acquire a tithe of it, they were yet the most unassuming of men, and with the exception of the use of scientific terms for which they were in no way responsible, they used the simplest of words and the clearest of sentences.

Although Franklin was not an educated man as were Darwin and Ruskin, he was an unusually wise one, and he wrote much. His writing was of the simplest sort, as was that of Lincoln, who although uneducated, was wise and intellectually great.

The published works of all the foregoing named men, reveal the simplest of words and sentence construction, and a total lack of the slightest trace of intellectual aggrandisement.

Horace Greeley once said that "easy reading is mighty hard writing," but if one is full of his subject both the writing and the reading will be easy.

MUTUAL HELPFULNESS.

In all this present divergence of opinion concerning public policy and private duty, do not forget that the thing that most makes for progress and the upbuilding of character and material welfare is the spirit of mutual helpfulness.

Do you know what has kept China where she is today? It is the prevailing spirit of "everyone for himself." In reading a book on Chinese traits the other day, we came across this observation by an author who knows them well:

"One other trait of Chinese character must not be overlooked. The people are selfish and unsocial; living apart in families, and indifferent to the welfare, or the sufferings, of their neighbors. They have few human sympathies.

"They work apart, in their several callings, without partnerships or combinations. They care not to lend a helping hand to others; and value little even their own wretched lives."

As long as this selfish spirit prevails, China will never amount to much as a nation. Those who will not and do not work together for the common good are poor units of humanity, and are lacking in the first rudiments of social advancement.

In Germany, for illustration, where the whole aim of government is directed toward the idea that the interests of the individual must be subservient to that of the mass, there is today unusual prosperity and an industrial and business condition that should cause other great nations to "sit up and take notice."

CAUSE AND EFFECT.

Just at present the great mass of thinking people of all shades of political and religious belief seems to be concerned as never before with the great problem of inordinate and swollen fortunes on the one hand, and pinching poverty on the other.

But there seems to be a bewildering variety of opinions as to what should be done to restore normal conditions—to make moderate welfare as widely diffused as possible. And well there may be when so many are prescribing palliatives for effects while little attempt is being made to seek for causes, much less to remove them.

First, let us see what is needed. Why, simply to make the road to material independence as easy and as short as possible, and the road from that point—to unnecessary and inordinate wealth —as long and arduous as possible.

Palliatives, such as a "minimum wage," and a paternal form of government that encompasses everybody in a network of legal enactments will not do it. There must be individual freedom for any and all action that does not interfere with the general welfare.

When conditions are as they should be, the man or the woman who has labor to sell, will be able to dispose of it—not at the price the purchaser fixes or the price that government fixes, but at the price that demand and supply fixes, just as is the case with the purchase or sale of merchandise, or of real estate.

In other words, there must be the same equality of relations between the purchaser and seller of labor that there is between the purchaser and seller of a pound of tea, or a house and lot, or a newspaper or magazine. Can any one imagine a more recklessly idiotic condition than to have the government fix the minimum price for any of

the commodities named? Well, the fixing of the minimum rate of wages is just as idiotic and futile to correct the evils of a dull labor market. "Yes," we hear some one remark, "but how do you know there is a dull labor market? I know cases where one is unable to get the help that is needed." We reply that labor combinations are a sufficient proof of a dull labor market, just as combinations of capital are a proof that such things are needed to prevent ruinous competition among manufacturers or producers of any kind.

The only way to secure an equality of relations between the seller and the purchaser of labor is to reduce the hours of work so that demand and supply will be equal. The only way to secure an equality of relations between the manufacturer of goods or the producer of anything else is to not produce more than can be consumed.

Supply and demand are what fix prices, whether it be for beans, potatoes, brains, skill, clothing, labor, manufactured goods, or anything else. Any attempts to go contrary to this law by fixing a minimum wage or a maximum freight or passenger rate, thus creating artificial prices, is like putting a plaster on the purulent smallpox sore, or fanning a fever stricken patient. It is a palliative for effects instead of a remover of causes.

For a fair price for labor, reduce the hours of work so that the demand and supply will be equal; for a fair price for the products of capital, reduce the output so that the demand and supply will be equal.

Combinations of labor and combinations of capital are both due to the fact that with unlimited competition the supply is greater than the demand.

TRADE DISCOUNTS.

Manufacturers of blacksmiths' and wheelwrights' supplies should send out their price lists without trade discounts or other marks, so that if necessary the smiths' or wheelwrights' customer may consult them for prices and yet not know the exact profit that is made on them at retail.

The average retail merchant is not in the habit of affixing to the goods he sells both the price he pays for them and the price he asks. In many cases even the selling price is not marked in plain figures, and no merchant thinks of putting on the cost price in plain figures.

Then why should the blacksmith be obliged to do this? It is often convenient for the smith to tack a price list on the wall of his shop, or leave a price list catalogue for the customer to refer to while he waits for his horse to be shod or for something else to be done. He thus learns the retail prices of the goods he may wish to purchase.

Or, if more convenient to the manufacturer or supply man, let him send the smith two price lists, one without the trade discounts and the other with them. The first will be for the customer's use and the last for the convenience of the smith himself.

This suggestion is made in consonance with the views of a reader as expressed on another page of this issue.

THE PHILOSOPHY OF DEBT.

In his well-known poem, Longfellow says, "The Village Blacksmith," "looks the whole world in the face, for he owes not any man." Well, it is a good plan to look the whole world in the face whether one owes not any man or whether he be deeply in debt.

The old maxim of "keep out of debt," is good advice or bad, according to conditions. We can call to mind several prosperous business men, who, had they kept out of debt, would very likely have been poor men today. The maxim would be very much improved by changing to something like this: Be sure you are right before you run in debt, and when you are sure you are right, be sure and run in debt.

One thing the borrower should never forget: You are no richer after you have borrowed than you were before. You should practice just as much economy, be just as industrious and just as cautious after you have the borrowed money in your hand as you were before you had it. More so, in fact; for you have a right to take a chance with the funds that belong to you but no right to take a chance with funds you have borrowed.

But borrowed funds give you the chance you otherwise might not have of embarking in something like that which Shakespeare referred to when he said "there is a time and tide in the affairs of all men which taken at the flood leads on to victory."

In any event, don't hypnotise yourself into the idea that you have not the full right to "look the whole world in the face," whether you are in debt or not.

We are told that the initiation of the Chinese into that clan or movement which is known as the "Boxers," consisted in encircling the fingers before the eyes, peering through the orifice, and repeating for an hour or more the phrase: "We will kill the foreign devils." Then when this phrase had been fairly burned into their superstitious souls, "The guns of the foreign devils cannot hit or harm us," was also repeated as often until they felt actually sure they were bullet proof. It was genuine self-hypnotism. Well, this attitude answers very well until put to the test. The foreign army was drawn up before them and they had absolutely no fear. But when the commanding General asked that a row of Boxers be placed in plain sight and they were fired upon and instantly killed, the others came to their senses, and unhypnotising took far less time than the hypnotising.

This is exactly the situation with the borrower. If he hypnotises himself into the idea that he is a penny richer after borrowing than before, he will sooner or later be awakened with a rude shock to find his mistake.

Run in debt, if you can, and if it affords you a fair opportunity of achieving the material success you otherwise could not accomplish. But do not for an instant imagine you are any richer after borrowing than before.

WHY IT COSTS MORE.

One of the New York papers speaks of "the cost of good roads." But it is not the cost of good roads that is of so much consequence as the cost of poor roads.

Good roads are an economy, and the greatest economy that a community can have. Nothing else in the line of public service gives so great returns for the investment.

As for the "high cost of living," there are three causes for it, as it applies to food, namely: The cost of transporting the food from the farm to the market, which largely depends upon the conditions of the highways; the increase of consumers over the increase of production of food; and the disinclination of the average purchaser in cities to himself carry his purchases home as was done by his father and grandfather.

Old Time Winters.

In the year 401 the Black Sea was entirely frozen over. In 462 the Danube was frozen, so that Theodomer marched on the ice to Swabia to avenge his brother's death. In 763 the cold was so intense that the Strait of Dardanelles and the Black Sea were entirely frozen over. The snow, in some places, was fifty feet deep, and the ice was heaped in such quantities on the cities as to cause the walls to fall down. In 860 the Adriatic was entirely frozen over. In 891 and 893 the vines were killed by the cold, and cattle died in their stalls. In 1067 the cold was so intense that most of the travelers in Germany were frozen to death on the road. Wine casks burst and trees split by frost with an immense noise. In 1281 the houses in Austria were completely buried in snow. In 1344 all the rivers in Italy were frozen. In 1468 the winter was so severe in Flanders that the wine was cut with hatchets to be distributed to the soldiers. In 1684 many forest trees and oaks in England were split with the frost. In 1691 the cold was so intense that starved wolves entered Vienna.

C. B. N. A. Convention Dates for 1913.

The committee appointed to arrange for the dates of the next convention of the Carriage Builders' National Association at St. Louis has decided upon the week beginning October 13, 1913.

The third week in October is an ideal period during which to hold a convention, as the temperature is likely to be the most pleasant of the entire year. At no season is a railway journey more attractive than in October, when Nature is at her best.

Correspondence

POORLY PAID.

But a Way to Raise Horseshoeing to the Condition Where It Belongs.

From A. C. Hilbish, Texas.—I have been a reader of The Blacksmith and Wheelwright for some time, and saying that I appreciate the many ideas and suggestions of my fellow craftsmen for the benefit of a worthy but poorly paid craft is hardly putting it strong enough, as I am a blacksmith and horseshoer in the service for a little over twenty years. Especially do I read with interest the suggestions in regard to bringing the shoeing department up to what it should be. Horseshoeing is, and should be, recognized as a profession apart and separate from blacksmith work. It is probably all right to leave the horseshoer's profession and the blacksmith trade together at present, in the smaller towns at least, provided we bring the profession of horseshoeing up to that high standard to which it belongs. Do this and we will have no trouble getting a reasonable price for our work.

In the December issue I noticed an article from the Canadian Blacksmith on "License for the Blacksmith" from which I quote these words "No man who lays claim to the title of a horseshoer should be ignorant regarding the shoeing and foot treatment of a horse." The latter part of this sentence, "foot treatment" will be condemned by many of our craft and by many veterinarians. By the former because they have either no talent, or no inclination, to apply themselves and "study to become a workman that need not be ashamed," and by the latter because they will and do feel that it is infringing on their profession to even talk about a farrier treating diseases of the foot, and this would be a just criticism should the ordinary ignoramus attempt to treat disease of any kind. But, put the profession of horseshoeing up to what it should be, and it would not be any more of an infringement of the veterinary surgeon's profession for a competent farrier to treat the different diseases of horses' feet than it is an infringement on the medical profession for a dentist to treat teeth or gums. We used to have the old tooth puller, who broke off our teeth and butchered our gums. Now we have the D. D. S. who treats our mouth after the latest advances of science.

My position in regard to horseshoers treating diseases of horses' feet is this: Give us a course in anatomy and the treatment of the different foot troubles and we are better prepared to treat foot diseases as a class than the average veterinary, as we have so much more practical experience with every kind and shape of feet than he has. Then, most defective feet require special shoeing as well as special treatment. Besides, there are so many small towns, too small to support a veterinary, where a shoer, if competent, could do lots of good work to the mutual benefit of his own pocket and many a good horse. The course which I would suggest that we take is this: Bring to bear every reasonable influence on the different members of our State legislatures and by fair reasoning try to get bills passed requiring every man running a shoeing-shop, or doing shoeing in any other kind of a shop, to hold a State license, or else keep a licensed foreman, to whose directions he and all others shoeing in his shop be subject. Make the requirements for such a license a diploma from a veterinary college, or a special school on shoeing, showing that he had passed at least 75 per cent. of an examination on the general anatomy of the horse's foot and its treatment; also shoeing for different diseases and defects.

I now hear someone crying out that such a law would not be just as there would be very few who could pass such an examination. Well, I admit that I could not, but what I would recommend would be this: That we urge such a law to be passed but with a provision giving all who are now in the business a reasonable limited time in which to qualify. I remember when the law was passed in this State requiring the druggists to hold a diploma that those already

in business were given two years in which to qualify, and now I will say, if such a law were to be passed and I was given two years in which to prepare myself, and then could not pass, I would just step down and out of the way of some one that could. If we had it to do we could get a book or two from which, coupled with practical experience, we could learn considerable in two years. Then the veterinary schools could adopt a special post graduate course, of say six months, embracing anatomy and the foot which could be given in simple language so that a man of reasonable intelligence and good practical experience could understand it, though he were not a college graduate. Such a course of study would place the average shoer of as much as four years' experience (and I don't think a man should be licensed to run a shop or be a foreman over one who has not followed shoeing at least four years, of course including his apprenticeship in that time) in position to pass a good examination. It would also make a much more skilled workman of him and he would be able to demand his price for he would be a Doctor of Farriery instead of just a common tradesman.

Secure such laws as this and you put the fellow out of business who has gouged around a shop for a few months, then got up an old set of tools, and is advertising that he can shoe a horse "just as good as anybody." You will also put dollar shoeing out of existence, as under such conditions shoeing could easily be two dollars and up, per set, and it would not be robbery either, as the horse owner would get scientific in place of haphazard work, while we in turn would not have to kill ourselves in order to do enough work to make a living. I would like to hear from others on this subject. There is much more that could be said on it.

The Net Price Catalogue.

From Alexander Snider, Ohio.—I am glad to note that from month to month you touch upon matters in your editorials that are of vital importance to the craftsman. You tell him of things that are, or would be, to his interests, and of things and conditions that are, or would be, to his injury and detriment. You very wisely tell him what to do and what not to do. The subjects you discuss are so many and varied as to lead one to believe that there is nothing further to comment upon. I admit you have done well in this respect, but did you ever stop to think that when it comes to the greatest enemy that the craft has, when it comes to the greatest detriment to the trade, when it comes to that which takes the last cent of profit out of the poor smith, when it comes to the greatest aggravation that the boys in the trade have to contend with, when it comes to the thing that tears down the blacksmith and allied trades, I say again, did you ever stop to think that on that point you have been silent, silent, silent?

I mean the nefarious "net price catalogue." We in the trade must be the most gigantic set of ignoramuses under the sun. We are not so smart as those engaged in other businesses, or the supply houses would not handle us as babies, for that is what they think we are or else they would not issue such catalogues. We are too ignorant in their opinion to figure a discount. The "net price catalogue" is an insult to the intelligence of the trade. What other supply houses insult their trade like the many blacksmith supply houses do by sending out broadcast their net price catalogues? What merchant handling shoes, or clothing, or dry goods, or notions, etc., etc., would continue to patronize a house that printed so all the world could see just what the goods cost him? Mr. Editor stop, think, write!

Business Suggestions.

From M. M. M., Massachusetts.—I see in your paper that thinking and doing are good, but in thinking let us keep our minds on the job. There are many good jobs spoiled trying to make Taft, Teddy or Wilson the best man. When we have a job to do, let us keep our minds on it, and if possible let us keep the mind a little ahead of the job. After the job is done, let us pick up the tools and place them where they belong. Then if we have nothing to do, we will sit down and talk to our heart's content, discussing if we will, subjects that interest us. But get the job out first. Then the customer will tell his friend to go to your shop if he wants his work got out on time. And don't do all the little jobs first. Do the most important work first and let the small things wait. Finally, don't attempt to do it all; give the other smith a show.

Five Generations of Blacksmiths.

From Charles Baker.—At the present time there is living in Haverhill, Mass., three generations of blacksmiths. Two preceding generations having passed to their eternal home long ago there are thus five consecutive generations in the McNeill family who followed the same line of industry.

Donald, the third in point of succession, is still living at the age of 83 having retired from active labor some three years ago. His son, J. A. McNeill, is the present head of the firm, whose picture accompanies this sketch, was apprenticed at the age of 13 and has never missed

J. A. McNeill.

a day for thirty-five years. He is a member of the Highland Press Association of Massachusetts, which is probably the most picturesque and expensively costumed organization in the United States, and Mr. McNeill modestly alludes to his costume, even if it did cost a mere trifle of $185.

He has two sons, aged 18 and 22 years of age, both having received a high school education—something few blacksmiths of today can lay claim to—who are daily employed at the shop, following the traditional occupation of their family.

Making a Small Axe.

From R. Gilstad, Minnesota.—I have been a reader of The Blacksmith and Wheelwright for three years, and have enjoyed reading it very

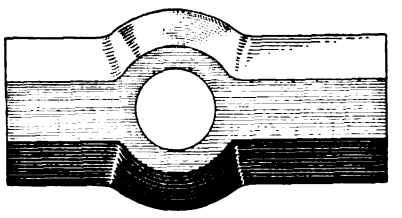


Fig. 1.

much. I have gained many valuable points by reading it, as I know all the other readers have. I make a small axe to cut the sole out of a horse's foot where it is too hard to cut with a

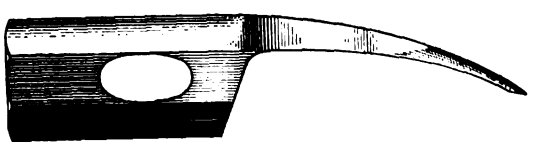


Fig. 2.

knife. Take a piece of ¾ inch tool steel, 2 inches long, and then take a round 7-16 punch and punch a hole in the center, as in Fig. 1, then hammer out the bulge and you have a nice eye for the handle, Fig. 2. Then draw out the blade, sharpening it from the inside, and shape it something like a spoon, Fig. 3, or to suit the user, and when tempered it is ready for the handle, which I make about 6 inches long. I find this

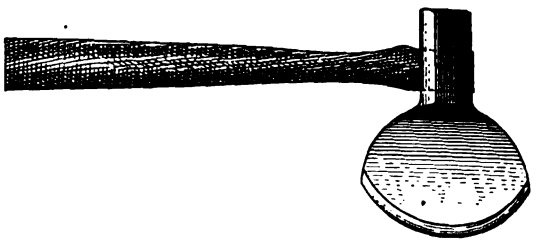
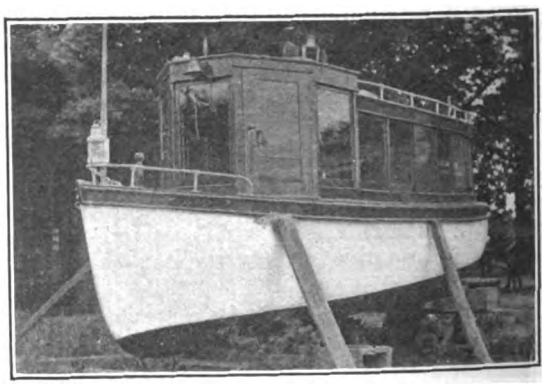


Fig. 3.

little tool very handy, as it saves the edge of my knife, and I like to have my knife sharp. If any brother uses one of these tools for a while, he will never be without it.

A Successful Experience.

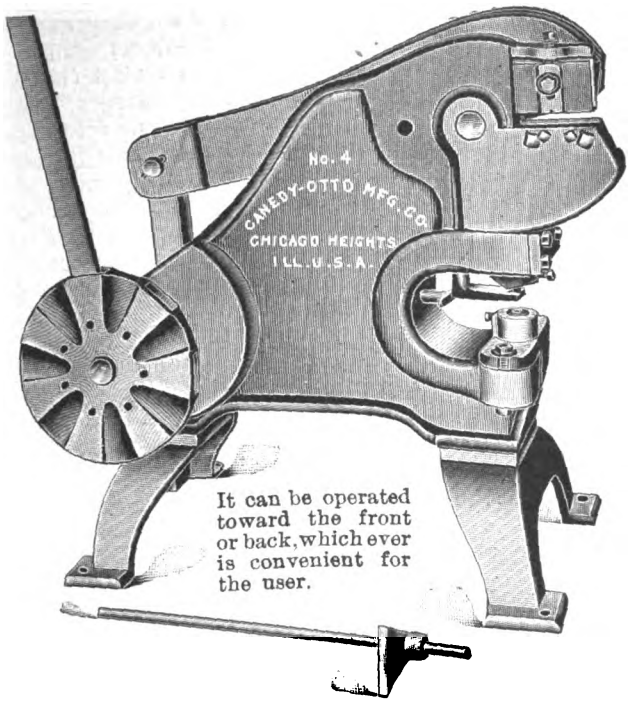
From Harry Hill, Delaware.—Here is my experience as a blacksmith and wheelwright, and the way I built up a trade. When I was seventeen years of age I lived on a farm, and while I had learned blacksmithing, I had never had any experience in the shop, but I made my first blower and it worked fine. Then I started to use old scrap iron around the farm, and I got so I could weld iron and make hooks for plow singletrees. Then I wanted a vise but did not have any money to buy one, so I got hold of a vise screw. I took a piece of pipe and cleaned the threads out nicely, fixed the screw in the center of the pipe, run in Babbitt metal, and I had a fine vise screw complete. I then took two pieces of 2x4 inch oak, 12 inches long, and fastened two pieces of steel on the side for the face and connected them at the bottom with iron strips on the sides and bolted them together so they would work at the bottom like a hinge and I had a fine vise for a first one. I continued to work on the farm with my father, doing all the repair work and lots of custom work, for three years. Then I thought I wanted to get into some one else's shop, so I went to work for a man that would work me all night if I would, but I would not work all the time. I told him I thought fourteen hours work a day was plenty for any one. I stayed eleven weeks and received two dollars and fifty cents a week. Then I got tired of working for nothing and went into another shop where I got six dollars a week. I stayed there five weeks. After I left there I bought a lot 120 feet square which had a small



Mr. Hill's Launch.

house on it. I used this house for a shop and struggled very hard to get a start. I only had twenty-five dollars when I started my own shop, having paid for the place, and could not buy supplies. But I was not long in this new place before my business compelled me to build another, so adjoining it I built a place 15x30 feet. The work began to come in and before the next summer I had everything paid for with a good stock of supplies on hand. The next fall following I raised another part of the old building and used it as a paint shop. In three years I had quite a little place. During the fourth year I got a gasoline launch and from that my brother and I built a yacht. See enclosed photograph. My brother and I worked on this boat only at odd moments, and although it was the first boat of the kind we ever built, it is one of the finest on the river. We use it just for pleasure. The question may be asked where I learned the shop work. Well, I will tell you. I don't have to go to school to learn everything. It is up to the boy or man if he wants to learn the work or not. I have learned by reading the craft papers and lots of other good books on the trade. Here are

No. 4 Combination Punch and Shear



Will shear ¾x4-in. flat bars.
Will shear 1-in. round bars.
Will punch ¾-in. hole in ¾-in. plate.
Depth of throat 6 inches.

This machine is furnished with ½-in., ⅝-in. and ¾-in. punches and dies, also a lever bar.

When choosing your blacksmith shop equipment why not get the best—

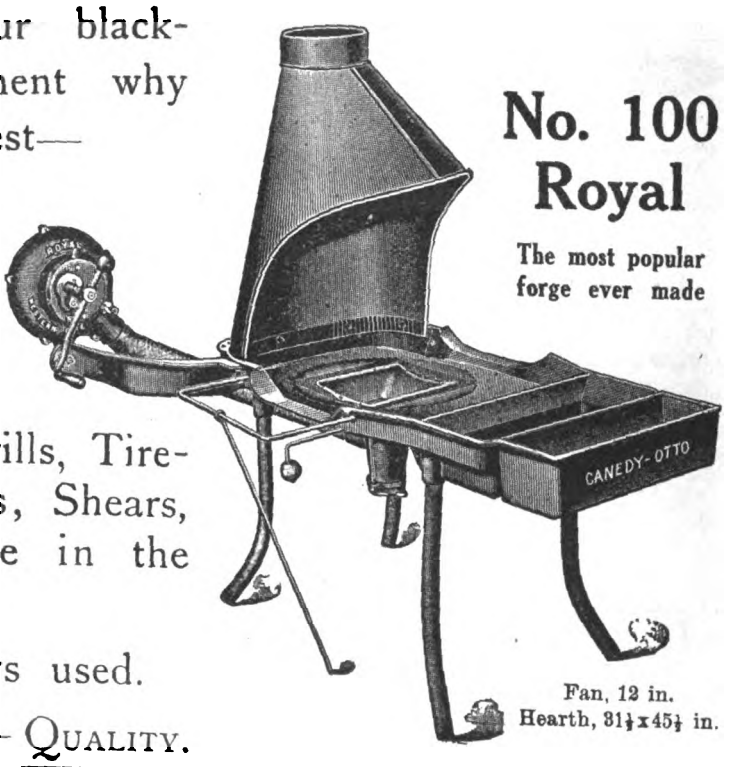
CANEDY-OTTO

It costs no more.

Manufacturers of the finest line of Forges, Blowers, Drills, Tire-Shrinkers, Punches, Shears, produced anywhere in the WORLD.

Once tried, always used.

There's a reason — QUALITY.



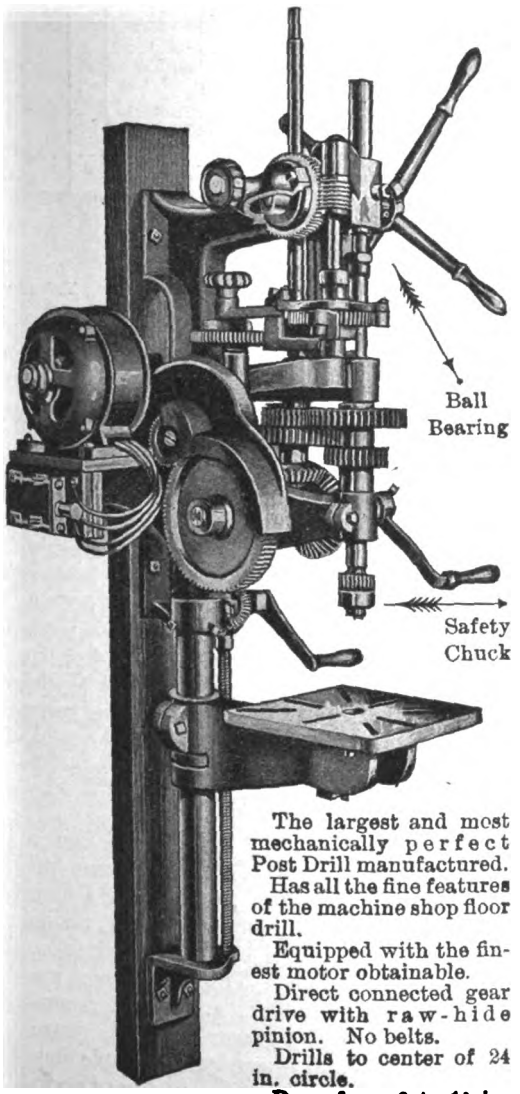
No. 100 Royal

The most popular forge ever made

Fan, 12 in.
Hearth, 31½x45½ in.

FORGES BLOWERS

No. 16 Electric Drill



The largest and most mechanically perfect Post Drill manufactured.

Has all the fine features of the machine shop floor drill.

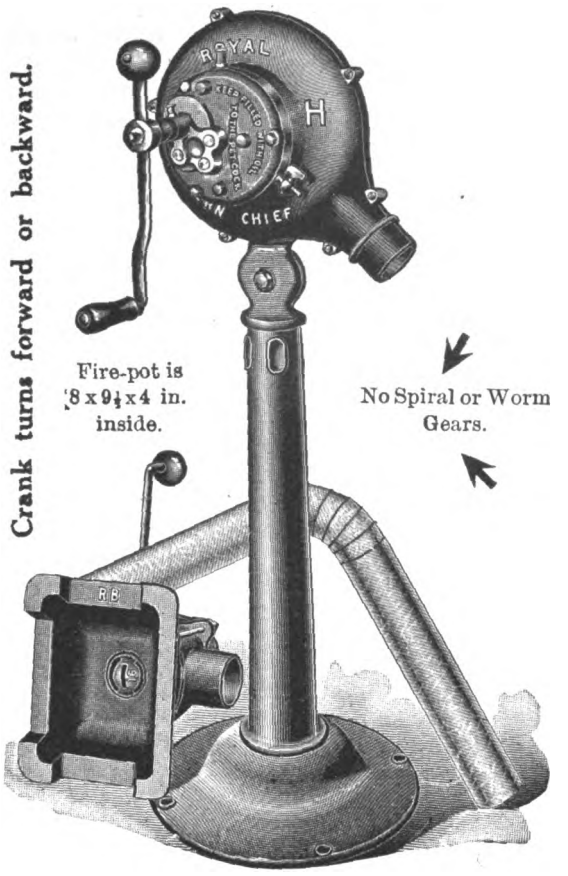
Equipped with the finest motor obtainable.

Direct connected gear drive with raw-hide pinion. No belts.

Drills to center of 24 in. circle.

Bores from 0 to 1½ in.

(Ask the man who owns one)



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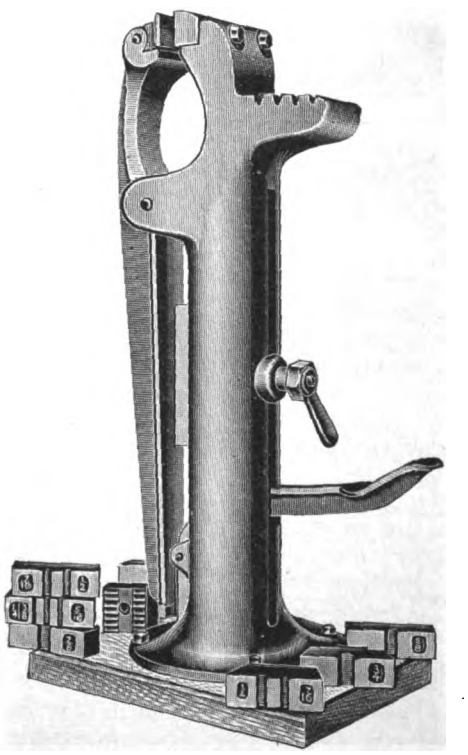
CHICAGO HEIGHTS, ILL.

PUNCHES SHEARS

Canedy-Otto Foot Vise and Bolt Header



A powerful, strongly built machine for making bolt heads, forming calks, shaping tools, and everything where a first-class quickly operated vise is needed.

Furnished with or without dies of the following sizes: ¼, 5/16, ⅜, 7/16, ½, ⅝, ¾.

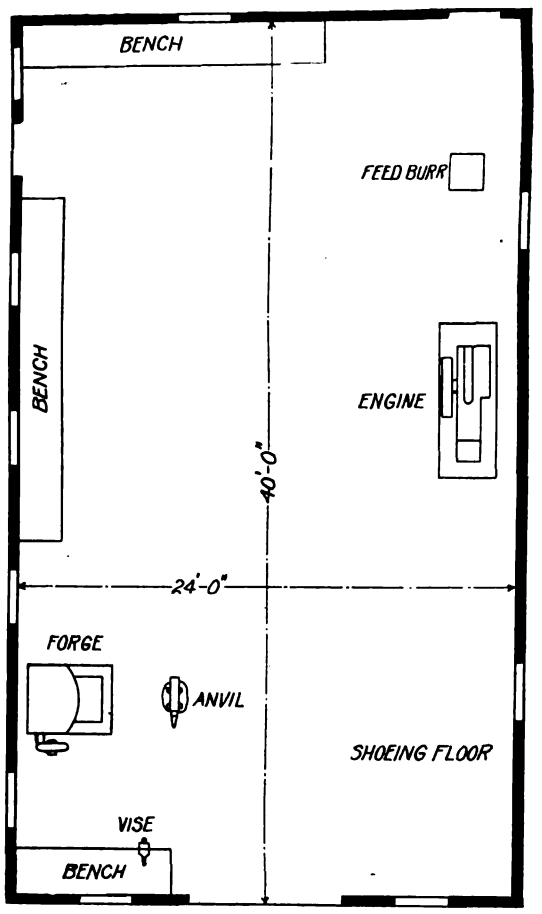
The best of material and workmanship used throughout.

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

some of my prices: Small spokes, 12 cents each; 1¼x1¼, 15 cents each; 2x2½, 25 cents each; 2½ to 3, 40 cents each; rims, small, $1; 1½ to 2, $2; 2½x4, $3; tires, small, per set $4; 1½ to 2, per set $6.50; 2 to 3, per set $9; extra large, $15. Staples for singletrees from 10 cents to 25 cents; singletrees, complete, 50 cents to 75 cents. Plow handles, $7 per pair. Harrow handles, 75 cents per pair. Carriage shafts without irons, $3. Singletrees for carriages, 65 cents. New axles for carriages, $15. Wagon axles, small size, $7; largest size, $10. Wagon poles, medium size, $2. Dearborn poles, complete, painted, $8. Re-setting tires, from 40 cents to $2. For all other things I charge according to the time taken, and my price is 40 cents an hour.

Where Should He Install?

From G. F. Colby, North Dakota.—I have just built a shop 24x40 feet 6 inches, 10 posts. I want to put in an engine, feed burr, emery stand, grindstone, saw and hammer. I have never had power before, and would like to know the best place to install it. I now have a small engine and a small burr. What kind of a hammer would you advise me to get for a country shop? I have lots of plows to repair.



Mr. Colby's Shop.

A Grub Puller.

From L. A. Carpenter, Michigan.—I send you a sketch of a grub puller that I got up years ago. Perhaps some of the brothers will find it of use in their locality. The foot is a piece 4x5 and 2 feet long. The clevis holds the hooks firmly in place, and an eye bolt goes up through the lever from the under side. Give the chain length enough so the clevis will drop down well to the front of the hooks when fast. This saves a lot of hand work, and with it one horse will draw a large root. Fig. 1 shows a side view and Fig. 2 a top view.

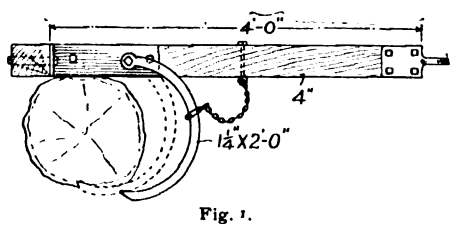


Fig. 1.

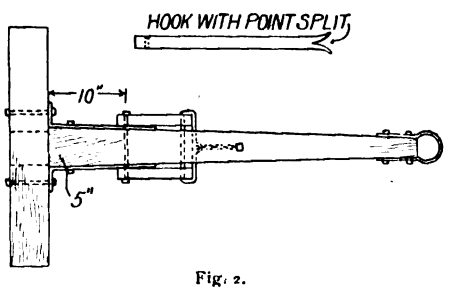
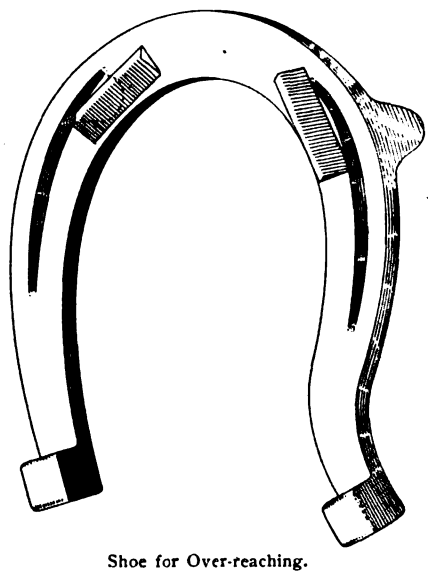


Fig. 2.

For Over-reaching.

From J. B. Shaver, Indiana.—I wish to send you a method of making a forging or over-reaching shoe. Either a machine or a hand turned shoe can be used by putting the calks close to the front of the shoe, as shown in the sketch, and set in a V shape. If the hoof is worn and a square or round toe is used, you can set the shoe back so that the hoof will project about ⅛ of an inch. Then double clip it both inside and outside between the first and second nail holes. This shoe can be also used for a horse that slides his foot, and one that "side wheels," by placing a side calk on it—on the outside heel, turning the heel out considerably. By this method it allows him to wear the shoe perfectly level, and the shoe will last longer.



Shoe for Over-reaching.

His First Article and a Good One.

From D. King, Texas.—I have never written an article for any of the craft journals, but enjoy reading what the other boys have written. Many things given are helpful but I have a better way of doing some things than they describe, so thinking possibly I might be of some help to some new man, I shall try a short article.

I have been at the anvil for over 20 years. I have a little cement blacksmith shop, 28x50 feet, located 20 yards from the beautiful Corpus Christi Bay. I run two fires, have a circle rip saw, emery wheel, drill and other general tools, and a 5 h.p. electric motor for power. I love the old craft and all the boys who work in same. I am learning every day. Here is a list of my favorite "Don'ts":

Don't talk but get busy.

Don't let a brother blacksmith be mad at you even if he wants to and tries to be.

Don't work with a dull tool.

Don't put ¼ inch bolt in 5-16 inch hole. It is all O. K. to start with, but is soon loose. Use 1-32 inch larger in iron and the exact size of bolt in wood.

Don't use borax for welding. It has served its time out. Use E. Z. Welding Compound and Crescent Welding Compound for plow work.

Don't take two and three welding heats on springs. E. Z. welds at one heat, and then don't cool in water, or even in open air, but cover the weld with slack lime until nearly cool, and cover with lard. It counts.

Don't use oil for drilling. Soapsuds is far better and the drill will cut a smoother hole in hard steel when it will tremble and whine with oil.

Don't forget that drills must be ground.

Don't try to fit a buggy spoke by using a draw knife or file. You cannot make a perfectly flat surface with either. Place the spoke on a bench and an 1½ inch chisel (sharp) on the spoke point of the shoulder on top of the chisel handle and push down. The shaving can be from ⅛ inch to 1-64 inch and you can have a flat side on every spoke. The wheel will stand while the filed spoke will get loose and lay down. I fill Sarven wheels from 1 inch to 2½ inches and guarantee every one.

Don't use common iron, round or flat, but order mild steel. It costs the same money and you can make quicker bends with no cracks or breaks.

Don't let the "Good enough" microbe get in your shop. Make it better. It pays.

Don't fail to send your renewal to The Blacksmith and Wheelwright. They give us the best craft paper. Let's help.

Two New Ideas.

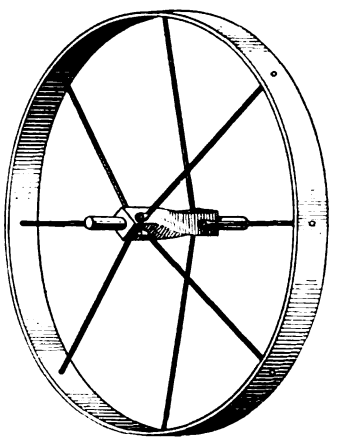
From August Mersing, West Virginia.—I will give you a kink which may be very valuable to a blacksmith or machinist, when they don't have a lathe. To bore out a fly-wheel, pulley, etc., by hand, turn up a wooden mandrel (hard wood) the size of the hole to be enlarged, and make it a nice fit. Take a cutter made from an old file, or anything else, and mortise it in the mandrel, then bore a hole from the center of the mortise clear through the mandrel to knock out the cutter. Put the mortise in at an angle like the flutes in a twist drill, having the cutter project a very little and the mandrel long enough to put a lever on the end to turn it. If the work has a keyway, run it full of babbitt. I bored out two 4 feet fly-wheels and some small pulleys and they ran true. If the hole is not big enough after the first cut, take the cutter out and put a piece of tin under it, keeping on until the hole is right.

I saw an article in the Stationary Engineer, telling how to bore out a cylinder for a cylinder valve and an engine without taking it to a shop. It was a success. I had ordered a 4-foot fly-wheel to a portable engine and they had left the hole too small. I was about to send the wheel to a shop 100 miles off when I remembered that article and did the work myself in a short time. As I saw it many years ago and have never seen it in your paper, I thought it might be of some use to someone sometime.

Two New Kinks.

From John Hotham, Pennsylvania.—I wish to show your readers an easy way to make a wheelbarrow wheel. Take a piece of four square iron for the axle as long as you want it, and bore four holes through it, and then heat it hot and twist it one-fourth around. That will give eight spokes and an even space on the rim. Rivet two spokes to one hole. By boring four holes you get eight spokes in the wheel equally spaced on the rim. Forge or turn the spindles on the axle before riveting the spokes on the axle. The sketch will show how it is done.

Here is a kind of a job a blacksmith can do straightening the supports of cooking stove lids when they become bent or drawn from overheating. Lay a piece of iron on the anvil face.



The Wheel.

Axle Before Being Twisted

Heat another piece along with the support. Lay that on the piece on the anvil, and lay the lid support on the red-hot iron. Drive a pin in the anvil block, and let a chain come up from the pin to the top of the anvil. Have a lever to fasten in the chain. Bring the lever across the red-hot support and bear down just enough on it to feel it give. Keep it giving just a little until it is straight. If it gets cold, heat again, for if it gets too cold it will break in two. Better try one that is no use until you get the idea right. You can make good money in this business. The idea of putting the cold iron on the anvil is to keep the hot iron from taking the temper out of the anvil, and the hot iron keeps the lid support hot longer.

From a Veteran Workman.

From F. C. Milburn, Kentucky.—I am a blacksmith, also a wood workman, and have had about thirty-six years' close experience. I have in my mind now to tell our brother wagon builders how to put an old section rim or felloe on a newly spoked wheel. This is of great importance. All wheel makers and wheel repairers know what a spoke gauge is. This gauge can be made in several ways. One simple way is to take a strip of wood similar to a yard stick.

Stocks for Shoeing Horses.—The Champion Horse Stock Company of Los Angeles, Cal., has an announcement in this issue of their automatic device with an illustration showing how it works. You can buy all or any part. Write for further particulars to the company as above and mention The Blacksmith and Wheelwright.

Wonder Disc Sharpener.—A. E. Durner, of Evansville, Wis., makes the Wonder Disc Sharpener which will be found illustrated and described in our advertising department. He makes the Little Wonder Disc Sharpener and the Giant Disc Sharpener. Dealers in blacksmiths' supplies generally are supposed to keep both of these disc sharpeners. But consult the advertisement for further particulars and either write direct or ask your dealer.

A Variety of Blacksmith's Tools.—In this issue the Champion Blower & Forge Company, Lancaster, Pa., comes before our readers with two pages illustrating and describing a variety of tools and machines for blacksmiths which this company makes. Our readers are invited to inspect both of these pages carefully, especially to examine into the merits of the No. 400 Champion Blower. The new catalog of this company is ready and it is their desire to place a copy in the hands of every blacksmith in the country. If you don't need the catalog today you may need it later on and you had better send for it at once, mentioning The Blacksmith and Wheelwright.

The Improved "Easy" Hoof Trimmer.—Those of our readers who have not looked into the merits of the Improved "Easy" Hoof Trimmer, manufactured by the Muncie Wheel Company, Ohio Avenue and Big 4 Ry., Muncie, Ind., should do so. See their advertisement on another page with a description of this tool, also an illustration. Under the new parcel post system, these tools can be delivered to any part of the United States. The reputation of the Muncie Wheel Company, acquired by years of careful attention in the manufacture of all its products, stands behind this tool. Our readers will make no mistake in buying one.

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 head of the "Want" Department on another page.

Now get the height of the wheel, deducting the diameter of the hub and taking one-half the remaining part of the diameter of the wheel. Now take the gauge stick, putting one end against the hub, also putting two nails in the gauge as wide apart as the rim is deep, so you can make the gauge mark where the spoke is to be sawed off. Also, the other gauge marks will show where the shoulder on the spoke will come. All wagon repairers know how troublesome it is to put an old section rim or felloe back on a newly spoked wheel. To do this simply set your old felloe to the outside gauge mark, boring tenons a depth to suit the old felloe, and boring and fitting on one felloe at a time. You will notice that you will not have to cut some of the tenons down to the gauge mark. That is, those next to the hub will not have to be cut as deep as some others, because of the different depths of felloes. If there is anyone that does not understand this after investigation, I am ready to explain, but I am very confident that no one will fail to see the point I have tried to make.

A Happy New Year to you and the brothers.

How to Mend Springs.

From A. D. Browne, Pennsylvania.—In the December number is a spring query by L. S. Ferree. I have had quite an experience in mending springs, having been at the business 36 years and having had all kinds of springs to repair, and I have always had the name of making them stand when I mended them. The temper is put in the springs when they are made and the short heat it takes to weld them does not take the temper away from them, and after the weld is made, and the laps are welded down and solid, and the heat begins to come out dark red, I take my hammer and dip it into the water tub and put some on the anvil from the hammer and hammer down the weld in the water. That puts back all the temper that is taken out by the heat. I like to scarf both ends of the spring to be welded, then punch two holes in each end, and put old tire bolts in for rivets and rivet them down solid. I find this better than splitting and lapping the spring for welding, as in splitting it almost always leaves a thin and weak place at each end of the lap. I use both ways but prefer the rivets. I also mend a good many auto springs, welding them and taking a piece of spring steel and putting new leaves in them. There is no set rule that I have ever found in setting the springs. Some will need more than others. But if they had no spring in them but were fitted so they lay together before the bolt was put in, there would be no spring to them at all, and they would stand apart at the ends when bolted together. So in heating and pounding a good spring in them I have never had any trouble to make them stand for any hard work.

In talking about the automobile business in the country shops, there is one drawback to what I have found. That is the Sunday travel and the Sunday work. When the automobile first came around I started in to make repairs on them for we have one of the best auto roads in the country. And by the way, there is one of the best chances for a good repair man here that he would find in the country anywhere. All went well and I had quite a lot of repairing to do and on Sunday everybody that had a car was out with it and would even come and call me out of church to help them out, as I was the good Samaritan and they were the strangers by the roadside, as different ones of them said, and I must help them out. I put up signs on the shop, "No work on Sunday" but it did not do any good, so I had to close up on them entirely and not bother with them at all. This was the only way I could see out of it, as I did not feel like going into the shop and working Sunday, after dressing up on Saturday nights and then go and change my clothes and put on a pair of overalls and get all grease and black off the cars. What do the craft think about this? Good-luck to The Blacksmith and Wheelwright, which I have taken since 1887 and I have one of the papers of that date in the house now.

Shoeing for Overreaching.

From Winnipegger in Canadian Blacksmith.—In order to proceed successfully the shoer should first of all size up the horse to be shod in order to ascertain the build of the horse. First step in front and size up the position or manner the horse has while standing. Take notice of the positions of the front feet and limbs; stand in to see if the feet or toes stand in or out, also to see if the front feet or limbs are calf-kneed; and at the same time step to the side of the horse and notice closely if the front limbs stand plumb under the body or vice versa. Thereafter step to the back part of the horse and notice closely if the hocks and feet stand under the body or vice versa. After this is done step to the back of the horse and notice if the hocks stand well together or far apart; also notice if the front feet and the hind feet are in line with each other. Should the front and hind feet and limbs project well under the body, or more than normal, such a horse will nine times out of ten have a low gliding gait behind and in front the action will be short and choppy.

In such a case the horse will require more weight behind to enable or force him to pick up the hind feet much higher and at the same time shorten the long, low, gliding gait. The hind shoes should be ten or twelve ounces heavier than the front ones and should have as much weight as can be obtained in the heels of the shoe; at the same time allow the hind shoes to project one inch or more beyond the heels of the feet. By doing so this will change the position of the limbs and feet when lifted, allowing them to land in a different position. The toe calk on the hind shoe should be as high as safety will allow, leaving the heels as low as possible.

Should the toes of the hind feet be badly worn off from striking against the front feet, place a piece of sole leather under the toe, shaving it so that it slopes gradually toward the heels. This will also allow the hoofs to grow at the toe more rapidly, and at the same time will prevent the horse from breaking over the hind toes so rapidly. The front feet on such a horse should be shod with as light a shoe as will stand the work the horse has to perform. Should the action in front be short and choppy, leave the toes of the front feet long. Place a long, low toe calk well back on the shoe, and at the heels of each shoe place a side calk well under the quarters. This will extend the stride and at the same time will force the horse to pick his feet up in a different manner, and will also allow them to swing in a true line with the body.

If a horse picks his foot or feet up straight they should land straight, and if the feet are properly balanced the effects should cease. The writer might mention that in many instances when time was short, or on a busy day, he has taken a pair of front shoes and placed them on the hind feet and a pair of hind shoes on the front feet. Should the horse still forge, remove the shoes and calk them as stated above—also weld two low heel calks on the heels of the hind shoes to add weight behing. Checking the head up also will add an increase of weight to the hind parts of the horse and will aid materially in changing his gait.

For Contracted Feet.

From John Downing, Washington.—I have seen in The Blacksmith and Wheelwright a good deal about horses which have contracted feet. I send you my way of shoeing. It may help some of the boys. I know they have helped me out on many things. Turn up a clip at the heel of the shoe as shown in the sketch. Then you can spread the heels with a pair of tongs or pincers. The horse will tell you when it is spread enough. A horse which has a foot where one side the heel has grown under will be helped by the use of a shoe of this sort. Spread the heel a little once a week. I have cured a good many that way.

When I was ten years old I used to stand on a box and blow the bellows for my father, and later stand on a box and use a light sledge. We then made all our shoes by hand. I am 70 years old now and love to shoe horses yet and will as long as I am able.

How and Where to Buy.

From G. W. L., Virginia.—For some time I have been intending to write something for you about this part of the country, and also about machinery and tools. I sold out my entire business in Northwestern Ohio last spring, and came to this place and started anew, with new tools and machinery, and I would caution anyone about buying light, cheap machinery. I bought what is advertised as ball-bearing machinery built on angle steel frames—a 12-inch jointer or buzz planer, band saw, rip saw and boring attachment combined. This machinery is not built substantial enough for the needs of the general repair shop. I also bought a 4 h.p. engine from the same firm, but it proved to be no good, and they would not make it right, and if I had not taken the matter up with the firm who makes the engines, I would have been out the price of a 4 h.p. engine. The makers of the engine were honorable and honest enough to send me another engine and take the defective one back, so my advice is to buy substantial machinery and from a firm who is known to be reliable. A guarantee does not amount to anything when you are in one State and the firm is in another. The cost of forcing the guarantee would be more than the machinery is worth. Now in the near future I will send you an article on the way of doing work in this "way back" country.

American Horses Number 23,000,000.

Another horse lover has come to the defense of his beloved animal; stating that there are more horses than ever in the United States, and that they also cost more than before. Just why they should cost more, Wilf. P. Pond does not say, but perhaps students of the law of supply and demand can throw some light on the subject. According to Pond, there are more than 23,000,000 horses in the country, and there is a greater demand for them than ever before.

A Spring Bench.

From E. W., Michigan.—Having been a reader of your paper for fourteen years I will send a sketch of a spring bench I have in my shop for setting a spring for any kind of a

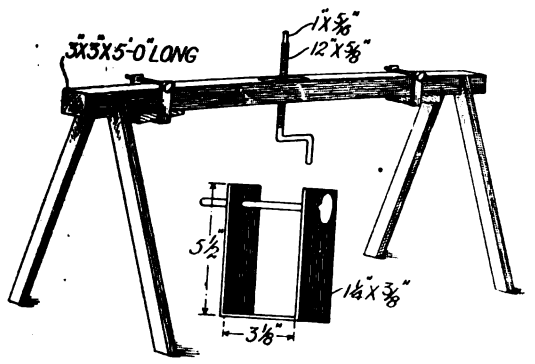


Fig. 1.

vehicle. It is made of 3x3 beam, and is 5 feet long, the same as a saw horse. It can be hinged on the wall to swing out of the way, if so desired. Fig. 1 is a sketch of the bench. Fig. 2 shows the first or main leaf at ease. Take measurements from the top down to the bench. Then raise the leaf about 5/8 of an inch. Then having the leaves all forged, I take the next leaf and heat from the end to about 4 inches back from the hole in the center to a good red heat, making the same to avoid reversing the ends, as changing the ends often makes a bad fit. Then with four pairs of tongs, as in Fig. 3, two to hold the leaf tight back of the center, the other two to press the leaf to place. Then after the red has left it, take a wet rag and stroke the leaf several times. Care and judgment must be taken in this part to secure the best results. Treat the other end in the same manner. Then

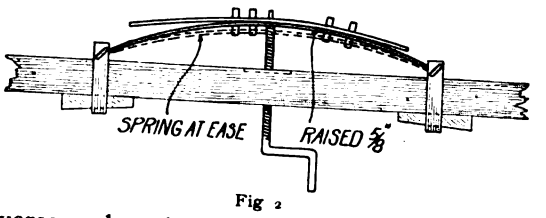


Fig 2

reverse and wedge the clevises, so that the end of leaf No. 2 will be free and not cramped, the ends down on the bench and the leaf at ease. Measure down from the tip of the bench, as with leaf No. 1, and raise ½ inch in the center with the screw. Treat the balance of the leaves in the same manner, giving them measurements as follows: Raising the inside leaf 5/8 of an inch, the next ½ inch, the next 3/8, and the last ¼ inch.

In welding springs I use the same scarf as in ordinary welding, upsetting the ends and making a plain lap, welding it perfectly solid at the

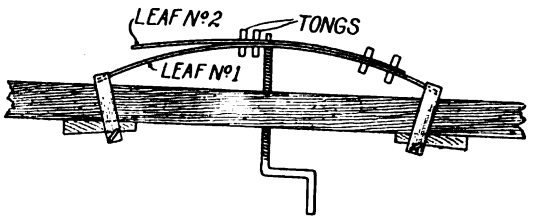


Fig. 3.

scarf on both sides, and see that the weld is uniform in size. Care must be taken to not overheat the steel in welding.

If the foregoing instructions are followed closely for the size of the spring given and other sizes in proportion the average mechanic will have no trouble in obtaining good results for all practical purposes.

Lock-Jaw Calks.—Although the Lock-Jaw Calk was not put on the market until September, 1912, it has leaped into instant popularity and large quantities of these calks are used in every city from the Atlantic to the Pacific. The locking feature prevents the falling out of the calks and the manufacturers claim that heretofore probably one-half of all the drive calks put into shoes have been lost on the streets. The reinforcement of the edges on the wearing end is also a feature of importance. These calks are not brittle and are described as non-breaking. They are exclusively distributed by the Rowe Calk Company, Hartford, Conn., and they are manufactured by the Key Calk Horseshoe Mfg. Co., Green Bay, Wis. For further particulars, prices, etc., address the Rowe Calk Company and mention The Blacksmith and Wheelwright.

"Favorite" Clipper Grinder.—The Heath Foundry and Mfg. Company, Plymouth, Ohio, have an illustration with a brief description of the "Favorite" Clipper Grinder, in our advertising department. They also furnish a new adjustable holder for holding barber, fetlock and hand clipper knives. This tool also grinds knives of horse clipping and sheep shearing machines. It requires no skill or experience to operate it, as it is automatic and cannot go wrong. Write at once for further particulars and prices to the company as above.

The Boob Wheel Company and Fischer and Metzger of Cincinnati have consolidated under the name of the Wheel, Shaft, Top and Hdwe. Mfg. Company. Under the reorganization the capital stock has been increased from $10,000 to $40,000, $10,000 being preferred stock and $30,000 common stock. The new company will carry a full line of carriage and wagon hardware, including tops and trimmings, and will manufacture nearly everything they sell. The company is in better shape than ever to furnish dealers with a complete line at low prices and prompt shipment. The sales of this company we understand have increased about 65 per cent. within a year. The officers are as follows: W. W. Boob, President; E. Fischer, Secretary and Treasurer; J. Fredericks, Vice-President, and A. Metzger, Superintendent.

For the benefit of our English readers, we desire to say that E. J. Samuel who has been in charge of the Publicity Department of the Goodyear Tire and Rubber Company has been promoted and will act now as manager of the advertisement department of the Goodyear Tire & Rubber Company (Gt. Britain), Ltd., with headquarters at Central House, Kingsway, W.C. Corner Kemble St., London, England.

A Dozen Complete Woodworking Machines in One.—Probably every reader of The Blacksmith and Wheelwright will be interested in the full page announcement in this issue of the Sidney Tool Company, Sidney, Ohio, illustrating and briefly describing a most remarkable woodworking machine, or rather the manufacturers say, a dozen complete machines in one, as will be seen by inspecting the description in the advertisement. It comprises a 27-inch band saw, a 1-inch jointer, a stationary saw table with raising and lowering arbor, and the attachments to this machine are a spoke tenoner, wheel equalizer, rim borer, complete felloe rounding attachment, pole rounding attachment, complete grinding attachment. But read over the description and then write for further particulars and especial terms to our readers. This is a machine that every shop in the country, possessing power, ought to have.

Some Good Questions.

From W. E. Etter, Bower Mills, Missouri.—I want to ask Mr. E. Parsons of California where to get the "hydroleum" burners spoken of in The Blacksmith and Wheelwright, May, 1911. Would they furnish heat enough to melt 500 or 600 pounds of iron, or would two ten inch power blowers do the work? What book on casting would you advise a novice to buy? I would like one explaining core making, and placing the same in the mold, also explaining all the particulars how to place and remove patterns from the sand to make the mold, and what kind of sand to use. Where do you get molder's sand? I would like to hear from all who have had experience in pattern making and molding. Since I have been a reader of your journal, Brother Hobart has written some articles on molding, but I would like to see more articles on this subject. While I am on the subject, I will ask about all the things concerning which I wish to be informed at present, and I feel sure my questions will be answered.

Since I have been reading the trade journals I have never seen an article on how to put on rubber tires. I should like to hear from some of the readers telling me how to put on rubber tires, how to bend and weld the channels, what tools to use, and how long to cut the rubber and the wires. How long does it take an experienced man to do the work?

Wagon Tires and Low Prices.

From J. E. Justus, North Carolina.—Some time ago I saw an inquiry in your paper from some one wanting to know how to put on wagon tires. This work depends very much on the height and strength of the wheel. For instance, I will say that taking a two horse tire 1½x½ inches, if your wheel is strong, you can give ½ inch draw. A very good rule is that you can give the tire as much draw as the thickness of the tire which suits the wheel. Be sure and have a bench to put your wheels on so you can bolt them down, and they will not pull any too much dish. Cool them off before taking them off. Below also find prices on some of my work:

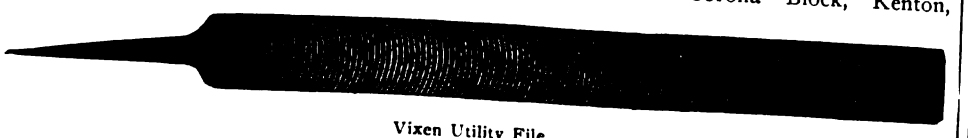
Shoeing horses with light shoes, 70 cents; shoeing with heavy shoes, $1; tipping, 90 cents to $1.20; setting two axles, $3; a set of wagon tires, heavy, $6.50; light, $4.50; filling old wheel and rimming it, $2.90; new bolster, 70 cents; tongue in wagon, $1.

Steel for Tools.

It is supposed by some that the coarser and poorer qualities of steel are best for some coarse tools, and that tools which do not require a fine cutting edge, but are to be submitted to hard knocks and rough usage, will be better if made of a poor rather than of a high grade of steel. This is true if applied to the kinds of steel which are made of materials selected for their availability, and which are limited by their natural properties to purposes for which they must be especially prepared. "The better the steel the better the tool." There are economical considerations which must be taken into account in determining what kind of steel to use for any particular purpose. If there is much labor and expense to be laid out in the manufacture of a tool it is good economy to procure the best material to make it of, for even if it is expensive, its cost will bear but a small proportion to the total expense, and will largely insure that the tool will be of value when it is finished. The old adage, "You can't make a silk purse out of a sow's ear," will prove itself true every time that principles of false economy lead to the making of expensive tools out of poor grades of steel.

Vixen Files.

True economy in purchasing files should not be considered from the standpoint of first cost. Files should be considered and bought per unit of work done. A file may do good or bad work according to its quality and the method of manufacture. The difference in cost between cheap and high grade files is small compared to the large amount of wages lost by the use of poor



Vixen Utility File.

files. A good file is cheap even at a high cost, while a poor file is very dear even if bought at the maximum discount. File economy consists in buying the best tool irrespective of price. The Vixen Tool Co., 5001 Lancaster Avenue, Philadelphia, claim that their files "cut three hundred to five hundred per cent. faster than ordinary files." Whether this be so or not, they have abundant testimony to the effect that their files are remarkably efficient. They also make a horseshoer's rasp which was awarded the highest medal in its class at the horseshoers' association convention in France in 1909. Those interested should send for catalogue, addressing the firm as above.

Motsinger Magneto.—This device increases the power of any gasoline and is just what every blacksmith needs. With it you can start and run your motor without a battery. Write at once for further particulars and prices to the Motsinger Device and Mfg. Company, 589 Cheery street, Lafayette, Ind.

"Absorbine."—This preparation does not blister or remove the hair, and the horse can be used every day while applying it. It reduces swellings and soft bunches, stops lameness, inflammation and reduces the pain. It is sold at $2.00 a bottle by druggists generally or you can get a bottle direct from W. F. Young, P. D. F. 55 Temple street, Springfield, Mass.

Corona Wool Fat.—The Corona Mfg. Company, 102 Corona Block, Kenton, Ohio, in order to introduce its "Corona" Wool Fat for horses' feet will pay the postage on a 50 cent can to any part of the United States. This preparation, it is said, will cure old sores, thrush, quarter crack, grease heel, scratches, sore shoulders, collar boils, etc. But read the advertisement and write at once for a trial can and special terms to agents. This company wants blacksmiths everywhere to act as agents for the sale of its preparation, and is offering extremely liberal terms.

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WANT ADVERTISEMENTS

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

will be inserted under this head at 2 cents a word, including the address for each insertion, payable in advance; but no advertisement will be accepted for less than 50 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 FOR INVENTIONS.

H. W. T. Jenner, patent attorney and mechanical expert, 608 F. St., 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.

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.

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 blocksmith 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.

PATENTS.

C. L. PARKER, attorney-at-law, and solicitor of patents. American and foreign patents secured promptly. Handbook for inventors sent free upon request. 926 G street, Washington, D. C.

BLACKSMITH.

Here is your opportunity to be an expert blacksmith without help. As life is short, get Toy's Modern Methods of doing hard jobs easy, forging and welding all kinds of steel solid. Also tempering all tools to a standard by colored charts. This is real plain information, not theory, all for $1.00. Send for free samples first. W. M. TOY, Sidney, Ohio.

BROTHER.

Accidentally have discovered a root that will cure both tobacco habit and indigestion. Gladly send particulars. No drugs. G. S. STOKES, Mohawk, Fla.

MECHANICS.

Send for a circular describing "Mechanics' Companions," a tri-square, a centering square, a caliper, rule and protractor. Address J. O. HESS, Oran, Mo.

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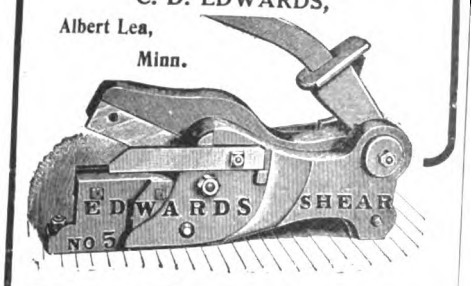

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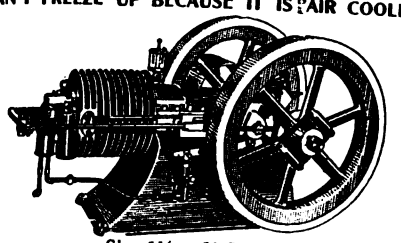

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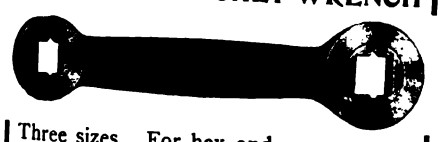

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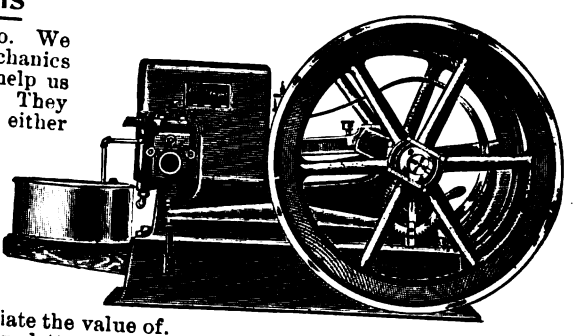

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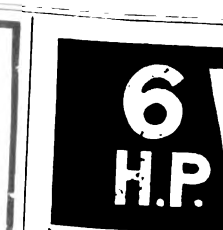

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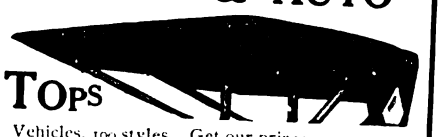

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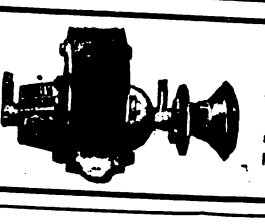

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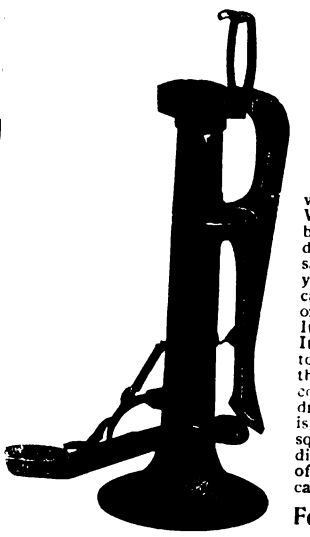

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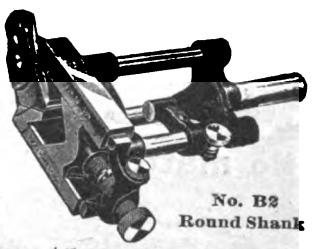

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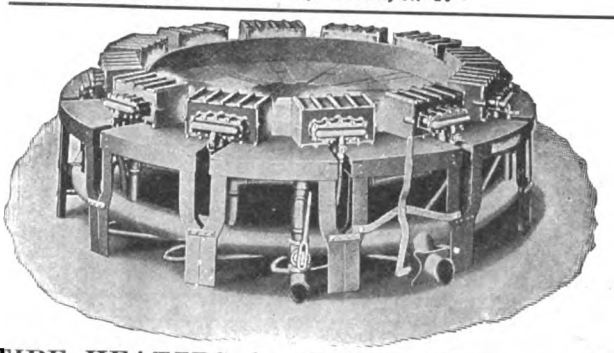

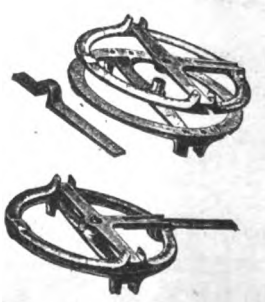

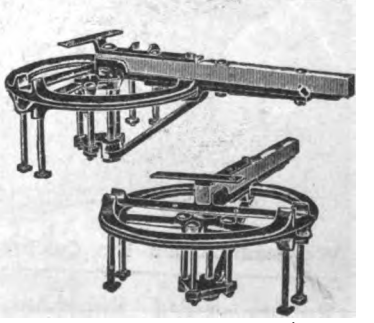

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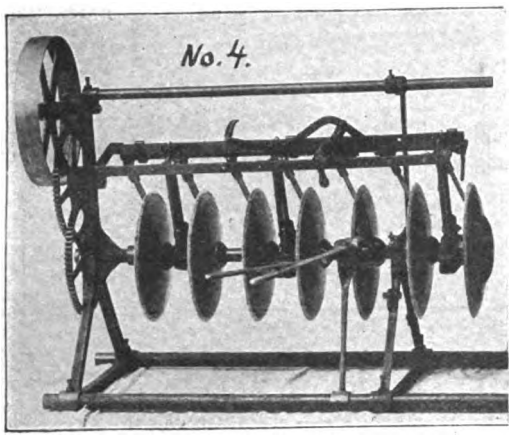

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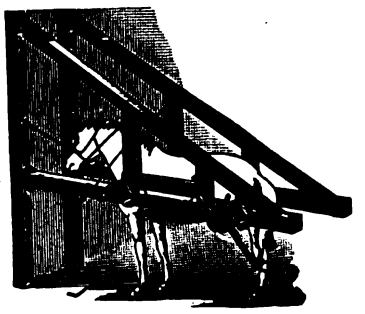

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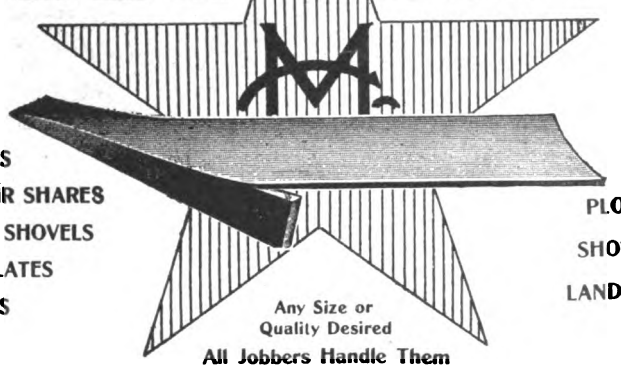

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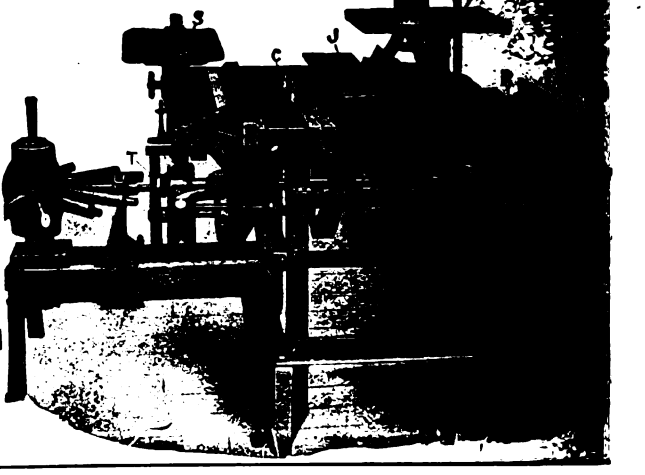

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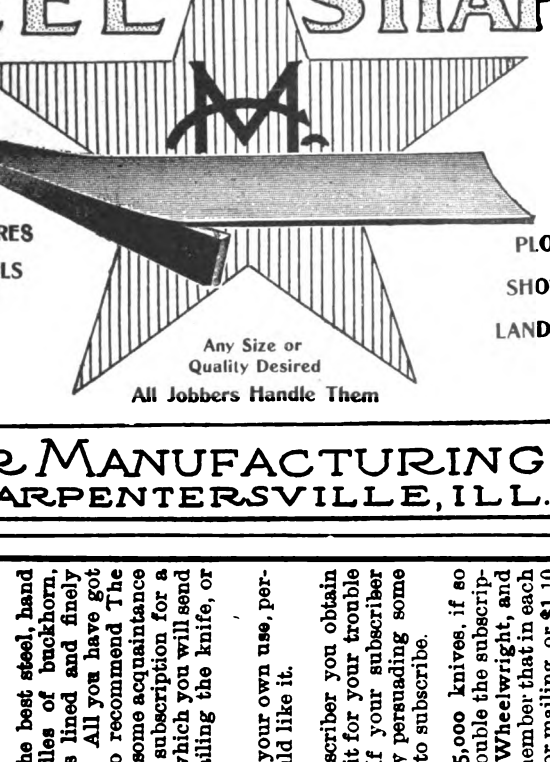

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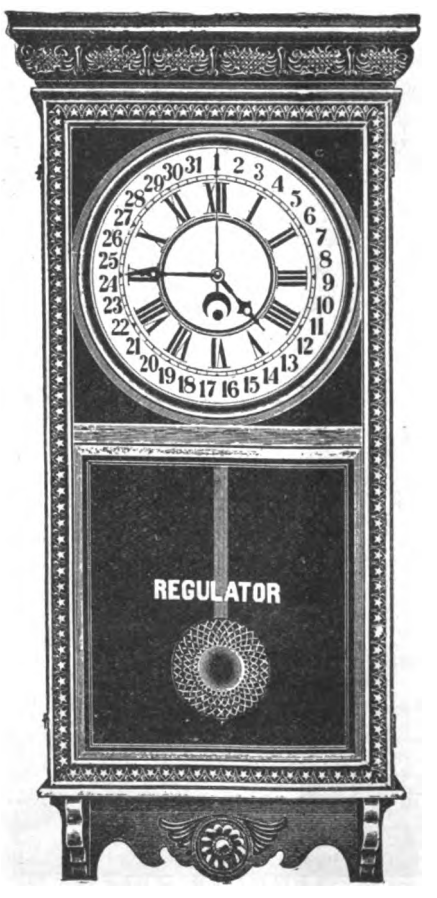

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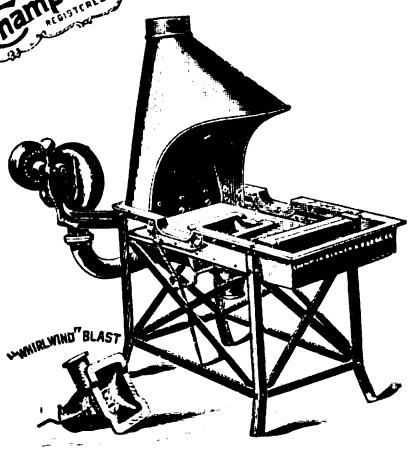
No. 400 Champion Patented "Whirlwind" Blast Anti-Clinker Heavy Nest Tuyere Iron goes with the 400 Blower, WITHOUT EXTRA COST.

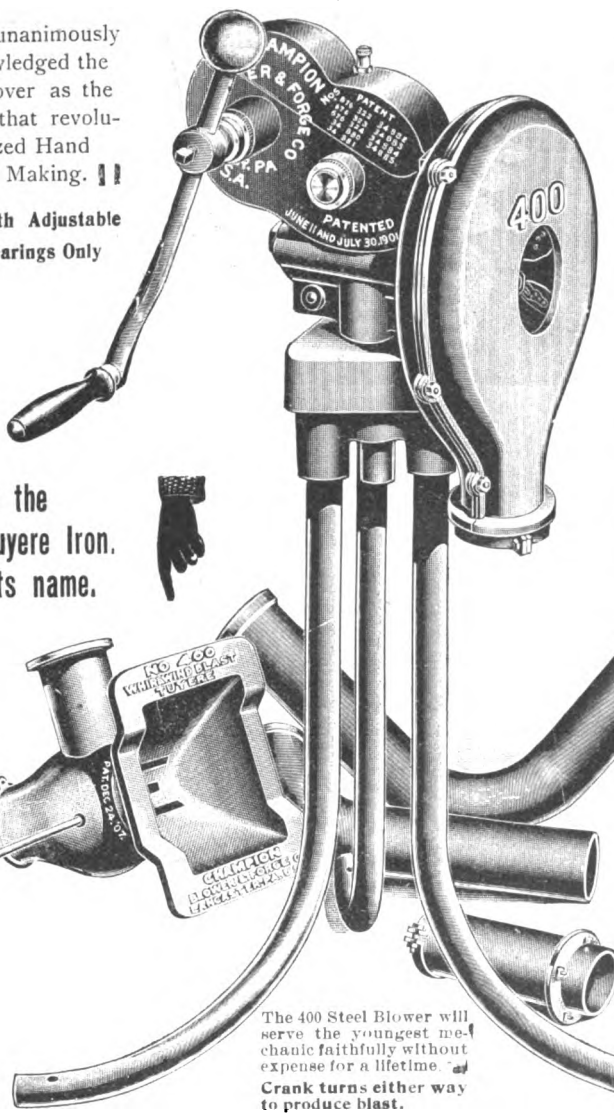
With the circular rotary feature of the "Whirlwind" Blast the hot blast from the coal is not wasted by being blown up through the fire and out of the chimney, like all other blacksmith fires. With the "Whirlwind" blast circulating between the heavy walls of the nest the hot air is forced to the center of the fire, thus giving the iron in the fire practically all the heating elements of the coal, which save in time and coal consumed, the first cost of a 400 Blower and "Whirlwind" Tuyere Iron many times over every year it is used.



No. 408 Steel Horseshoers' and Blacksmiths' Forge with Half Hood.
Hearth 30x36 in. Fan 12 in. in diameter.

The 400 unanimously acknowledged the world over as the Blower that revolutionized Hand Blast Making.

Made with Adjustable Ball Bearings Only



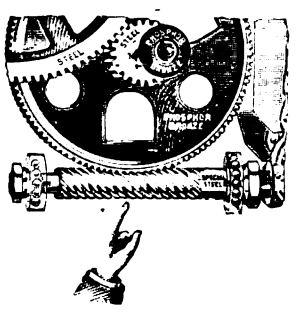
The 400 Steel Blower will serve the youngest mechanic faithfully without expense for a lifetime.

Crank turns either way to produce blast.

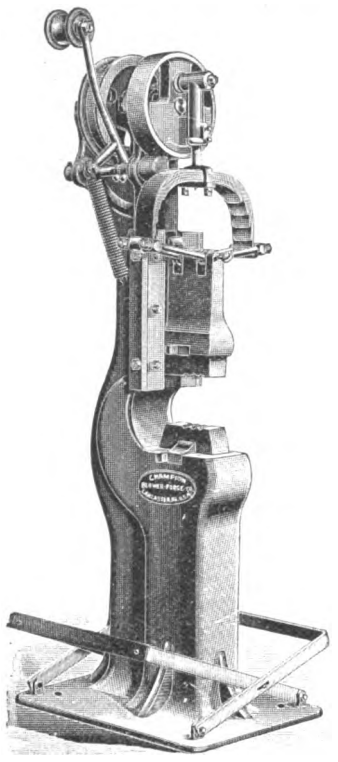
Don't miss the "Whirlwind" Tuyere Iron. It is true to its name.

No. 433 Cast Iron Blacksmith's Forge with Half Hood and Sloop Bottom Coal Box.
Hearth 32x45 in. Fan 12 in. in diameter.

THE FAMOUS 400



It's all in the Spiral



The Champion "Patented" Power Hammer.

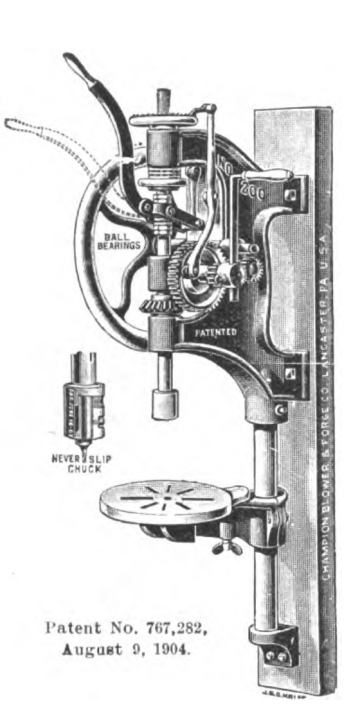
Made in Two Sizes.

No. 0 Champion "Patented" Power Hammer, with one regular set of dies for plow work, upper die 3x1⅛ inches, lower die 3x2 inches. Size of base of Hammer 18x25 inches. Height over all 5 feet 4 inches. Weight of ram 30 pounds. Pulley 9x2⅝ inches. Speed 400 RPM. Capacity 2 inches, square or round. ½ HP required to operate same. Weight 900 pounds.

No. 1 Champion "Patented" Power Hammer, with one set of dies 2½x6½ inches, with plain surface 2½x3 inches, and two plain grooves and one tapering groove across one end for forging round iron, straight and tapering. Size of base of Hammer 20x27 inches. Height over all 5 feet 8 inches. Weight of ram 65 pounds. Pulley 10x2½ inches. Speed 300 RPM. Capacity 2¼ inches round or square. 1 HP required to operate same. Weight 1,250 pounds.

Our New Catalogue can be had free upon application, showing the very latest and greatest inventions in the blacksmith line in the world on Blowers, Forges, Drilling Machines, Tire Benders and Shrinkers, Power Hammers, Punches, Shears, Screw Plates, Power Blowers, etc. It will pay you to see our catalogue. Write for it.

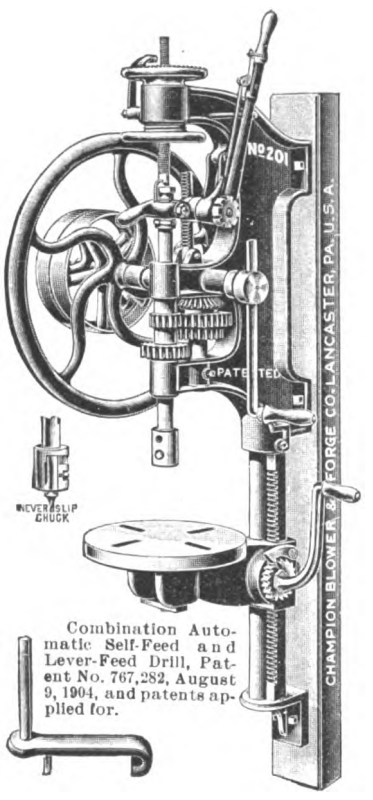
The Champion "Patented" Automatic Self-Feed and DOUBLE COMPOUND LEVER-FEED UPRIGHT POST DRILLS. Made with Cut Gears and Ball Bearings.



Patent No. 767,282, August 9, 1904.

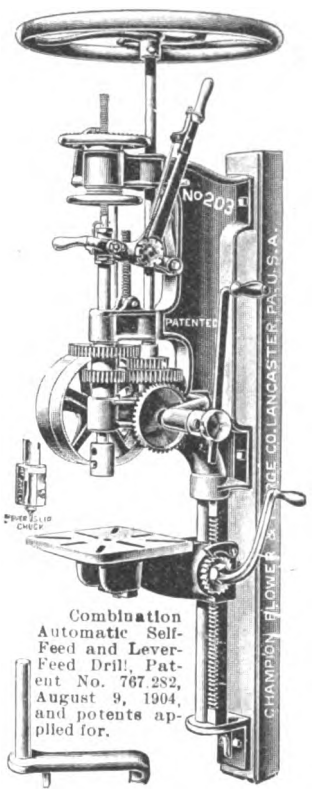
No. 200 DRILL

Combination Automatic Self-Feed and Lever-Feed Drill.



Combination Automatic Self-Feed and Lever-Feed Drill, Patent No. 767,282, August 9, 1904, and patents applied for.

No. 201 DRILL



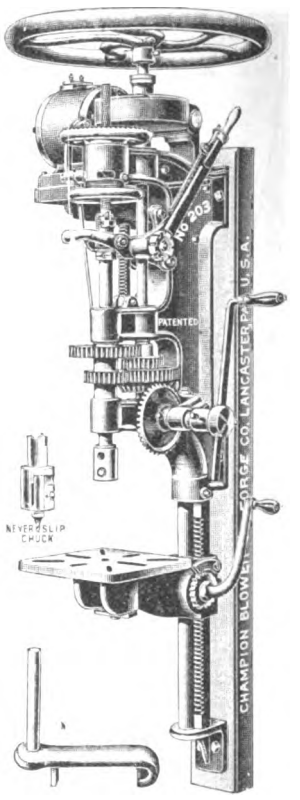
Combination Automatic Self-Feed and Lever-Feed Drill, Patent No. 767,282, August 9, 1904, and potents applied for.

No. 203 DRILL.

The Double Compound Lever-Feed produces 80% more pressure or drills holes 80% larger, with the same labor, than any Lever-Feed Drill

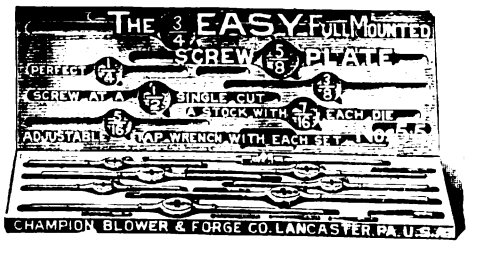
REMEMBER

There is no TURNING BACK of the FEED Screw NUT WITH EITHER FEED.



No. 203 Champion Combination Automatic Self-Feed and Double Compound Lever-Feed ELECTRICALLY DRIVEN Upright Post Drill.

This Drill has the motor direct connected to the upright back gear shaft, which represents what we consider a perfect up-to-date Electric Drill and one that is worthy of most careful consideration from the up-to-date mechanic. It represents simplicity, durability and no loss of power.



Screw Plates in four styles cutting up to 1½ inches.

The DOUBLE COMPOUND LEVER-FEED Saves 200 Per Cent

IN TIME AND LABOR in drilling holes, reaming, countersinking, etc., and makes the drill a first-class Wood Boring Machine.

THE CHAMPION BLOWER & FORGE COMPANY, LANCASTER, PA., U. S. A.

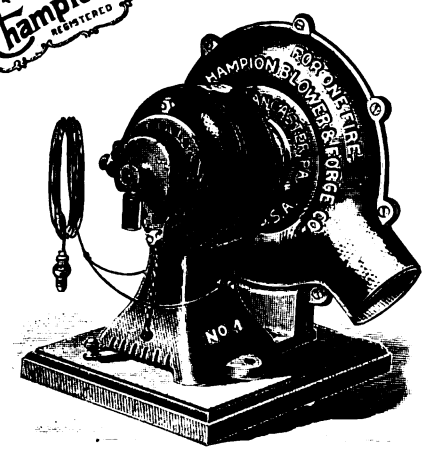
Please mention "The Blacksmith and Wheelwright" when writing to advertisers.

THE CHAMPION ONE-FIRE, VARIABLE SPEED ELECTRIC BLACKSMITH BLOWER

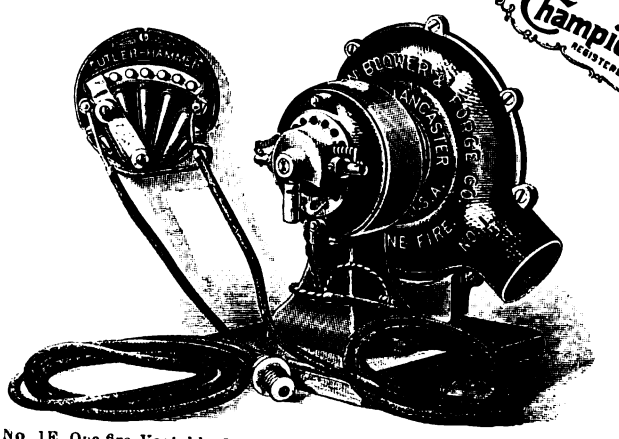
THE ELECTRIC SUCCESS

Motor Capacity 40% above requirements

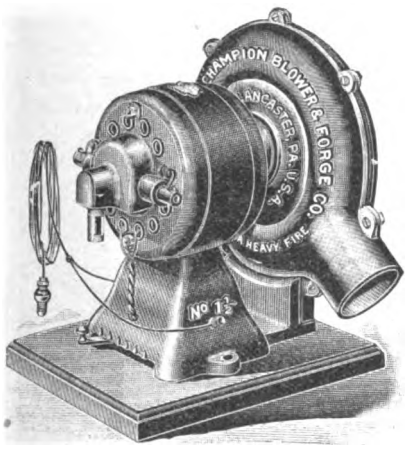
The illustrations show a very complete line of Electric Blowers, running up to nine fires. We recommend, in every instance, each fire to be equipped with its own individual Electric Blower, so it gives each operator full and complete control of his own individual fire and a large saving in the consumption of electric current. The material, workmanship, etc., used on these Blowers are of the very best.



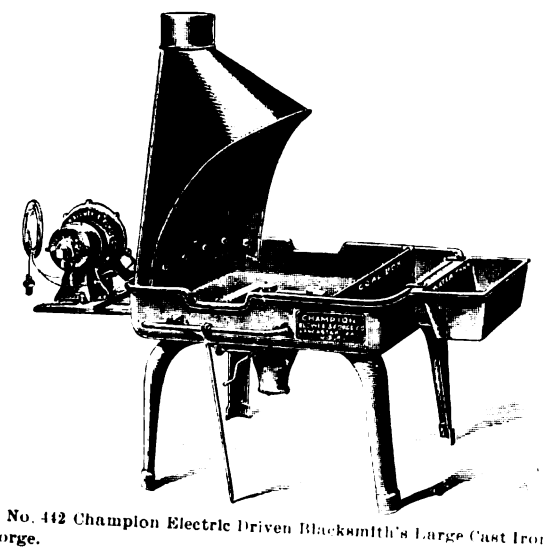
No. 1 One-fire Variable Speed Electric Blacksmith's Blower with six speeds, for light and medium fires.



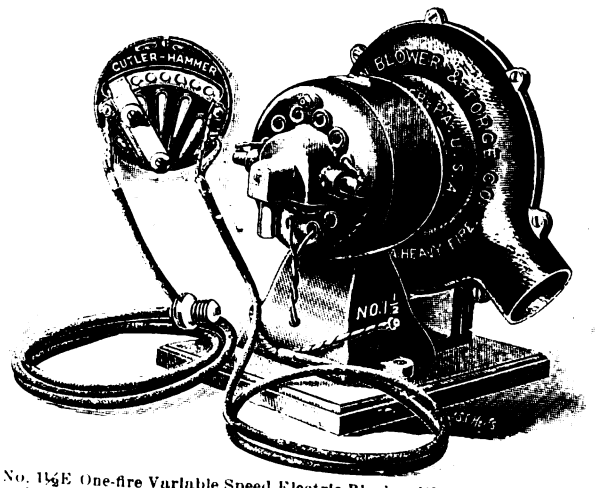
No. 1E One-fire Variable Speed Electric Blacksmith's Blower with universal motor and detached rheostat, with six speeds, for light, medium and heavy fires.



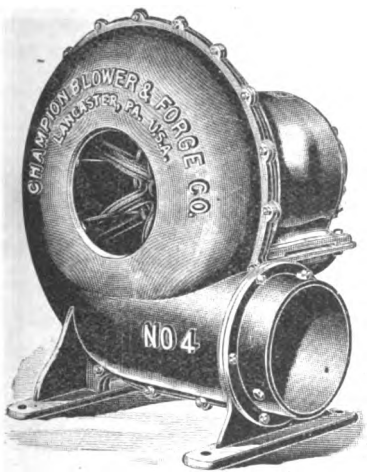
No. 1½ One-fire Variable Speed Electric Blacksmith's Blower, with six speeds, for extra heavy fires.



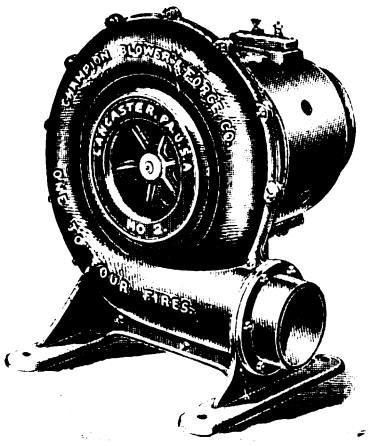
No. 442 Champion Electric Driven Blacksmith's Large Cast Iron Forge.



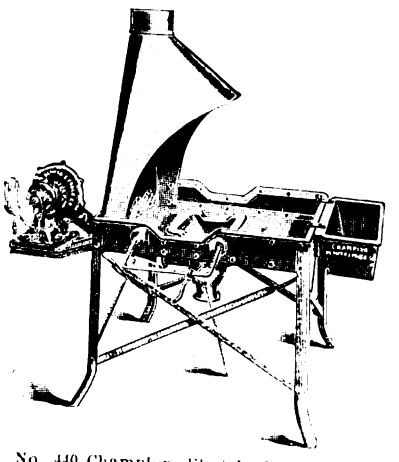
No. 1½E One-fire Variable Speed Electric Blacksmith's Blower with universal motor and detached rheostat, with six speeds, for extra heavy fires.



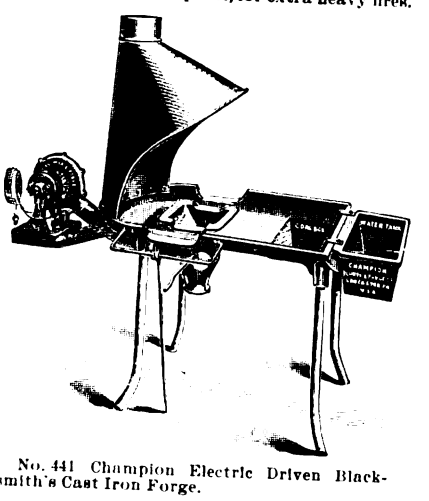
No. 4 Electric Blacksmith's Blower will blow from one to nine fires.



No. 2 Electric Blacksmith's Blower will blow from one to four fires.

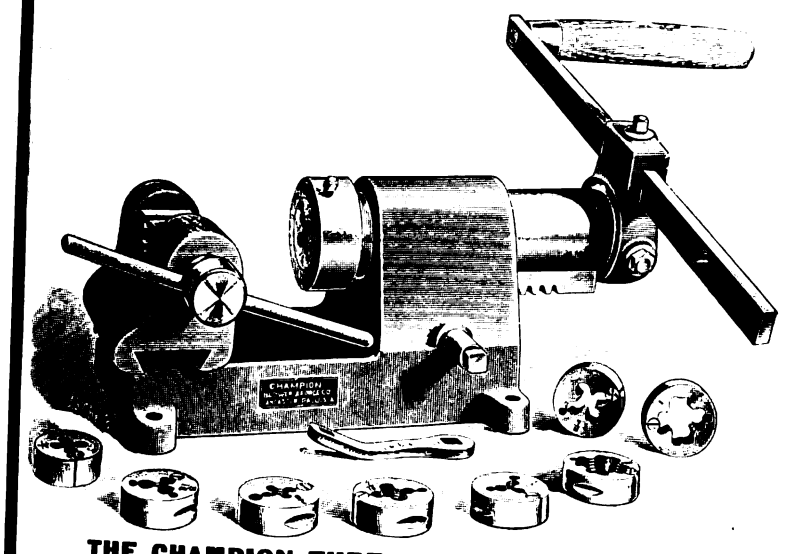


No. 440 Champion Electric Driven Blacksmith's Steel Forge.



No. 441 Champion Electric Driven Blacksmith's Cast Iron Forge.

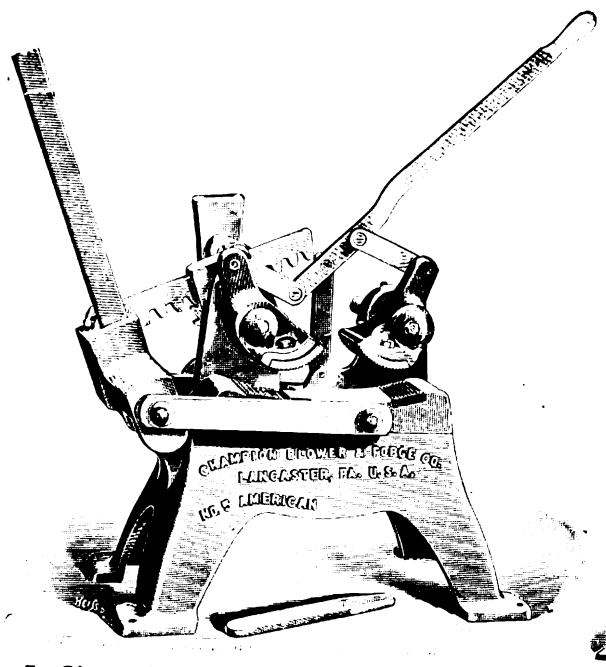
THREE NEW CHAMPION TOOLS



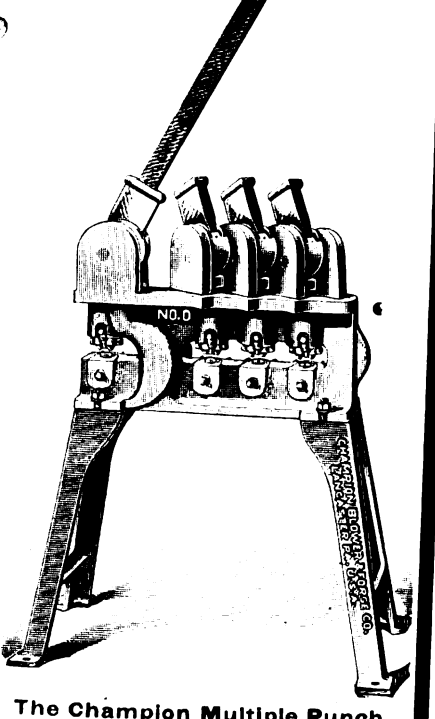
THE CHAMPION THREAD CUTTING MACHINE

Thread Cutter to do Quantity Jobs Equal to Machines Costing Ten Times the Price.

No. 1 Champion Thread-Cutting Machine with Dies Only cutting ¼, 1/8, ¾, 1/8, ½, ⅝ and ¾ inch. Weight 40 pounds.
No. 2 Champion Thread-Cutting Machine with Dies Only cutting ¼, 1/8, ⅜, 1/8, ½, ⅝, ¾, ⅞ and 1 inch. Weight 45 pounds.
No. 3 Champion Thread-Cutting Machine with Dies, Taps and Tap Chuck, complete, cutting ¼, 1/8, ⅜, 1/16, ½, ⅝ and ¾ inch. Weight 45 pounds.
No. 4 Champion Thread-Cutting Machine with Dies, Taps and with two Tap Chucks, complete, cutting ¼, 1/8, ⅜, 1/8, ½, ⅝, ¾, ⅞ and 1 inch. Weight 55 pounds.



No. 5. Champion American Tire and Axle Shrinker.
HAS TWO SHRINKING LEVERS.
1st Lever for Light Tires, 2nd Lever DOUBLE COMPOUND.



The Champion Multiple Punch.
Regularly furnished with ¼, 1/8, ⅝, and ½ inch Dies and Punch. Maximum capacity ⅝x¾ inch.

Our 1913 catalogue can be had upon application, showing the very latest and greatest inventions in the Blacksmith Line in the world on Blowers, Forges, Drilling Machines, Tire Benders, Tire Shrinkers, Screw Plates, Power Blowers, Power Hammers, Punches and Shears, etc. It will pay you to see our new catalogue.

THE CHAMPION BLOWER & FORGE COMPANY, LANCASTER, PA., U. S. A.

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 principles 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.....B. Scott Payne Co.	Providence, R. I.....Congdon & Carpenter Co.
Boston, Mass.....B. 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.....B. 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.
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Pittsburg, Pa.....McLean & McGinness	Wilmington, Del.....Delaware Hardware Co.
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SHELDON

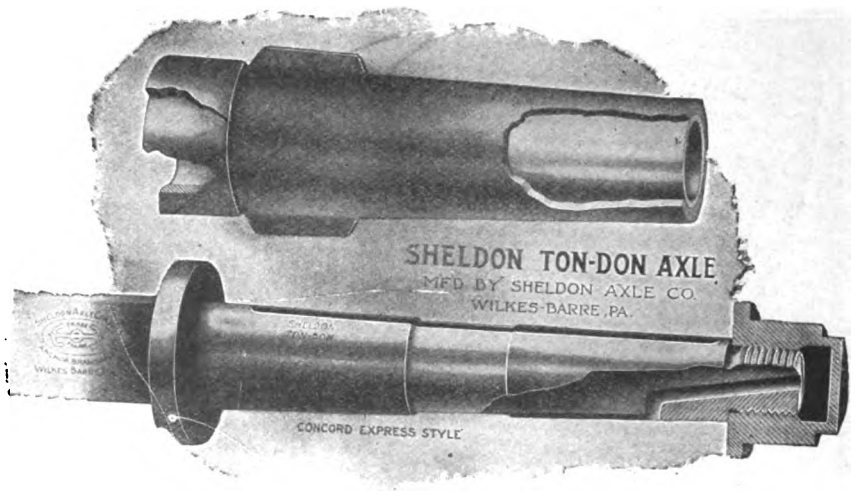
"TON-DON"

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 CO.
WILKES-BARRE, PA

LARGEST AXLE FACTORY IN THE WORLD.

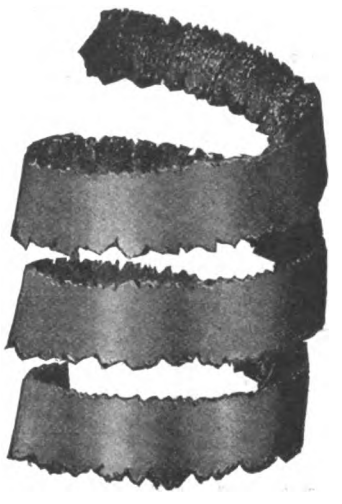
JESSOP'S "ARK" HIGH SPEED STEEL

HAS AN UNEXCELLED RECORD


ARK.

NOTE THE FOLLOWING FACTS

In turning 100 railway car wheel tires, Jessop's "Ark" High Speed Steel has the record of losing less steel, due to grinding, than any other make.



The actual amount of steel ground off the tool in turning 100 wheels was 3 ounces. This is an unrivalled performance in steel economy.

We have a large stock of Carbon Tool Steel and High Speed Steel. Write for Catalogue.

WM. JESSOP & SONS, Incorporated

91 JOHN STREET, NEW YORK, N. Y.

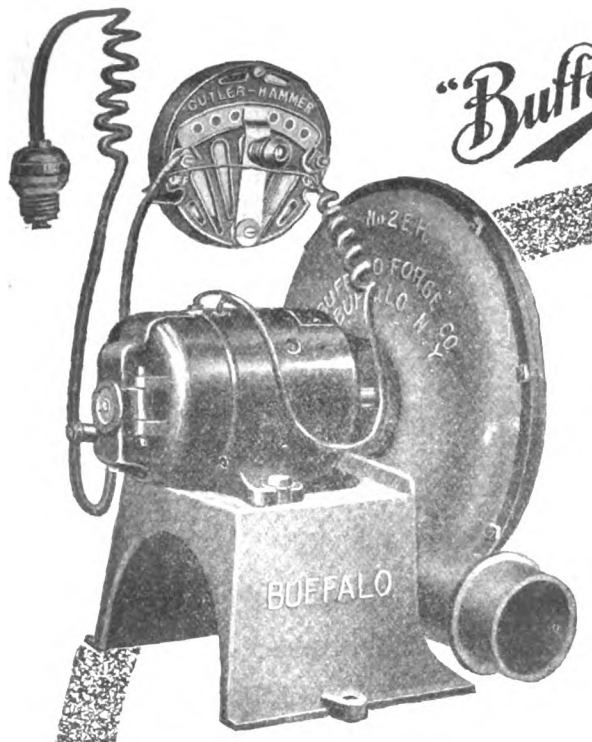
Boston Warehouse: 163 High Street

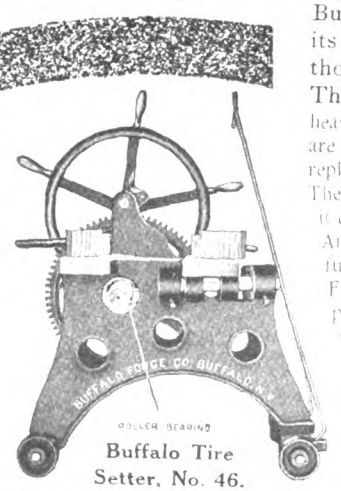
Branch Warehouses throughout the United States.

"Buffalo"

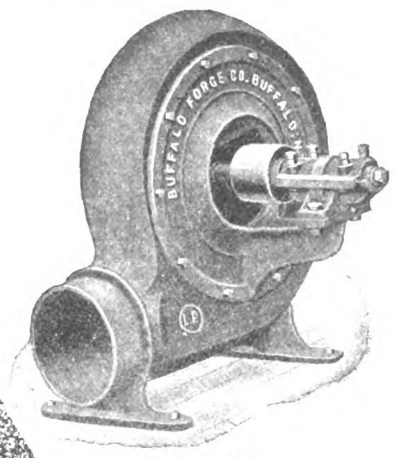
Variable Speed Electric Blower

By all odds, the fan with the *slowest* speed lasts the longest and uses the least current. The slow speed of the Buffalo Electric Blower is the secret of its superiority, and the *large diameter* of the fan the secret of the *powerful blast.* This blower is about twice as large and heavy as other electric blowers, and the brushes are nearly *three times* the regular size,—making replacing necessary only at the longest intervals. The speed regulator is *separate* from the blower, so it can be hung up where most convenient to reach. Any blast, from the gentlest to the most powerful, is obtained, up through six graduations. Furnished complete with 15-ft. heavy wire, and plug, which simply screw into ordinary lamp socket and the connection is made.

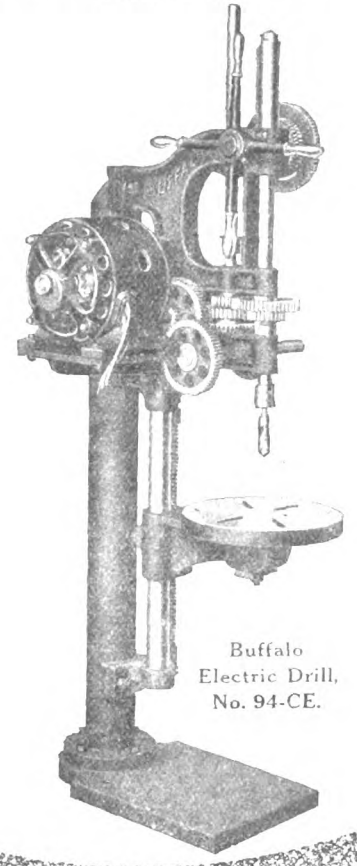




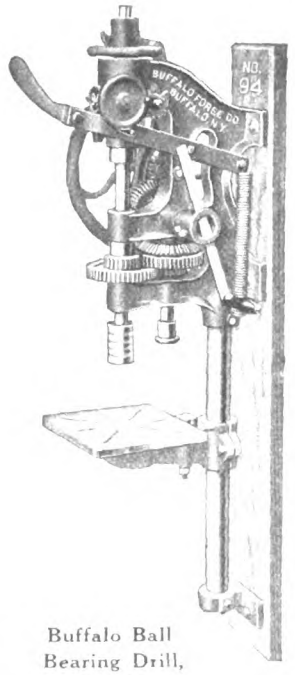
Buffalo Tire Setter, No. 46.



Buffalo Power Blower.



Buffalo Electric Drill, No. 94-CE.



Buffalo Ball Bearing Drill, No. 94.

Crain Combination Woodworking Machine

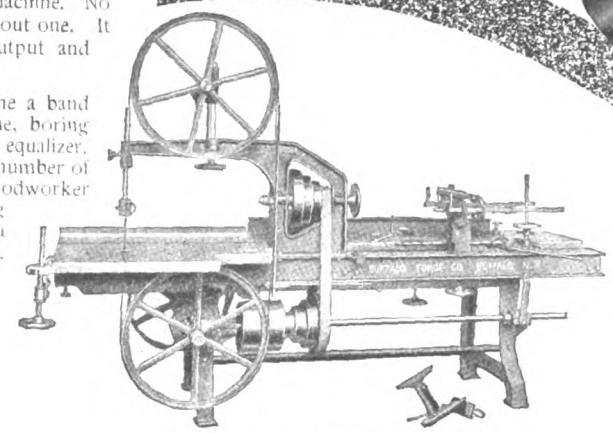
12 Machines in One.

The only combination machine made especially for the Blacksmith and Woodworker.

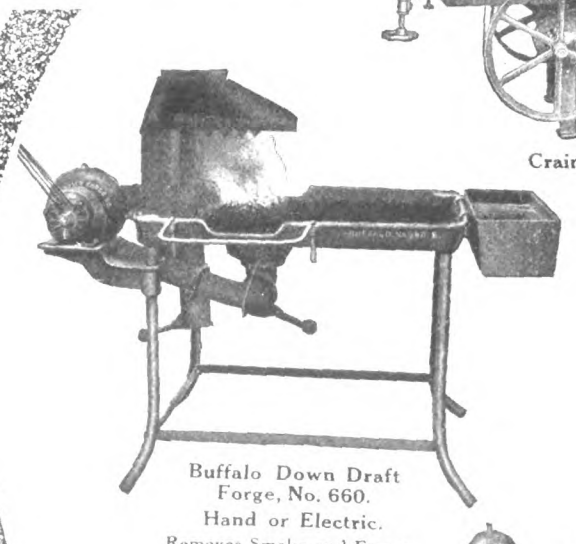
Strength, capacity, variety and small floor space are the the distinctive features of this machine. No up-to-date shop can afford to be without one. It increases quantity and quality of output and will pay for itself in a short while.

It combines in one compact machine a band saw, rip saw, cut-off saw, planer, lathe, boring machine, drill, shaper, sizer, spoke equalizer, spoke tenoner, and can be used for a number of other operations common to the woodworker and blacksmith, and usually requiring several machines. All without extra attachments—simply change the tools.

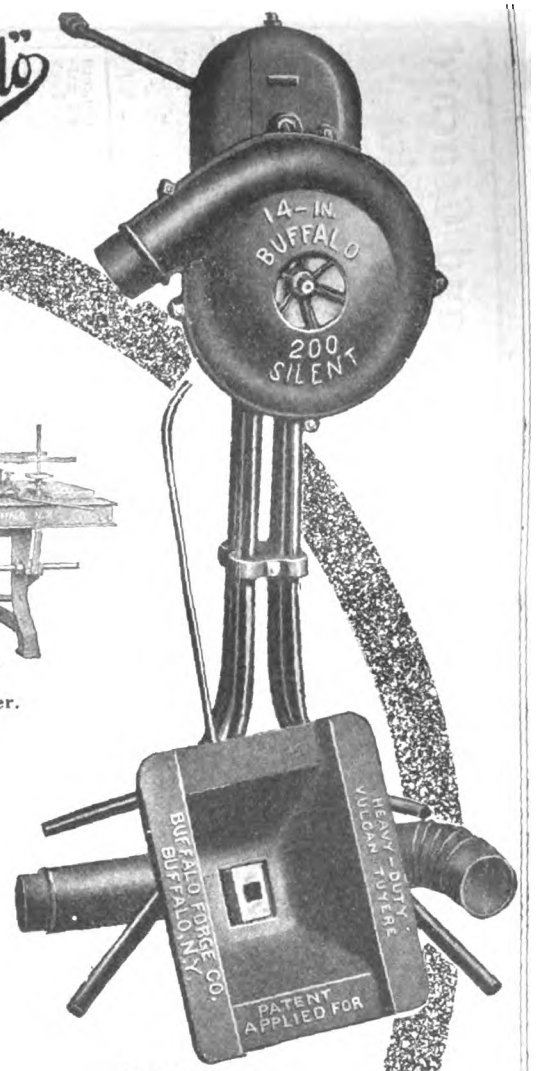
"Buffalo"



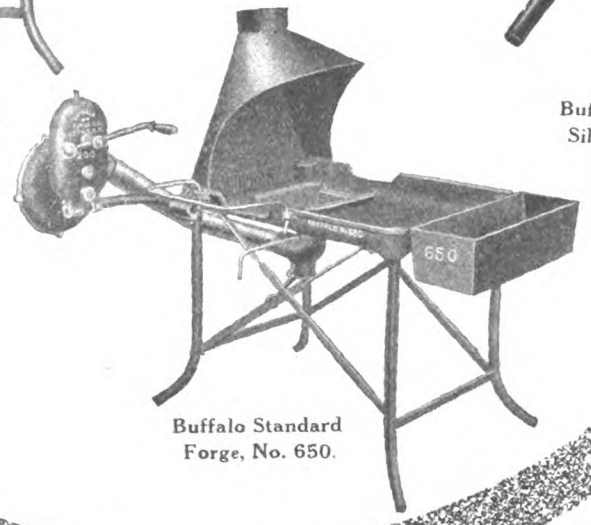
Crain Combination Woodworker.
Twelve Machines in One.



Buffalo Down Draft Forge, No. 660.
Hand or Electric.
Removes Smoke and Fumes.



Buffalo No. 200 Silent Blower.



Buffalo Standard Forge, No. 650.

Ask us for **net prices now** on any tool in which you may be interested. First of all, is your blower everything it could be? Do you know that the **14-inch** Buffalo 200 Silent Blower is now preferred by all smiths who do a certain amount of implement and wagon repairing? Even horseshoers find it a great advantage, as it gives **22% higher blast pressure and runs as easily as any 12-inch** blower.

The 200 Silent Blower **14-inch** fan is now furnished on all our heavy blacksmith forges, without advance in price. This gives you a greater value for your money than you have ever been able to obtain in forges. Take a look at the splendid electric blower in the upper left-hand corner and the Electric Drill No. 94-CE. Any shop may justly be proud of such tools and find them highly profitable. But write at once—take the first step **now** and start the new year with your mind at rest regarding that machine you **know** you ought to have.

Buffalo Forge Company
BUFFALO, N. Y.

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THE

BLACKSMITH AND WHEELWRIGHT

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DELIVERY CAR BODIES.

For a Furniture Van and One for Less Bulky Loads.

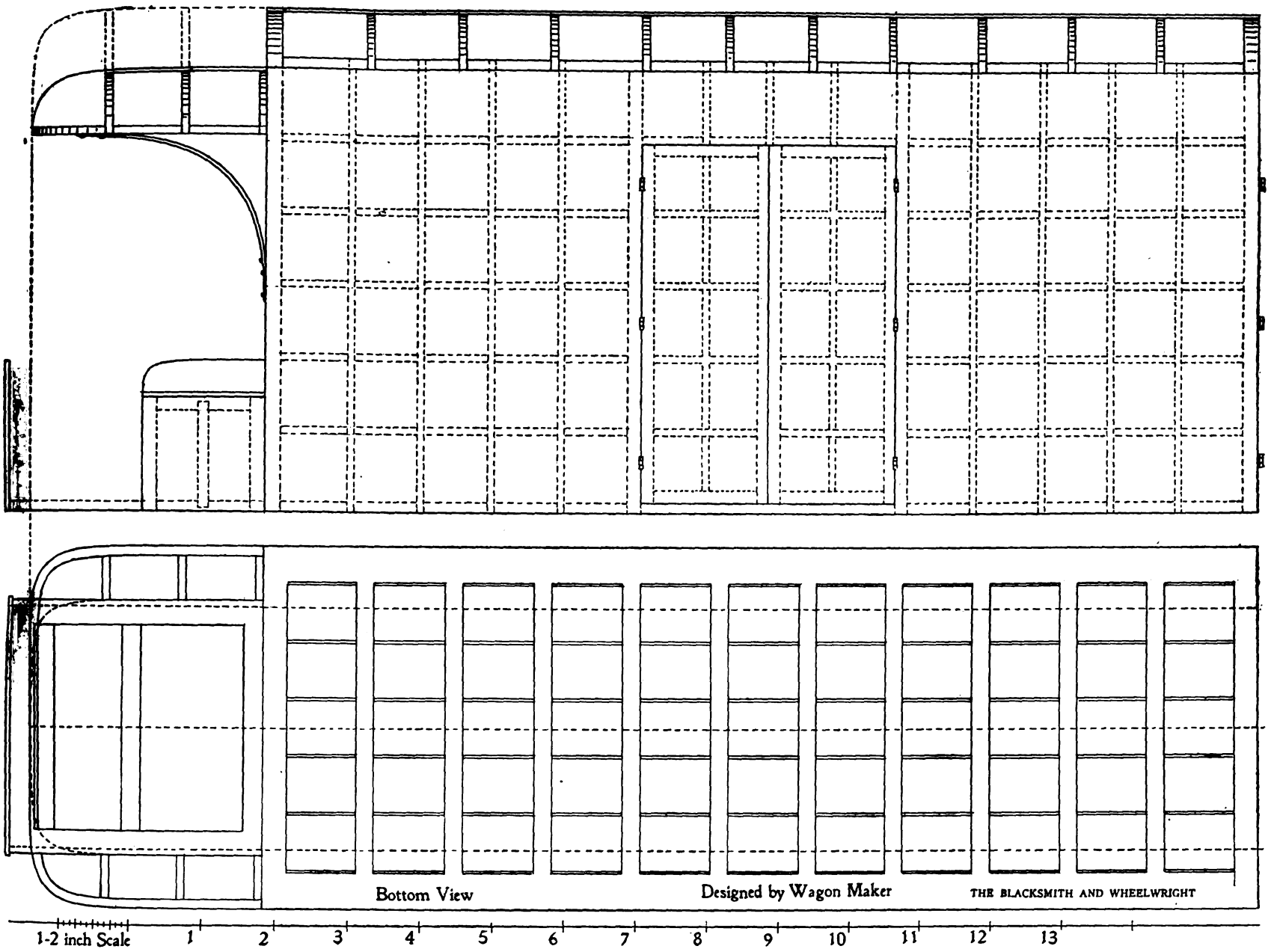
This furniture van is 14 feet long outside of posts, and 5 feet wide. The height of the body outside is 7 feet. The front hood is 39 inches long and 42 inches wide, but this is not always the rule. On some of them the hood is level with the top as per dotted line, and below it are shelves where blankets, lace curtains or bedding are placed, and therefore, shelves are fitted to each side and an opening of 18 inches left in the center. When done as explained above, the hood is as wide as the body. For this reason we have drawn this both ways.

The front seat is not always wanted, as in most cases the seat or the cab is on the chassis. This seat when furnished with the body is sometimes as wide as the body to make room for four, so that all can comfortably be seated.

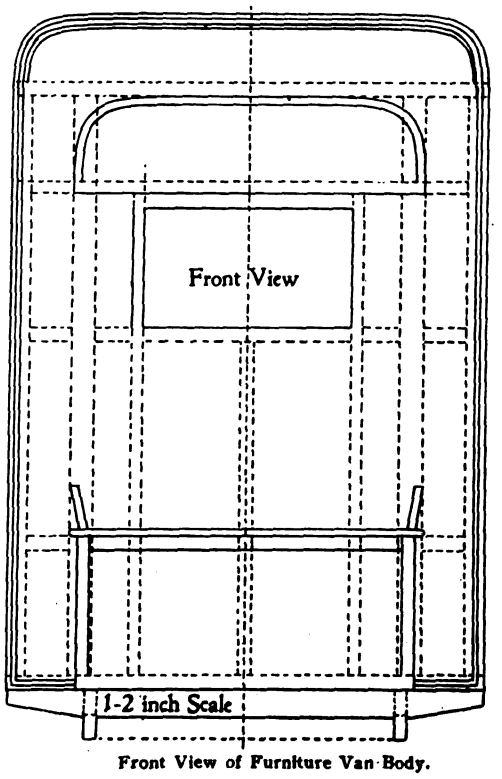
The convenience of side doors on the furniture vans has never been questioned, but nevertheless the majority of them are built without. It makes a stronger body when suspended on horse-drawn gears, but when the body rests on a chassis on lengthwise risers and cross bars, it is stronger with doors than a horse-drawn body without doors. On motor van bodies, to guard against side motion the posts must be strengthened with the sills by plates on all eight posts. To strengthen such van bodies on the rear end, some wagon builders use two posts on each rear end corner five inches apart, which strengthens the body considerably but makes the doors narrower across. If this is not objected to the two post corners are preferred.

The construction of side doors either for hinges or to slide. On hinges they are easier opened while a sliding door when not on rollers is difficult to move back and forward.

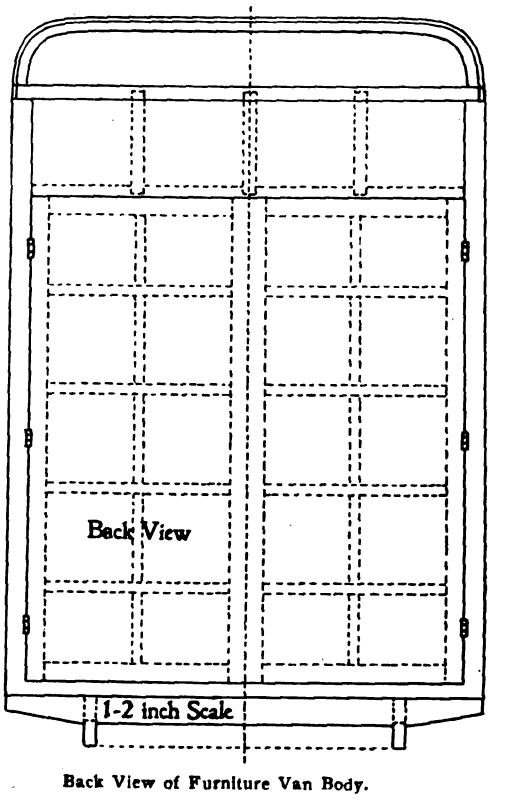
Most of these bodies have square tops; that is, the top part is made with rails and curves across. On this body there are narrow side rails and bent bows across, which makes the body look lower without infringing on the space. With bow construction the top is covered with ½x1¾ inch strips, 1½ inch apart and covered with imitation rubber cloth. As the cloth cannot be bought wide enough, it is jointed in the center. To prevent the water getting inside, a lengthwise rail is fitted under the bows, notched in both the rail and bows so that both are level. On top of this rail, put on the ½x1¾ inch strip and all the rest till down to the side rails. Over this stretch the rubber cloth in two parts, with joint in the center, and tack with a ¾x⅜ inch rounded molding, with white lead between and fasten with wire finishing nails every three inches apart.



Motor Furniture Van Body, with Side and Rear Doors and Bow Top.



Front View of Furniture Van Body.



Back View of Furniture Van Body.

Three bends or angles will be required to make this tee, which is represented in its finished form at A, B, C, the portion A being merely a piece of straight pipe which may or may not be soldered to B B. In the tee made for the writer's use, it was not soldered. The pieces, B, are the regular elbows or bends furnished with stock conductor pipe. The pieces C C, are short portions of the third elbow, cut just long enough, with allowance for their lap into B B, to fill out the required angle of 90 degrees. When it is possible to slide one piece freely into the other, then the third elbow may be cut in half, but usually it will be found best to fit the pieces together, forcing them together as far as they will go, then cutting off just the necessary length to make up the 90 degrees.

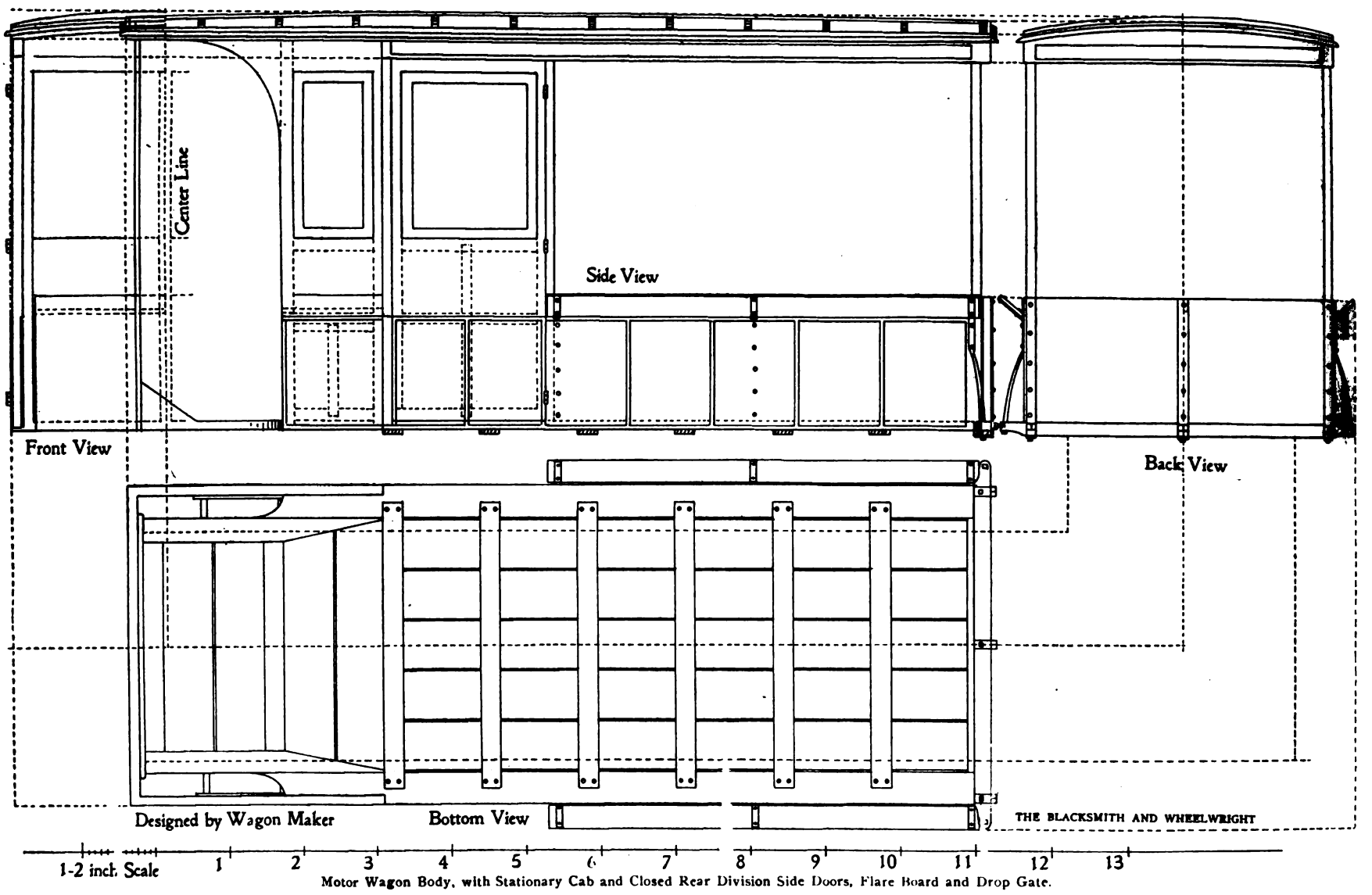
If the smith is very particular, and desires to make an extra good job of the piping, then he may fit together those portions of B B which are to touch each other—fit them together in such a manner that they lap a half of the finished tee, were not to stand in a straight line with each other, but were to make quite an angle horizontally. This matter is shown in Fig. 3, at D, where the two branch pipes E E, are shown to lead off at the required angle with each other. This angle was readily secured by cutting the sides of the two elbows long and short at F, taking care that they were cut "right and left" so as to fit together and give the required angle.

All small posts between the heavy ones are divided equally between, also between the doors and so are the rails, which all run in one direction, so that all can be marked from one post and simplifies the construction. All posts are lapped. The corner posts on the sills are lapped on both sides, glued and screwed to the sills. On top all posts are lapped to the rail from the outside, all rail ends are mortised into the posts and all connections with rails and small posts are halved together. The hood rails when built 42 or 45 inches across are mortised into the posts, but when made the whole width to the sills. On the cab part the cross bars are framed level, top and bottom, with the sills and the bottom boards are rabbeted into the sills, while on the body part the cross bars are framed 5/8 inch below the top surface of sills, or the thickness of the bottom boards, so that the bottom boards are level with the sills. To connect the cross bars with the sills, the strongest possible way, there must be a mortise and a lap, which are shown on the bottom view. The tenon is 3/8 inch thick and 1½ inches long.

Notice the sills on the bottom view. The front cab is set in 1½ inches and the cab sill is spliced to the rear body sill. These joints are glued and strengthened with screws from inside and outside. The half front view and full rear view will give further details of construction.

Motor wagon body with large sliding side doors and two hinged rear doors:

The length of this body outside of posts is 8 feet 10½ inches. From front post to rear of



Motor Wagon Body, with Stationary Cab and Closed Rear Division Side Doors, Flare Board and Drop Gate.

an inch or so. Put a few rivets in the lapped portions, then solder; and the joint will be the best that can be made. If the smith be an expert tin-worker, he may turn the portions of B B, which come together, then make a regular locked seam, which may, or may not be soldered, as desired.

But the writer, in making the joint described above, did neither of these things. The pieces B B were cut to fit together fairly, then they were soldered with "half-and-half" in two or three places where they touched each other fairly. Then a strip of galvanized iron—the elbows were also of galvanized stock—a strip about 3/8 inch wide was laid along the joint between the two pieces B B, and the strip was then soldered well to both pieces B B, using raw muriatic acid freely.

During the putting together for the initial soldering, pieces B B were inserted in piece A, as shown by Fig. 3. This insured their being kept to the proper diameter, and it also steadied the pieces for the first soldering. If trouble should be met with in keeping pieces B B in position inside of A, it is well to find or make a pipe or plug just large enough to slide into the opening between the pieces B B, then, with the plug inside, and piece A slipped on outside, pieces B B will be held firmly in place and may be soldered with little trouble.

The above course was employed by the writer, for the reason that the two parts, C C, of the body two rails are used, upper and lower, and both rails are lapped into the main posts, supported either with iron posts or frame work and paneled over.

This body is decidedly different from most wagon bodies as it contains a stationary cab front, carrying comfortably two with glass frames to drop on each side, two back of the driver. The rear is closed with a curtain. There are side doors, also with glass frames to drop. This body has been built with the intention of carrying three passengers besides the driver and a lot of luggage in the rear.

The length of body from front post to rear of the drop gate is 9 feet 6 inches. The top on the front end extends 25 inches outside of the front posts. The length from front posts to rear posts is 44 inches, and the leg room for the rear seat is under the front seat which is closed in front but not in the rear. The loading space on the rear is 5 feet 9 inches and 3 feet 11 inches between.

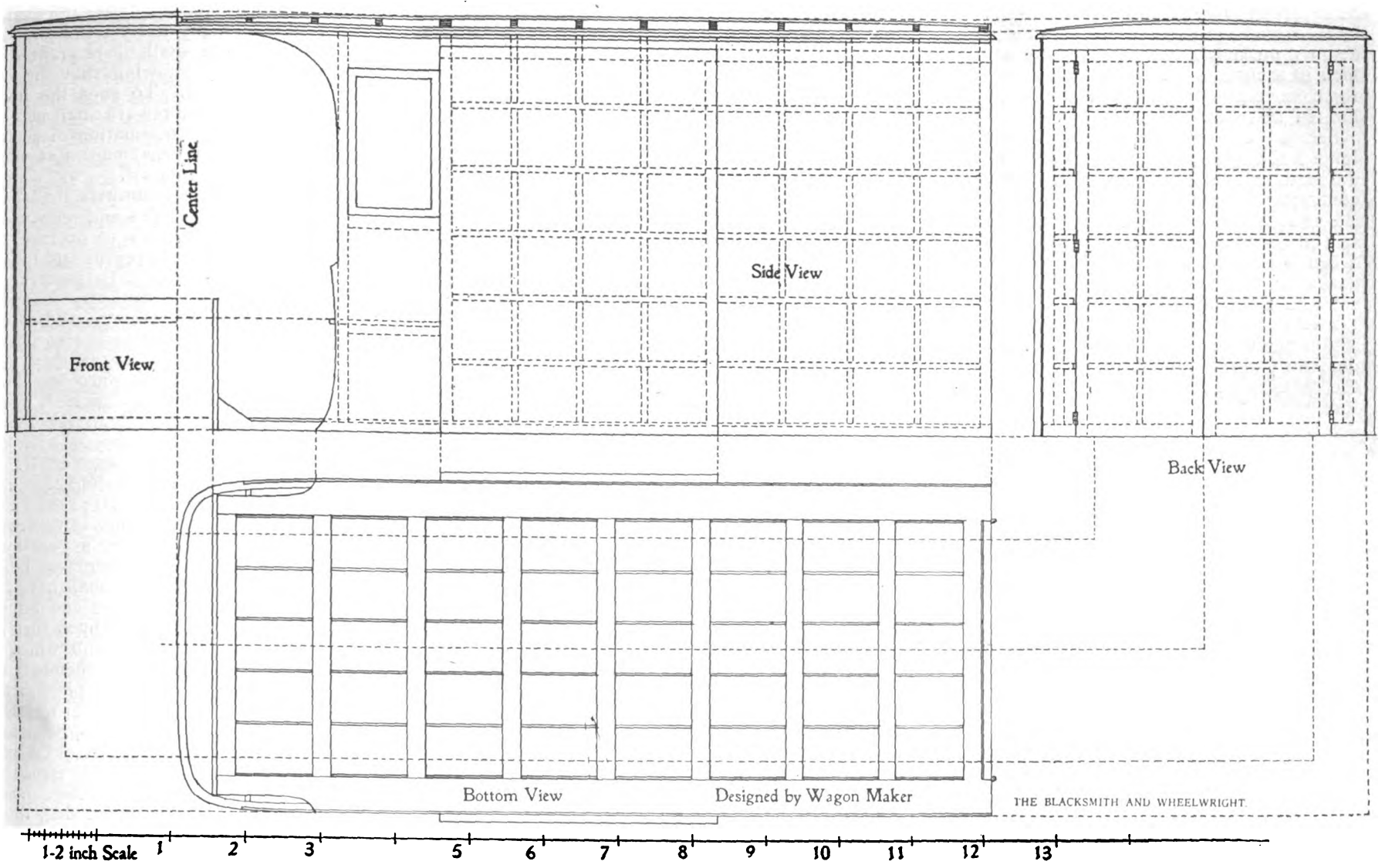
The doors are framed as usual, when made with glass frames to drop. The cab front is framed the same, and the lower rear end is closed with a ¾x18 inch board, molded as shown.

The flare boards are secured to three iron stays each side riveted to side boards and flare boards as shown on the side view. On the side boards the stays are on the inside and on the flare boards the stays are on the outside. On inside the stays form a corner and are bolted dash is 19 inches, and length of top from front post to front of top, 26 inches. The width of the body is 54 inches without the sliding door. The inside loading space is 4 feet 3 inches across; 7 feet 3 inches for length and 5 feet 4 inches between bottom boards and curves at the center. The space between the sliding doors is 3 feet 5 inches by 4 feet 11 inches. The space between the rear doors is 3 feet 6 inches by 5 feet. The frame work it will be noticed is very light but the panel spaces between are 10 inches only, which is far better than heavier posts and rails spaced further apart. On this draft the spaces between are 10 inches only, and still less on the doors.

The doors are one inch thick only, small rails 1 inch square, door posts and door rails 1x1½ inches; over this a panel 3/8 inch thick is glued for each door up and down. If the panels are not wide enough, make a joint at the center of the post. For the sliding doors the panels should also be glued up and down, because when the panels shrink or expand, it will affect the frame work and will warp. It is better to warp lengthwise as it is held in position with the sliding groove.

Such panels for sliding and hinged doors should be blocked all over the inside surfaces with ¼ inch thick blocks by one inch either way, glued on the panels between posts and rails. This keeps the panel from shrinking or expanding and also keeps the door from warping.

On this body the side glass frames are made to drop but the inside space is all open and this finish depends altogether for which trade the wagon is used. The division back of the seat is closed entirely; stationary windows are made to drop. Again, stationary lights, or drop lights, are made for the rear doors. On some of them the entire inside surfaces are lined including the top between the bows or covering the bows. In some of them are not only shelves but also closets, depending altogether for which purpose the wagon is used. For instance, the banker's wagon has iron screened windows and fitted with interior banking facilities and furniture.



Motor Wagon Body, with Large Sliding Side Doors and Two Hinged Rear Doors.

A LICENSE AND A LIEN LAW.

Two Important Bills of Vital Interest to the Horseshoers' Business.

At the suggestion of the Hartford, Conn., Horseshoers' local organization and of the president of the M. H. N. P. A. of Connecticut, Warren D. Chase, of the Rowe Calk Company, has introduced two bills in the Connecticut legislature which are of vital interest to the trade everywhere. They are reprinted below. One of them is a lien law and the other is an act providing for the examination and licensing of horseshoers. It is probable that some minor changes will be made in these bills but in essence it is expected they will pass as presented. Both have been referred to the labor committee one of the members of which is a horseshoer.

The idea started at a recent meeting of the Hartford local horseshoers' organization. It was a lively meeting and the idea of licensing horseshoers to protect the public against incompetent workmen was favorably received.

Bill for a Lien Law.

Be it enacted by the Senate and House of Representatives in General Assembly convened:

Section 1. Any person who shall shoe or cause to be shod by his employees any horse, mule, ox or other animal shall have a lien upon such animal or animals for the amount due or to become due for such labor or services, which lien shall take precedence of all other claims, liens or encumbrances thereon made, or filed after the time of doing such work, labor or service.

Section 2. No debt or demand for such labor or service shall become a lien upon the animals mentioned in the preceding section unless a petition therefor in writing shall be made and signed by the claimant and verified by him or by some one in his behalf under oath, setting forth the nature of the debt or demand for which the lien is claimed the amount claimed to be due, a description of the property upon which such lien is claimed and an averment that the petitioner claims a lien thereon pursuant to law. Such petition shall be filed at the office of the town clerk of the town in which the owner of such animal or animals resides within six months after the performance of such labor or services. Such labor or services shall be deemed continuous notwithstanding a change of ownership in the property in which such lien is claimed. The clerk with whom such a petition for a lien is filed shall receive twenty-five cents for filing the same.

Sec. 3. Any person may file successive liens upon the same animal for charges for shoeing the same, and he may include in any one claim of lien his charges for any number of times of shoeing such animal; provided, however, that no lien shall be had for any shoeing of any animal done more than six months prior to the filing of the notice of lien.

Sec. 4. All actions to enforce such lien may be brought before any town, borough or city court or justice of the peace in the county in which such petition is filed. Actions may be commenced to enforce and foreclose any such lien, if the amount for such labor services shall then be due, immediately after the filing of such petition for lien, and such claim for labor services shall cease to be a lien on the property described in such petition unless an action to foreclose such lien be commenced within four months after the filing of such petition. If the claim be not due at the time of filing such petition the time when the same shall become due shall be stated therein and in such case such claim shall not cease to be a lien on the property described in the petition until thirty days after the claim shall have become due; provided that such claim shall continue a lien upon the property so described in all cases for four months after the filing of such petition. Where the property subject to such lien has been transported or taken from the county where such work was done, the person in whose favor such lien exists may bring an action to foreclose the same in any county where said property may be found. In all actions brought to foreclose such liens the person, company or corporation liable for the payment of such debt or claim shall be made the party defendant. And any person claiming to own or have any interest in such property may also be made a defendant, but shall not be held personally liable for any costs unless he defends the action.

Sec. 5. The plaintiff in such action may have the remedy by attachment of the property upon which the lien is claimed; such attachment may be issued, served and returned and like proceeding had thereon, including the release of any attached property, upon giving a bond in such sum as may be fixed by the court or judge for the payment of the amount which may be finally determined to be a lien on the property. The affidavit for the attachment must state that the defendant, who is personally liable to the plaintiff therefor, is indebted to him in the sum named, over and above all legal set-offs, for such labor or services done or performed as entitled the plaintiff to a lien thereon describe the property on which it is claimed such work was done or services were performed and aver that the plaintiff has filed his petition for a lien pursuant to law; but no other fact need be stated therein. The writ of attachment shall direct the officer to whom it is issued to attach the property described or so much thereof as shall be necessary to satisfy the sum claimed to be due thereon and to hold the same subject to further proceedings in the action. The officer executing such writ shall make return thereon of his doings in the premises. In actions brought in a justice court or town, borough or city court hereunder where defendants cannot be found the provisions of law relating to service of attachments upon nonresidents or persons who cannot be found in other actions in such courts, shall govern and apply to such action to foreclose a lien.

Sec. 6. When more than one person has a claim for a lien upon the same property, any person having such claim may have assigned to him in writing the debt or claim of the other, subject to the set-offs to said claim against the original owner, and may file a petition for his own lien and for the claims for liens so assigned to him and bring an action to enforce the same in his own name; but such petition shall allege such assignment.

Sec. 7. The taking of a promissory note or other evidence of debt for any such labor or services done or performed shall not discharge

the lien therefor hereby given unless expressly received in payment therefor and so specified.

Sec. 8. If any animal or animals on which a lien is claimed under the foregoing provisions shall, during the pendence of the claim therefor, be transported out of this state, secreted, killed, sold or incumbered, the owner of such property and every purchaser thereof or person acquiring any interest therein during the pendency of such claim shall be liable to the lien claimant for the amount which may be adjudged to be due him, which amount may be recovered against such person in a personal action; provided, the petition for a lien is filed in accordance with law and an action to foreclose the same is begun within the time limited therefor.

Sec. 9. The complaint in any action to enforce a lien given upon animals shall in addition to ordinary allegations in actions upon contracts allege the filing of the petition for a lien as hereinbefore provided and shall contain a description of the property upon which a lien is claimed, and if any part of the claim has been assigned to the plaintiff that part shall be alleged.

Sec. 10. The court or jury which tries any action hereunder shall, in addition to the sum due the plaintiff find if such be proven, that the same is due for the labor or services performed upon the property or some part thereof described therein as alleged in the complaint, and that the same is a lien on the property or some part thereof described therein, and the judgment shall be in accordance with the findings. Costs shall be taxed and allowed as in civil actions. The execution, in addition to the directions and commands of ordinary executions upon judgments for money, shall direct that the property upon which the lien is found to exist or so much thereof as may be necessary for such purpose be sold to satisfy said judgment and costs including the cost of the sale. If the court or jury find that the amount due the plaintiff is not a lien upon any part of such property it shall be released from the attachment if it has been attached. The plaintiff shall, in such case, have judgment for the amounts so found due, with costs, as in ordinary civil actions, but he shall not recover the costs of executing such attachment.

Sec. 11. Any proceeding brought or instituted under this act before any court of this State except as herein provided shall be in accordance with the statutes of this State and the rules of the court to which the proceeding is brought.

Bill for Licensing Horseshoers.

Be it enacted by the Senate and House of Representatives in General Assembly convened:

Section 1. No person who is not actually engaged in the occupation and practice of a master horseshoer, or a journeymen horseshoer, on July 1, 1913, shall follow such occupation, or engage in such business in this State, unless he shall have first obtained a certifinate of registration as provided in section two. The governor shall appoint on or before the first day of July, 1913, and biennially thereafter, a board of three examiners who shall have been citizens of this State for at least three years prior to their appointment, one of whom shall be a master horseshoer who has been engaged in such occupation at least five years prior to his appointment, one of whom shall be a journeyman horseshoer who has been engaged in his occupation at least five years prior to his appointment, and one of whom shall be a graduate of a recognized veterinary college and shall have been engaged in the active practice of veterinary medicine at least five years prior to his appointment and who shall hold their offices for two years from the first day of July in the year of their appointment and until their successors shall have been appointed and qualified. Each member of said board before entering upon the duties of his office shall give a bond to the State in the sum of One Thousand Dollars and shall take the oath provided by law for public officers. Said board shall elect a president, secretary and treasurer, shall have a common seal and its members may administer oaths. The treasurer shall give an additional bond to the State of Two Thousand Dollars. The offices of secretary and treasurer may be filled by the same person. Each member of said board shall receive in full compensation for all his services as said member under this act the sum of Five Dollars and necessary traveling expenses for each day that he shall actually be engaged in the carrying out of his duties under this act. Said board shall report annually to the governor a full statement of its receipts and disbursements during the preceding year and a full statement of its doings and proceedings and make such recommendations as it may think proper. Any moneys in excess of Five Hundred Dollars held by the treasurer of said board at the time of making such report shall be paid over to the State treasurer to be kept by him for the future use of the board and to be disbursed by him upon warrants signed by the president and treasurer of said board.

Sec. 2. Said board shall hold four public examinations in four different cities in this State in each year at such times and places as it may determine, notice of each meeting to be given by advertisement at least ten days before such meeting in a daily newspaper in Hartford and likewise in the county where such meeting is to be held. Any person not actually engaged in the occupation of a master horseshoer or a journeyman horseshoer on July 1, 1913, desiring to obtain a certificate of registration shall make application to said board therefor, shall pay to the treasurer of said board an examination fee of Five Dollars and shall present himself at the next regular meeting of the board for the examination of applicants. Thereupon said board shall examine such person and being satisfied that he is above the age of nineteen years, has studied the trade for three years as an apprentice under a qualified and practicing master horseshoer or in a properly appointed and conducted horseshoeing school under the instruction of a competent horseshoer, or has practiced the trade for at least three years in this or other States, has the requisite skill in said trade to perform all the duties thereof and all services incident thereto in a manner to prevent and relieve suffering and physical injury and has sufficient knowledge concerning the common diseases and disorders of the feet and legs of horses to perform his work humanely, shall thereupon issue to such person a certificate of registration and a card as provided for in Section 4 hereof entitling him to practice the occupation of a master horseshoer or a journeyman horseshoer in this State. Nothing in this act shall prevent any person from serving as an apprentice in said trade under this act nor from serving as a student in any school for the teaching of such trade under the instruction of a qualified horseshoer.

Sec. 3. No person actually engaged in the occupation and practice of a master horseshoer or a journeyman horseshoer upon July 1, 1913, shall follow such occupation in this State after August 31, 1913, unless he shall have first obtained a certificate of registration from said board which shall be issued to him as a matter of course upon proof of the fact that he was so engaged upon July 1, 1913, and upon the payment of a tax of One Dollar for the fiscal year, September 1, 1913, to August 31, 1914, inclusive. Application for such certificate of registration shall be in writing addressed to the board of examiners and signed by the party applying for the same upon a form provided by the board. The purpose of this Section and of Section 7 is to lay and provide means for collecting a tax to meet the expenses of the commission provided for in this act.

Sec. 4. Said board shall furnish to each person to whom a certificate of registration is issued a card bearing the seal of the board and the signatures of its president and its secretary certifying that the holder thereof has paid the tax required by this act and that he is entitled to practice the occupation of a master horseshoer or a journeyman horseshoer in this State until and including the 31st day of the following August and the holder of such card shall post the same in a conspicuous place in the shop which he conducts or in which he is employed where it may readily be seen by all persons whom he may serve. Said board shall keep a register in which shall be entered the names of all persons to whom certificates are issued under this act and said register shall at all times be open to public inspection. Said board may revoke any certificate of registration granted by it under this act for gross incompetence or cruelty inflicted wilfully or ignorantly provided that before any certificate shall be so revoked the holder thereof shall have notice in writing of the charge against him and shall at a day specified in said notice at least five days after the service thereof be given a public hearing and full opportunity to produce testimony in his behalf and to confront the witnesses against him. Revocation of a certificate of registration shall ipso facto revoke the card provided for in Sections 4 and 7. Any person whose certificate has been so revoked may after the expiration of ninety days apply to have the same regranted and the same shall be re-granted to him upon satisfactory showing that the disqualification has ceased. To shoe the horse of any person for hire or reward shall be construed as practicing the occupation of a master horseshoer or a journeyman horseshoer within the meaning of this act.

Sec. 5. Said board of examiners shall have the power to adopt such rules and regulations as they may deem necessary to procure the enforcement of this act, to prevent and relieve animal suffering and injury, to protect the public against inhumane work by inexperienced or incompetent horseshoers, and to improve the conditions of horseshoeing shops and their surroundings so far as they may deem best to accomplish the purposes above set forth. Said rules shall be submitted to the State Board of Veterinary Registration and Examination and upon being approved by said board shall be in full force and effect. A printed copy of every such rule shall be mailed to every licensed horseshoer in this State.

Sec. 6. All horseshoeing shops in this State shall be inspected at least once a year by a member or members of the examining board and any member of said board shall have full power to enter in business hours and inspect any such horseshoeing shop. If upon such inspection conditions shall be found which in the opinion of said member or members require correction or change to accomplish the purposes of this act, such member or members shall report the name of the proprietor and the street and number of the place of business together with the details of such inspection to the State Board of Veterinary Registration and Examination and such board shall thereupon issue such orders as it may deem necessary in the premises and it shall become the duty of the proprietor of such shop to execute and carry out the terms of such order. Said order may be enforced in the same manner as any legal order made by any health officer. A full statement of the number of shops inspected and the number reported as having conditions requiring corrections or changes as provided herein shall be included in the annual report required to be made by said board by this act.

Sec. 7. Said board of examiners shall on the first day of September, 1914, and annually thereafter, issue to every registered master horseshoer and journeyman horseshoer in this State presenting an application for a renewal of the card provided for in Section 4 hereof bearing the date of his registration card upon such form as may be prescribed by the board and accompanied by the sum of One Dollar, a card stating that said tax has been paid and that said horseshoer is entitled to practice said occupation until and including the 31st day of the following August. Said board of examiners shall not renew any horseshoer's card unless the application for renewal be received by said board within thirty days after the expiration of the previous card. Every person practicing the occupation of a master horseshoer or a journeyman horseshoer without having obtained a certificate of registration as provided by this act or after the expiration of his card without renewing the same or who shall fail to comply with any order, regulation or rule that may be lawfully adopted by the State Board of Veterinary Registration and Examination or falsely pretend to be qualified to practice such occupation under this act shall forfeit his right to a card and be compelled to pay a fine of not more than Fifty Dollars for such violation and every person who wilfully employs a horseshoer who has not such a certificate of registration or such a card in force shall be fined not more than One Hundred Dollars.

Sec. 8. Said board shall create no expense exceeding the sum received from time to time as fees as hereinbefore provided.

SOME SHOP SPECIALTIES.

Installing an Electric Blower—Belted and "Self-Contained" Blowers—Direction of Belt Travel—Angles in Blower-Pipe.

BY JAMES F. HOBART, M. E.

A man does get awful tired of pumping a blower-handle day in and day out, and where there is an electric wire within reaching distance of the shop, it will pay the smith to purchase power for the forge blower, and to obtain said power through the same electrical current which lights his shop. The cost of current for running the blower is much less than the extra profit obtained from the time of the helper or smith who otherwise would be tied to the blower-lever all the time.

The smith may easily estimate for himself just what it will cost him to run the blower by electric power. Find what the company, owning the nearest or most convenient line, will charge for current per kilowatt hour. This term means "per thousand watts." If the line carries a tension of 110 volts, and the blower requires one-half an ampere, then the watts supplied will be $110 \times .5 = 55\frac{1}{2}$ watts, and to make up 1000 watt-hours, the blower must run

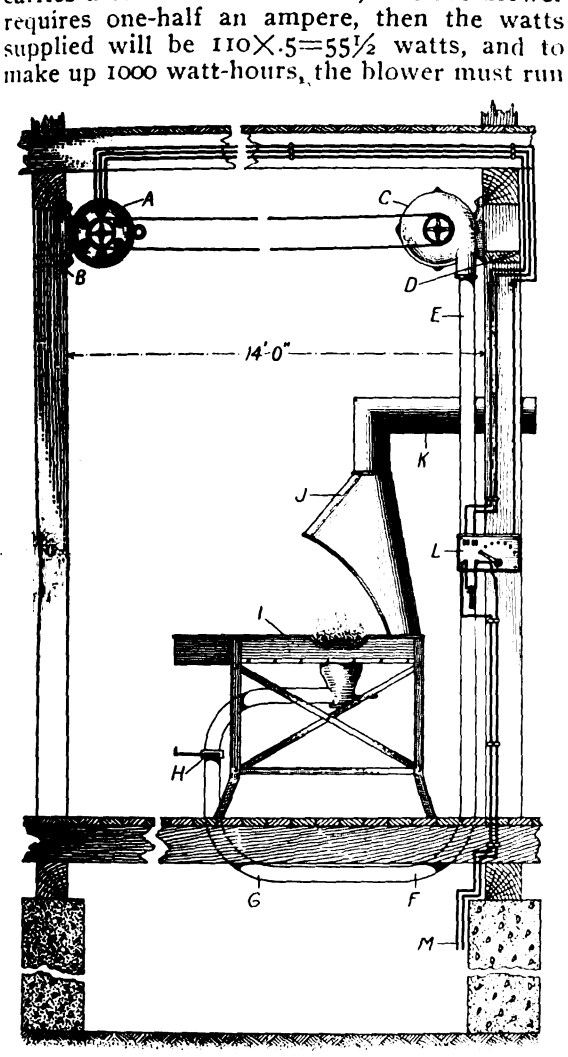


Fig. 1.—Arrangement for Electrical Blower Drive.

$1000 \div 55.5 = 18$, nearly. Then the "1KW" would run that particular fan 18 hours and if the lighting company charged lamp rates for current, say 10 cents per KW., the cost of running the blower would be little more than one-half cent per hour—surely a bit cheaper than a man at 20 cents per hour.

But there are other things to be considered, besides bare cost of current. Sometimes the lighting company will charge a flat rate, irrespective of the amount of current consumed by the blower motor. And usually, there is a charge per month for the use of connections, safety devices, etc., which must be paid as long as current is wired into the building, and this charge is in addition to the meter charges for current actually passed through the fan-motor.

On the other hand, current may frequently be purchased cheaper for motor purposes. Indeed, in more than one instance, the writer knows that street railway companies are selling motor current at two cents per kilowatt hour. And such a rate, if the smith can obtain it, would make the actual current cost for running the blower described above, only one-ninth of a cent per hour for the time the blower was actually running.

Installing an Electrical Blower.

The proper type of forge blower for the smith to install is beyond all discussion the self-contained type, the motor and blower being built in the same casing, upon the same shaft. But the smith must "take what he can get," and it may be necessary to use a motor and a blower which are separate and distinct machines, and which must be connected by belt.

The writer lately found himself in such a position, and was obliged to use a couple of "pick-ups" in the motor and blower line, which were very satisfactorily disposed of as shown by Fig. 1, herewith.

There seemed to be no place in the shop where the motor, the fan, and a long connecting belt would not be in the way, therefore it was decided to mount both blower and motor upon a long plank, then hang the plank from the ceiling, or from the joists of the floor above, and preparations were made to do this, when it occurred to the writer that the plank business might be dispensed with and this was done by mounting motor and fan upon two of the shop frame posts, about 14 feet apart, as shown by Fig. 1, both machines being placed close to the timbering of the floor above.

To set up and align the two machines, was a very simple matter. They were both placed on the floor, adjacent to their respective posts, and the position of each pulley carefully noted. It was found that to have the belt run parallel with the line of posts, that 2 inches of wood must be spiked to the near side of one post, and another 2 inches to the far side of the other post, and these pieces of plank are shown by the full lines at D, and the dotted lines at B. No attempt was made to stretch a line for bringing the pulleys fair with each other, but with both machines hanging loosely upon their respective lag-screws, the motor was wedged by placing shingles under two of its feet, until the side of its pulley sighted to the side of the blower pulley. Then the same thing was done with the blower pulley, and its side brought into line with the side of the motor pulley, more shingles being used under the feet of the blower to throw the pulleys into line, after which the bolts through feet were tightened home and the motor and blower were ready for the belt as shown by Fig. 1.

It will be noted that the direction in which the belt travels, as shown by the arrow, is such that the pull of the motor is on the under side or fold of the belt, and whatever slack is developed in the belt by the pull of the motor is taken up by the sagging of the upper belt fold. By arranging the working pull to come on the under fold, the slacking of the idle (upper) fold of the belt serves to wrap the belt a little farther around the pulleys, whereas, had the belt been so arranged that the working pull was carried by the upper fold while the lower one was idle, then the more stress in the belt the less contact (number of degrees circumference) between belt and pulley. This point should always be looked out for when arranging belts.

It will probably occur to the reader that it was possible to locate the blower on the bottom of the post, close to the forge I, and then place the motor on the upper end of the same post, belting directly downward to the blower, thereby saving some belt and a lot of wind pipe E. This was quite possible, but it was not done for the reason that a horizontal belt is much more efficient than a vertical one which seldom carries as much power as when placed horizontally. In fact, the builders of some types of heavy machinery, publish in their catalog, the lessening belt efficiencies as the belt leaves the horizontal and approaches the vertical, and they claim about one-half more belt surface needed with the latter than with the former belt arrangement.

Another thing, against the locating of motor and blower on the same post, is that then, there would be the blower always underfoot, taking up valuable floor space, and always in the way. There also would be the belt, which would effectually prevent use of the space on that side of the post, and these things effectually neutralize the slight benefits to be derived from shortening the blower pipe by locating the blower on the floor above F.

The wires from motor A were not carried down post B to a starting box located on that post, as would be a little the cheapest as far as wiring is concerned, but the starting box was located at L, on post D, so that the motor could be stopped and started from post D, close to the smith's position at the forge. The extra wire, in this case, was not to be considered beside the time lost by the smith in going to post B, and back again each time the motor was to be started or stopped.

The arrangement of the piping was as shown at F and G. Common round galvanized conductor pipe was used, about 3 inches in diameter—such pipe as is used on buildings, for carrying the roof-water from gutter to ground. The elbows which come with this kind of pipe are not quite 90 degrees, therefore it was necessary to use a portion of the third elbow on each of turns F and G, in order to make a complete right angle turn at either F or G. The two pieces of elbow were simply soldered together and then used as a single piece.

It will be noted that the bends, F and G, are very long and easy. This should always be

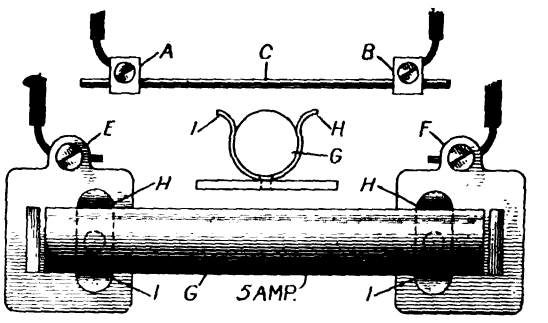


Fig. 2.—Tested Fuses and Plain Lead Wire.

the case whenever possible, in running lines of pipe, either for air, water or steam. It is claimed by the authorities that the loss of head on a pipe, due to a short elbow, is equal to at least the loss of sending the fluid through 30 diameters of the same pipe. This means that the friction of one short elbow upon the air sent through it is as much as it would be in 90 inches of straight pipe. In the three elbows in Fig. 1, the friction through the three, is equal to that of about 23 feet of straight pipe—and that's considerable when it is actually measured.

The air-gate H, was arranged in the wind pipe as shown, and the hood and pipe J, K, placed above the forge in the usual manner. The electric wires in this case, came into the building underneath the floor, therefore it was only necessary to run the wires down through the floor, as shown at M, and connect them directly to the line wires, through the usual safety fuses, switches, etc. And just a word to the smith at this point, regarding fuses:

When purchasing a motor outfit, particu-

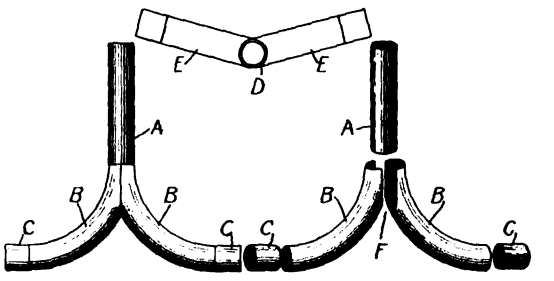


Fig. 3.—Making a Tee.

larly if second hand material, make it a point to see that the starting box—Starting Rheostat—if you wish to be exact—is equipped with cartridge fuses, instead of the old-style bit of plain fuse wire, caught beneath two screw clips AB, as shown at C, Fig. 2.

When a man uses a fuse, in cartridge form, he knows with considerable confidence that a five ampere fuse will "blow" if loaded to more than that amount of current, but with the old wire fuse, it is quite problematical as to just how much current is necessary to fuse the lead wire, and there is every opportunity for a man to slip in a bit of copper or iron wire when a fuse blows out and another lead fuse is not at hand. A horseshoe nail will carry current to the motor all right, but it will not protect the motor against burning out when exposed to severe overload or when suddenly stopped dead or slowed down when under current. Such times are when fuses which will fuse, are necessary for the protection of the motor and with the tested, cartridge form of fuse, as shown by Fig. 2, at G, there will be no danger from placing improper fuse material in the clips, unless indeed a bit of round metal, same size and length as the fuse cartridge, be placed in the clips instead of a regular cartridge fuse.

In Fig. 2, the old-time lead wire fuse is shown at C, simply clamped under the wire terminals A and B, but with the cartridge fuse, no screws need be loosened and tightened when a fuse is changed. The wire-terminal clips E and F, carry spring clips H, I, and it is only necessary to pull the old cartridge from between these clips and introduce a new cartridge, when it is desirable to change a fuse.

Look out for this point, brother smiths, when purchasing motors and starting rheostats, and see that you get modern equipment instead of old-style apparatus.

During the setting-up of the motor and blower shown in Fig. 1, it was found desirable to connect with another forge, one used for melting Babbitt metal, preheating for hot-flame welding, etc., and as water gutter conductors are not made up with tees in stock, it was necessary to find some way of connecting another pipe into the one leading from the blower. This was done just below the shop floor, at F, Fig. 1. The manner in which the tee was made up, is shown by Fig. 3, and this illustration also shows how the 75 degrees elbow was made into one of 90 degrees, as noted in a preceding paragraph.

MODERN MACHINE SHOPS.

Some of the More Recent Developments of Machinery and Practice.

Although not many of our readers have what may be called machine shops, they are constantly using more machines in their business, and they thus may be interested in some of the developments of machine shop practice during the last decade, as recently reported to the American Society of Mechanical Engineers at its New York meeting.

Not many years ago it was quite common for each workman to have his own stock of tools. Consequently there were good tools and poor tools just in proportion as there are good workmen and bad workmen. The result was that the workmen wasted a great deal of time wandering around looking for auxiliary equipment. The turning and planing tools in many shops are now ground to standard shapes in the tool-room on special tool grinding machines. This method not ony saves the time of the machine tool operator, but insures the grinding of all tools to the correct form.

Most shops at the present time keep all small tools in the storeroom, except those in actual use. In this way, the tools are kept in good condition and a much smaller stock is required.

Location of Tools and Lighting.

More attention is given to the relative location of tools in the shop, in order that all machining operations can be performed with no unnecessary handing of the work, the aim being to finish parts by advancing them from one tool to another in a direct line without any see-sawing or useless movements. Shops are constructed so that the light will be properly diffused, which makes it easier for the machinist to do accurate work and reduces the amount of spoiled work. The physical comfort of the workmen is also receiving more and more attention.

Drilling Machines.

High-speed steel has been substituted for carbon steel in the manufacture of twist and flat twist drills with marked improvement in capacity. The speed of drilling has been increased two or three times, if not more. The drilling machine, the most common machine tool, has been redesigned to meet the new requirements; and so rapid are some of the most highly developed machines on the market that holes can be drilled in boiler plate quicker than they can be punched.

Multiple drilling machines with from two to fifty or more drills in operation simultaneously, have been developed. Inverted drilling machines with which the capacity of drills is increased largely because of the rapid clearing of chips from the holes are being used with satisfaction.

The need of the old-style reversing countershaft has been eliminated from drilling machines by automatically reversing tapping attachments, automatically opening studsetters; and many screw-threading operations are now performed on drill-presses with special forms of automatically opening dies, at a great saving over the former method of chucking the work on a turret lathe.

Lathes.

The improvements in lathes have been chiefly in matters of strength, power, and details of construction. Spindles are made larger and are supported in longer bearings, improvements have been made in carriages, tailstocks, toolrests, apron mechanisms, stops, ways, spindle noses, gear boxes, change gear and feed mechanisms, etc. Three-step cone pulley and double back gear headstocks have been widely adopted for high-power rapid reduction lathes, this construction providing a wide range of speeds with simple and efficient mechanism. Quick change gear mechanisms, which enable the selection of gear combinations for screw thread cutting to be made practically instantaneous, have been generally provided by lathe builders. The demand for simple lathes, that is, lathes without change gears, lead screws and other standard features of complete engine lathes, has not been insistent. Hence we still have the anomaly of thousands of lathes in manufacturing plants that are never used for thread cutting, but which have the change gears, lead-screws and other parts required for screw cutting.

Planer Drives.

A weak feature of planers and a serious limitation to the power of large planers, is the common shifting belt reversing mechanism. On small planers even the shifting belts are objectionable, because of slipping and the characteristic squeaking noises, but on large planers their fault is of more serious nature. Wide belts necessary to transmit the required power at practical speed cannot be shifted from the tight to the loose pulleys and *vice versa*, quickly. Clutches of various designs are used with varying degrees of success. The reversing electric motor direct-connected to the planer drive has been developed to the point that makes its success assured. Probably this change of drive is the most marked improvement in planers made in recent years.

Milling Machines.

A change in the machines for producing plane surfaces has been going on gradually but surely. Planers, shapers and slotting machines are being displaced by various types of milling machines in manufacturing plants. As plants change from a building to a manufacturing basis, the superiority of the milling machine as a manufacturing machine gives it the perference. The development of coarse-pitch teeth milling cutters and of face milling machines, are two of the marked improvements.

Single pulley drive with which the maximum power capacity of a given width belt can be transmitted to the machine, irrespective of the work spindle speed, and geared speed boxes giving a wide range of positive speeds are other important changes in design. The vertical spindle milling machine has been developed to a high plane of efficiency, especially for small work. Rotary table machines with quick action clamping devices revolving continually while the operator places the work in position and removes the finished parts, are coming into extensive use.

Boring Mills and Boring Machines.

The Boring mill has taken a commanding place as a machine tool for both light and heavy work. When equipped with turret heads and a proper complement of tools, its productive capacity has been made second to none. Convenience of operation, economy of floor space, compactness of design, adaptability to use of lubricants on cutting tools, are some of the advantages of this machine which have been emphasized in the new designs brought out in recent years. The builders have studied to find the best order of operations and equip with chucks and tools that produce an output far in advance of that possible ten years ago.

The horizontal boring machine of the bed and carriage type, which has been developed practically within the past ten years, partakes of the characteristics of the lathe, milling machine and boring mill, and in the improved designs is superior to any one, for certain classes of work. One of many uses to which it is devoted is that of boring jigs and fixtures for interchangeable production. But not only is it useful for jig making, but it is peculiarly well suited for manufacturing machine parts interchangeably without the use of jigs. This important fact enables machine tools and similar high-grade machines to be economically produced on the interchangeable plan during the very active period of developing the design.

Magnetic Chucks.

Magnetism for holding steel and iron parts for grinding, planing and turning operations has been made useful, especially for thin parts that are easily sprung out of shape by ordinary clamping means. Magnetic grinding, planing and lathe chucks have come into common use in plants having up-to-date equipment.

Grinding Machines.

The surface grinder, especially the vertical spindle type, has made great strides during the last few years. The improvements in cylindrical grinding methods are also worthy of mention, especially the use of the heavy-duty grinder for removing stock formerly removed by a second or finishing cut in a lathe. Grinding stock from the rough as in the finishing of drop forged crankshafts is also a good example of modern practice. The stage has been reached in cylindrical grinding practice which places the cylindrical grinding machine on a co-ordinate basis with the lathe as a tool for finishing cylindrical work. Machines for internal grinding of non-revolving work with planetary spindles provides for the economical and accurate sizing of engine cylinders and other parts difficult to rotate. Vertical grinding machines and rotary work-tables utilizing magnetic chucks or other quick action clamping means for quickly securing and releasing the parts to be ground have come into extensive use for high-grade interchangeable manufacturing. The development of the disk grinder from a mere smoothing machine to a place as a powerful machine tool of great capacity for finishing plane and curved castings from the rough is one of the most interesting phases of modern practice.

HANDLING GLUE FOR WOODWORK.

How to Use It Economically and Still Make It Hold.

From G. D. Crain in The Woodworker.—An authority stated some time ago that glue consumers pay for this material each year somewhere in the neighborhood of $12,000,000, and that 25 per cent. of it is wasted through improper treatment. If this be so, then the efficiency experts have a fine opportunity to prevent a great economic loss, amounting to $3,000,000 per annum, accepting the figures of the expert quoted as correct. Perhaps the reform in the use of glue, if one were accomplished, would not be presented so much in the form of a net saving as in better results secured in goods in which the material is used, and that, of course, would be the best kind of achievement which could be recorded.

Glue is probably as universally used a material as any that could be mentioned. It figures in almost every woodworking industry, from boxes to furniture, and is found on the outside in the paper, shoe, textile and other industries. All of these are calling for glue, and with the increased knowledge on the subject that is now available, are usually demanding better glue than they had before. With the increased population of the country, with its greater consumption of all products of every variety, the demands of glue consumers on the limited supply will continue to increase. There appears to be enough to go around at present, although it is true that live stock, the principal source of production, is not being raised in as large quantity as heretofore—a fact pointed out in connection with the increased price of meat in discussions of the high cost of living. Therefore, from this standpoint, economies in the use of glue, and holding the quantity consumed down to the lowest amount consistent with the requirements of the job, would be well worth working for.

The average ultimate consumer would be surprised to learn how big a part glue plays in holding together the furniture which he gets from his local dealer. Without stopping to think, he may assume that the strength and durability of his furniture depend chiefly on the kind of wood used in it; but while there are differences in the qualities of various woods, furniture is not, as a rule, subjected to tests which call the maximum load-carrying capacity

of any wood used in furniture-making into play. The chief test is that which comes through use; a general knock-about, careless treatment, which doesn't test the wood as much as it tests the furniture as a whole; and that really means the glue, which holds the various pieces together and makes it furniture instead of material.

Thus it is evident that the vital points of a piece of furniture are the glue joints. Wherever the integrity of the piece depends upon the glue continuing to hold its parts together, there is an opportunity for use to disclose weakness. That furniture holds up as well as it does under so many instances of severe usage, only goes to demonstrate the fact that glue, as a whole, is fully capable of meeting the requirements of the situation. As a matter of fact, good glue, properly prepared and applied, makes a joint which is stronger than the wood itself—a statement, made by glue experts, which is borne out by tests made by machines built for the purpose of determining the strength of the material.

There is, of course, glue and glue. The man who is making cheap furniture usually is looking for a cheap glue; but, be it ever so humble, furniture must stand together if it is going to give the service which the man who buys it for use in his home expects it to render. Since the crucial points of construction are those where glue is used, it looks like poor economy to try to skimp on the glue, when a defect there is certain to show itself in a fairly brief period. It would be far better to cut down the grade of the lumber used, or put less expense into the finishing, rather than neglect what is obviously the most vital point concerned in the construction of the goods.

A table, let us say, that holds together solidly and remains intact after years of use, may be battle-scarred and dingy, showing at every point evidences of continuous use. But as long as it is all there it will continue to be used, no matter how much of its finish it may have lost. In fact, it may have endeared itself to the owner through its very lack of the fine appearance characterizing new goods, since the worn look it bears is the sort of appearance taken on by friendly faces which have been wrinkled and tanned by suns and winds of many years.

In other words, the good old table which has been battered around for years in the service of a big family is held onto steadily; it can always be refinished, if necessary, and after that it is pronounced invariably to be "just as good as new." But suppose the glue joints which hold the veteran piece together weaken, allowing it to pull apart; suppose the veneering blisters because the man at the glue-spreader back in the factory didn't see that the adhesive was evenly applied; suppose, in other words, that the glue work turns out to have been a bad job—what can avail to save the table? Nothing: its days of service are over, and it is relegated to the garret, while another piece, equally battered and time-worn, is continued in use, just because those fundamental and vital features of its construction are still essentially sound.

Some manufacturers of furniture and other goods involving the use of glue have considered the question of using one grade of glue for their flat work, the actual laying of the veneers, and another and better one for the joints proper. They figure that the big load comes on the joints, and that while the chances always favor the veneering holding tight, it is better to play it safe and take no chances with the sections which are going to be subjected to a strain. This is probably good reasoning as far as it goes, and if one were going to use a cheap glue anywhere, possibly it would be best to use it in veneering rather than in making joints. But, just as suggested above, there is little logic in doing either, and the best manufacturers are found to be using good glue, which comes up to the scratch in all respects, for both flat work and joints.

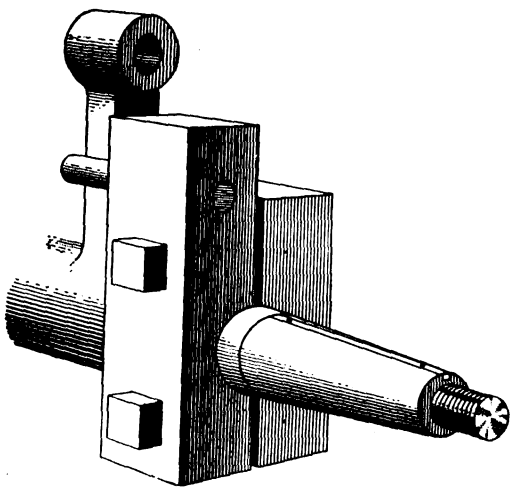
Some factory men think that the requirements of the two classes of work differ; for instance, that the glue should not set quickly if it is used in veneering, while the quicker the better in the case of end or side joints. And, of course, good spreading qualities are desirable in veneering, while they are not so necessary in joint work. But usually the variance is not great enough to warrant changing the character of the mixture, especially since comparatively small quantities are needed at a time, unless the factory is laying all its own veneers. Where built-up work is being done on the outside, and glue-room operations are confined to joint work and to making whatever curved panels are required, the amount of glue needed is pretty small, and economy is served by using the same lot for both classes of work.

The largest economy that is to be realized is in handling glue properly—not heating it to too great a temperature; not preparing more than is going to be used, and not permitting old glue to remain in containers used in handling it. Care should be taken to determine the exact requirements of the factory for the day, and only enough should be made up to take care of these. By observing this plan, and seeing that the glue is kept in good condition all the time, the problem of spending just enough and not too much for this material will largely be solved.

Running with a Broken Shaft.

From Donald A. Hampton, New York.—When we got there we found the right rear axle shaft of our automobile twisted off close to the equalizing gear. It was 12 miles out and some of the way was pretty rough, but we started to tow the car in. After spending an hour on the first mile, stopping every hundred feet to drive the shaft back in the housing, it was decided to try something else.

So the car was jacked up, the shaft removed and a quick run made with the axle back to the garage. While one of the boys was putting a



For a Broken Axle Shaft.

piece of keystock into the keying on the taper end of the axle, the other one was making a clamp. This clamp is shown in the drawing. It consists of two pieces of 1x1¼-inch steel, joined by two bolts. It is then drilled half in half with a 1¼-inch drill—the size of the axle. A pin, ½ inch in diameter, projects on one side of the long half of the clamp. Armed with the clamp, some grease, and a few feet of stout iron wire, the axle was ready to be taken back to the car.

The axle was replaced but with the clamp on it, the pin resting against the brake support. It could then neither turn nor go further in. To prevent it working out it was wired fast. The tapered end of the axle, upon which the wheel was to turn, was well greased and the wheel was put on as before, except for the nut which was slacked back against the cotter so the wheel was free. Thus fixed, the car was easily towed in and with no further damage. Given a little more time and the clamp should have been made with a V in each piece instead of round. It is then a handy fixture to carry for similar emergencies and will fit varying sizes.

To Clean Scale from Plate Metal.

For turning and galvanizing, scale is removed from iron in two general ways, or rather by a combination of two methods, in most establishments. The first is known, technically, as pickling, and the second as scraping. The latter is made to supplement the former. A pickle of sulphuric acid and water is prepared, into which the plates are first thrust. In some cases a second solution, composed of muriatic acid and water, is used. After the sheets or plates have been thus heated, they are critically examined for spots to which the scale still adheres, and these are then carefully scraped until all the scale is off. The plates are next carefully rinsed in clean water, after which they are dried, when they are ready for dipping. In a few establishments quite a different course is followed. The plates are first immersed in an alkali solution, after which they are exposed to intense heat, as over a charcoal, coke or anthracite coal fire, for a short period, when it will be found that the greater part of the scale has been loosened from the surface of the plate, and remains upon it only in shape very much like blistered paint. It may now be easily removed by brushing. The sheets are next immersed in a weak pickle, either very weak sulphuric acid or preferably muriatic acid. After which they are examined for odd spots of scale, and scraped as already described. This process of cleaning by the action of heat results in a material saving in the item of acid, the fuel and ingredients of the solution employed being less in cost than the materials used by the other plan. There is the additional advantage of the scale or oxide being saved in a shape to be merchantable. It may be used as a basis for so-called iron clad or oxide of iron paint and for other purposes.

Removing Whitewash.

If there are many coats to take off it is best to soak the lime with water and concentrated lye solution, one or two pounds to the pail of water. Be careful in handling this caustic. The lye will soak in and rot the lime, after which it may be scraped off.

Or scrape the dry lime, using a plane bit. Nelson advises sizing with white vinegar, which is the strongest vinegar; acetic acid and water, made strong, will also do. While wet with this acid size scrape with the zinc scraper. Then scrub with a stiff scrubbing brush, to remove the loose lime, after which wash off with clear water. Recent thin coats of lime wash may be removed, sometimes, by applying a thin coat of paste or glue size. This will, on drying, curl and take the lime with it. Then the surface may be swept down. In all cases kill the lime with acid when done and before calcimining.—A. Ashmun Kelly, in American Paint Dealer.

Lead Poisoning.

There has been reported from the Brooklyn Navy Yard a number of cases of lead poisoning, caused by the taking off of the lead paint from the double bottoms of the battleships. There is a space between the inner and outer shells at the bottom from 2½ to 3½ feet, this space being divided into compartments of not more than 5 or 6 feet square, and the paint lining these places is sometimes a ¼-inch thick. It is scraped off by means of a compressed air chisel, the workman having to crouch on his knees to do the work. Being so closely confined with all this lead dust around them has caused the workmen considerable sickness and loss of time, some being paralyzed, and many others have died from the poisoning.—Master Painter.

A Rust-Proof Coating.

A new patent rust-proof coating for iron or steel is being used in England and is in the form of a paint that is applied to the surface of the article to be treated and is then baked. The following are the proportions of the ingredients by weight: Linseed oil, 25 parts; calcium resinate, 36 parts; manganese borate, ½ part; sugar of lead, 1 part; naphtha, 37½ parts; artificial graphite, 25 parts. The whole is mixed and applied to the steel or iron by brushing, dipping, or other procedure. The article is then baked at 300 degrees F. for a period of 1 hr. 40 mins. It is stated that the coating is highly lustrous and is resistant to corrosive influences, but that no other form of graphite gives satisfactory results.

Rings in Tree Trunks.

As showing how fast trees grow in Oregon, some one says he found an Oregon pine two feet through, and counting the "rings" he learns that the tree is but twenty years old. The tree may not be more than twenty years old, but it is doubtful whether its age could be determined by any such means, despite the fact that science has defended this fable for centuries. Such rings as trees possess may also be seen in forms of vegetable growth, notably in the beet, and are more or less numerous, according to the rapid or slow growth of the root. Take a photograph of an end piece of an elm tree and one of a beet, and the rings around each will so closely resemble each other that an expert might be deceived.

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MARCH, 1913.

PARTIAL CONTENTS.

WARNING.

A party signing his name Sullivan, without any initials, has been taking subscriptions for The Blacksmith and Wheelwright in West Virginia, and offering to give a clock as a premium. Sullivan, in each case that we have heard of, pockets the money and we know nothing about it until the subscriber complains to us. We are offering no clocks as premiums or any other premium for that matter. It is our impression that The Blacksmith and Wheelwright is worth a dollar a year to any blacksmith in the land.

The description of Sullivan, which we have obtained, is as follows: He is said to be a small man, slightly auburn, with a small mustache and represents that at one time he played baseball with one of the American League teams. He is further said to have a gentlemanly way with him, which one may believe, when he can persuade a blacksmith that he can give him a five-dollar clock and a subscription to The Blacksmith and Wheelwright (for a year) for a dollar.

HORSE REARING FOR PROFIT.

The question of the supremacy of the horse or the automobile seems to be anomalous, not to say, paradoxical, in New York City, as quite likely is the case elsewhere.

For illustration, let one visit the great driving boulevards of this city and its environs, and he will be struck by the absence of horse-driven vehicles. We should judge there are at least three automobiles to one horse. On the other hand, if any of our readers interested in the horse ever visit New York it will be worth while to them to walk over to East 24th street, the famous old "Bull's Head" district which has been the center of the work horse trade for 60 years or more.

The big arena extends from 24th street through to 25th street, and on sale days it is one of the busiest places in the city. Horses are sold at the rate of one a minute when the day's consignments are heavy. All classes go under the hammer. One minute a Percheron weighing 1,800 pounds, and then a diminutive pony or a trotter from the Speedway. Men in the market say that more horses are sold there to more different buyers than at the famous Tattersalls in London or any other auction mart in the world.

It is impossible to state just how many work horses are now sold in New York every year, but the total runs closely to 40,000, according to the estimate of experienced horsemen.

Uptown further, around 59th street, are sold the carriage horses, the trotters, the runners and the saddle horses. Trotting horses to the number of 2,000 or more change hands every year, chiefly by auction. The best of these have lately been purchased by European horsemen, as witness the recent sale of Billy Burke, 2:3¼, for $40,000 to the Russian Ambassador; of Baden, 2:05¼, for $30,000, and Jay McGregor, 2:07¼, to another Russian breeder; of Baldy McGregor, 2:06¾, for $16,000 to an Austrian dealer, and of nearly a score of other 2:10 trotters for export to Europe. The highest price ever paid for a trotting horse at auction in this market was by the late E. H. Harriman, who bid $41,000 for Stamboul, 2:07½. Sixty-one young trotters, mostly the offspring of that horse, were sold in one consignment for $140,300, an average of $2,300. One untrained two-year-old brought $26,000 and a yearling $8,500. These are record prices for trotters at auction.

Such prices as $10,000 and $8,000 have been paid for single carriage horses in New York on several occasions. The record at auction is $7,800, paid by James H. Moore for The Turk. At one public sale sixty-six carriage horses brought $81,755, an average of $1,239. Most of the carriage horses are nowadays disposed of at private sale in the uptown market, where some of the finest horses of this type to be found in the world are kept on view in the handsomely appointed sales stables.

Saddle horses have assumed a position of increased importance in the metropolitan market in the last few years. Many of these are schooled and finished in the country and shipped in during the busy season, to be offered at auction or at private sale.

The foregoing facts are stated for two reasons, namely: First, to show that interest in the horse has by no means died out; and second, as a proof that the rearing of horses for the market has never been more profitable than today.

Those of our readers who have customers who are interested in the horse may well call their attention to the matter. Unless we are greatly mistaken, horse rearing and mule rearing for the market is now extremely profitable—as profit on the farm is usually estimated.

PRICES AND BAD BILLS.

It is most discouraging to note the low prices that some smiths charge for work. One reader recently sent in a list of prices so palpably ruinous that we sent it back for his confirmation, thinking that some mistake had been made. But it appears to have been correct, although the prices charged for shoeing and wagon work were so sure to ruin anyone who complied with them that we must decline to print them.

There is a certain point below which it would do the business nothing but harm to make a record of prices. Any man who can afford to own a horse or a wagon can afford to pay living prices for work in connection with them. A physician may have a patient who cannot afford to pay for medical attendance; sickness is a misfortune and is quite as likely to come to the poor and needy as it is to the wealthy. Lawsuits, likewise, are something that cannot always be avoided even by the most poverty-stricken. In both cases mentioned, there may be occasions when the fee of the lawyer or the physician may be justly cut in half or remitted altogether. But this does not apply to the smith or wheelwright. His customers can afford to pay well for the work he does for them, and they should be made to do so.

Moreover, we must admit little patience with the complaints of bad bills for such work. A man who will try to evade a blacksmith's or wheelwright's bill—work which is an economy and not an extravagance or a luxury—must be lacking in the qualities of average decency and honesty.

The things that the trade needs most and has always needed most are better prices for work and prompt payment for work. With the same co-operation that exists among other business men, both these needs may easily be secured.

SUBVERTING A NATURAL LAW.

Many of our readers must have observed the attention that is now being paid to "industrial efficiency" and scientific management of business. It is clear enough that the day of "the rule of thumb" has ended in almost every workshop and factory.

But in considering the matter of "efficiency" it is well enough to bear in mind that already the general efficiency of man has increased two or three fold during the past 50 or 60 years. The remarkable increase in what man can accomplish varies, of course; in some cases his power to produce since the advent of the machine has increased far more than threefold, and in others far less.

At all events, this efficiency has so increased that laws enforcing a "minimum wage" are being passed in some States, and with this as an entering wedge, they will soon exist in all States. Now, assuming that a law is necessary to prevent an employer from hiring an employee for less than what is considered a living wage, why is it necessary? The correct answer is easy and plain enough. It is because the demand for labor is so much less than the supply that the individual worker must sell the work of his hands or brain in a falling market.

Thus the law of supply and demand has been interfered with and in such cases labor has been put on a fictitious basis of value, just as other commodities are often given a fictitious price, as for illustration, when competition is abandoned for co-operation or combination.

Now without going into the fact as to whether the natural law of supply and demand should be subverted in either one case or another, it must be admitted that inasmuch as one of the great problems of business today is to find markets for goods and not to find goods for markets, the need for greater efficiency to

produce is far less than the need for greater efficiency to consume.

It seems to us that this clamor for greater efficiency of the workers—whether it be brain or hand—is likely to further intensify the necessity, real or fancied, for a legal minimum wage, and likewise still further increase manufactured production for which there seems to be no need, while it will not increase consumption for which there is need.

VALUABLE SUBSTITUTES.

No sooner does a thing become scarce or high-priced than some ingenious individual begins to consider something to take its place. Illustrations of this fact might be cited in a hundred or more cases.

A few years ago the increasing use of leather began to add to its cost and immediately attention was drawn to a substitute. Leather belting has recently advanced in price until it is now worth nearly its weight in gold, but experiments have been made abroad with steel for belting and it appears that the result is satisfactory. It is said that a steel belt 7⅞ inches wide, weighing 119 pounds, performs the work formerly done by a leather belt 22 inches wide, weighing 814 pounds and transmitting 300 h.p.

In one mill a steel belt 3½ inches wide, weighing 12 pounds, does the work in driving 40 h. p. that formerly required a leather belt 12 inches wide, weighing 64 pounds. It is said further that, "The steel belt is also an economizer of space, does not slip or stretch, and gives the greatest efficiency of power delivery. A government test has shown a saving of 61 h. p. on a drive of 640 h. p. in using steel belt."

Speaking of substitutes, the International Association of Automobile Clubs has offered a prize of $100,000 for the production of a fuel which will be a substitute for gasoline. The conditions proposed are that the fuel must be obtainable in large quantities, and must be of such a nature as to preclude the possibility of its being monopolized by a trust; that it must be free of taxation, and of such a nature to make its admission into foreign countries possible at a very low fixed tax.

As many of the best chemists and scientists of the world have been working upon a gasoline substitute for some time, it will be seen that the chances of an immediate solution of the problem are not very auspicious.

WHERE WILL IT END?

Without criticizing or questioning the present tendency toward paternalism, we would like to ask where the line is to be drawn between things that may well take care of themselves and things that should be regulated and controlled by the Government.

For illustration, a bill to prevent the sale of shoes manufactured in whole or in part from the substitute for leather, unless that fact is plainly stamped on the sole, has been introduced in the House of Representatives by Mr. Oldfield of Arkansas.

If such a law is needed—and we want it understood that we are not now claiming it is not—should not a "plain label" be affixed to our clothing setting forth whether or not anything other than wool is used in the fabric? And, by the same process of reasoning, should we not be protected by law from all deception as to what we eat and wear?

WHICH IS BETTER?

Some of our esteemed friends whose business it is to make a tariff law have expressed themselves as having but one fear of a reduction of duties. They are afraid that such lowering of duties will have a tendency to reduce the revenue from importations.

It seems not to have occurred to them that such lowering of duties may so increase the importation of foreign goods that the revenue from them will be increased rather than reduced. As far as revenue is concerned, the effect is the same whether we reduce the duty one-half and thus increase the imports one-half, or let the duty remain as it is.

But the question of whether the people of the United States shall consume home-made goods and keep their money at home, or consume foreign-made goods and send their money out of the country to pay for them, is one of vital importance.

Parcel Post Rules.

All parcels must be securely wrapped.

No article may exceed a measurement of six feet in combined length and girth.

Explosives are prohibited.

Special parcel post stamps must be used on all parcels and on articles of merchandise that formerly went fourth class. The fourth class is superseded by the parcel post.

Addresses must be plainly written.

Every parcel must have the card of the sender in one corner.

Butter, lard, fresh meats, fowls, fish, berries and produce that spoil quickly will be admitted if it is securely wrapped so none of the contents can spill on other matter.

Eggs must be packed in a basket or other container.

All perishable articles must be marked "perishable."

Queen bees, live insects and dried reptiles will be admitted.

All fragile articles must be marked "fragile."

Articles of glass, millinery and toys will be admitted.

Spirituous, malted, vinous, fermented or any other intoxicating liquors are prohibited.

Matches, kerosene and other oils are prohibited.

Disease germs or scabs are prohibited.

Live poultry, birds or animals are prohibited.

Undelivered perishable articles will be turned over to charitable institutions.

Parcels may be insured for full value up to $50 on payment of 10 cents.

Parcels must be prepared so contents can be easily examined.

Catalogues Without Discounts.

In relation to supplying blacksmiths and wheelwrights with net price catalogues, or catalogues with stated discounts, the Strong Hardware Company of Burlington, Vt., supplies catalogues with dealers' discounts printat the bottom, which portion may easily be cut off and the regular price list may then be tacked up on the wall or the door of the shop for the benefit of customers.

But as to that matter, the idea of stating discounts to dealers alone and not to their customers may be accomplished in other ways which are likewise neither troublesome nor expensive. It only needs the will, and the way follows easily, as is shown by the well known firm above referred to.

Blacksmith Law In New Zealand.

Horseshoers in New Zealand are required to pass an examination showing themselves competent to shoe horses both by written and oral test. Five years' apprenticeship is required before the examination can be taken and a fine of about $5.00 a day is inflicted upon all who violate the law.

Evidently New Zealand horse owners appreciate the value of their horses. Investigation in various quarters has developed beyond question that incompetent shoeing not only cripples the horse temporarily but decreases the average life of the horse from 30 to 35 years to about 15 years. If American legislators could be made to see this side of the question they would, no doubt, see the practical economy in requiring efficiency from horseshoers.

Obituary.

We are pained to announce the death of George Edward Holton, president and treasurer of the well-known Bryden Horseshoe Co., of Catasauqua, Pa. He died February 10, 1913, respected by all who had business dealings with him, and regarded with affection by his associates in the company with which his connection was prominent.

Smaller Farms.

In 1850 the average farm in the United States consisted of 202.6 acres. In 1910 the average farm numbered only 138.1 acres. This would seem to show that "bonanza farms," vast cattle ranches, etc., are succumbing to the tendency toward intensive cultivation on a smaller scale, and that the movement toward consolidation, so marked in business, has been reversed as far as agriculture is concerned.

Correspondence

Some Old Subscribers.

From Charles Barker, Massachusetts.—The owner of the shop illustrated, W. G. Lugton, of Hyde Park, has been a subscriber to The Blacksmith and Wheelwright nearly twenty years to which fact he points with pride, besides acknowledging his indebtedness to the points of information gleaned from its pages, particularly one whereby he is enabled to turn a left hand thread with a right hand tap over which he has had many discussions in convincing his opponent of the truthfulness of his assertion. Mr. Lugton, while learning his trade in Scotland, was fortunate in having an employer who was a subscriber to The Blacksmith and Wheelwright and being a studious apprentice made good use of each number during his spare time. He early resolved to have a shop of his own and emigrated to America with that purpose in view and settled in Hyde Park and soon established himself in what is now the oldest shop in town having been erected 48 years ago.

It is also worthy of note in these days of

Mr. Lugton's Shop.

short term helpers, he has one employee with him for over ten years—Mr. C. McPherson—who now has a large shop of his own in West Roxbury. Directly opposite the shop of Mr. Lugton, is the shop of A. W. Hudson, another old subscriber of 15 years, and it is pleasant to observe these neighborly rivals in business, working under the most harmonious conditions.

Another old subscriber located in a distant section of the town is Mr. L. F. Upham, who has conducted an exclusive wheelwright shop for 40 years. While doing very little custom work his old time business has dwindled to job work and feeling the trend of the times has taken up automobile repairing and reports business very good. Hyde Park once boasted of seven blacksmith's shops, but is now reduced to five, all apparently in a prosperous condition.

An Enterprising Smith.

From J. G. Bierman, Kansas.—I have been a reader of The Blacksmith and Wheelwright for a long time, about thirty years, I think, and like it very much. Our shop is built of cement blocks, 30x60 feet, with a hall in the second story. We do all kinds of general blacksmithing, wagon and carriage repairing, both iron and wood, and do quite a bit of automobile repairing. We have some modern machinery in our shop, such as 6 H. P. gasoline engine (it is a Dempster, Eng.), one disk roller sharpener, one J. D. trip hammer, one emery stand, one No. 5 Edwards shears, one No. 33 Badger punch and shears, one Brooks

cold tire setter, one Bulldog feed grinder, two blowers and forges, with all kinds of small forge tools and also bench tools to do woodwork with. Trade has been very slack this winter as we had fine dry weather and fine dry roads, until after the first of January. Then we had quite a bit of snow and now it is thawing, and the roads muddy, which makes shoeing, and at the present time we are doing considerable shoeing. I will give you some of our prices.

New shoes up to No. 3, 75 cents per pair; No. 4 and up, 80 cents per pair; Never Slip shoes, 1.20 per pair; resetting shoes, 25 cents apiece; new stubs 1¼ inch axles, $8.00; new stubs 1 inch axles, $7.00; new wood axle for wagons, $3.50; new buggy tongues, $3.00; new wagon tongues, $2.75; cutting down wagons, $8.00; rimming buggy wheel, $1.50; wagon felloes, 25 cents apiece; spokes, 25 cents; new plow shares, $3.35; Lister shares, $3.25; sharpening listers and subsoilers, 60 cents; sharpening plowshares, 30 cents; setting wagon tires with cold tire setter, 50 cents apiece; setting buggy tires with cold tire setter, 40 cents apiece.

We also grind feed for 12 cents per 100 pounds. This is a side issue from blacksmithing, but we have a nice little trade in this work. In the spring we expect to handle farm implements which will add that much more to our business. We are agents now for the Dempster gasoline engine. I hope this will encourage some one of the brothers.

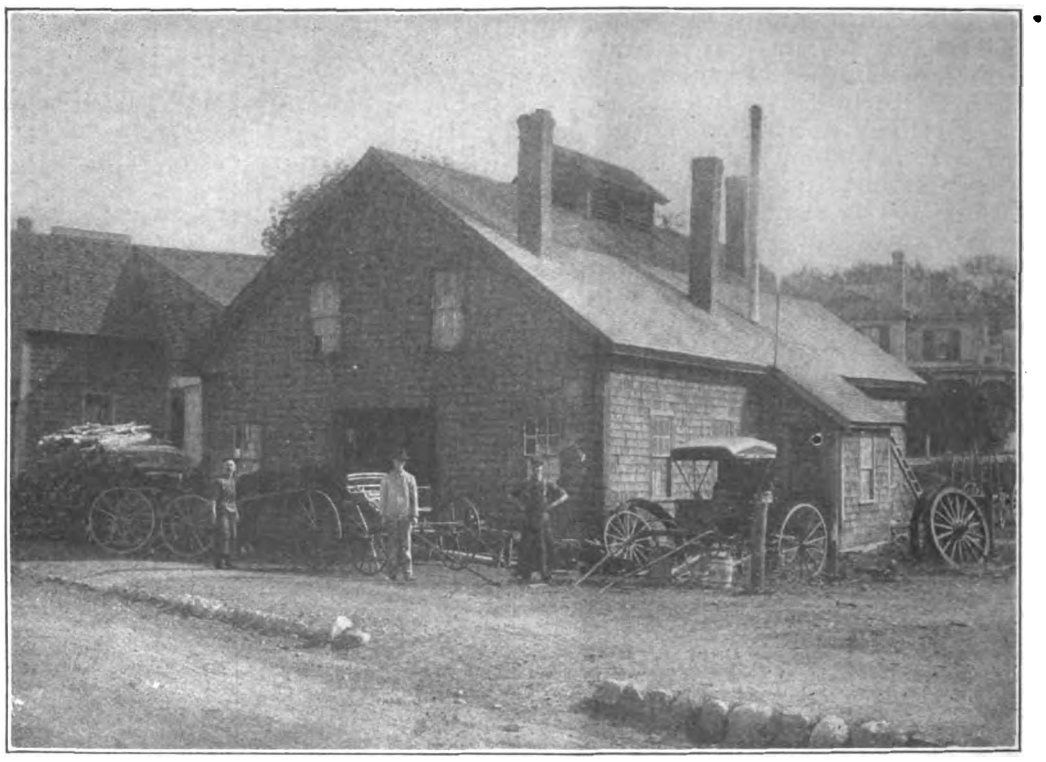
Lack Energy and Thrift.

From G. W. L., Goshen, Virginia.—I will try to give your readers a description of this part of Virginia, and no doubt they will all want to come South. Goshen is in Rockbridge County, in the heart of the Allegheny Mountains, on the Chesapeake and Ohio R. R. The climate is good and we have the best of freestone water, also mineral water of different kinds. We have some good bottom land for farming, but the chief industry is in wood, ties, lumber, tan bark, extract wood, and hoop poles. The country is rough which gives the repair man plenty of work. There is a large summer hotel here, which makes the town lively for about three months in summer. I came here from Ohio last May, and opened a general repair business. I have all the work I can do, but money is slow and scarce. There are very few good mechanics in this part of the South, wages and work are too cheap. There is one other shop here, but in our Northern or Western States it would not be called a good cow stable. The man's outfit consists of an old pair of bellows, a forge with no chimney, an old battered anvil, some old worn out hammers and tongs. The most he does is nailing on horseshoes. I do not think he could be called a horseshoer. When a man takes a horse to his shop, the man goes to a grocery store and buys the shoes and nails. The smith calks or turns heels on them, punches them out, and nails them on for about 40 cents, or 10 cents per shoe. This is about the average horseshoeing business, not only here but in most of the Southern States. So you know under such conditions we can never have horseshoers even in large towns. There are some negro smiths here with small huts for shops, working for almost nothing. The repair business is different. According to the prices for material, we get about as good prices for work as in the other States. Most of the people here are poor, and will likely remain so as they lack energy and thrift. Most of them are so addicted to the tobacco and whiskey habits that they have become inefficient, dull and lazy. My shop is on Jockey street, and every Saturday there is a crowd around trading horses and drinking. I think the people here are very far behind the times, not only as mechanics but in all lines. The advertisements sent out by the railroad companies and real-estate men are misleading. I can see that the smiths would be benefited by reading The Blacksmith and Wheelwright, and getting in touch with the modern ways of doing work and modern tools to work with. I believe there are very few of us who know the value of a good trade paper, one that brings us in close touch with each other, so we can exchange ideas with each other. I would consider The Blacksmith and Wheelwright worth its subscription price if it contained nothing but the advertisements of tools, machinery and material.

Shops of Old Timers.

From Charles Barker, Massachusetts.—Taunton, Mass., contains the shops of several old timers, among them Charles H. Dean, who might be termed the dean of wheelwrights. Mr. Dean opened his shop 44 years ago, and despite his long active life is still young at 73. He has had in his employ one helper for 33 years, another 16 and still a third for 13 years, which speaks well for him as an employer.

Perhaps the honors of the oldest horseshoer in Taunton may be divided between Dan Carey and Tom Britt. Mr. Carey's shop was erected 84 years ago, and has been occupied by him 46 years. Mr. Britt opened his shop a little over 40 years ago, having been a journeyman 10 years before that time. He has never had a vacation in all his many years of hard labor, neither does he drink, smoke, chew nor swear. His only weakness is a good horse race, or a good game of cricket. In both pastimes he is an expert. He is a member of the Taunton Gentlemen's Driving Club, and consequently is popular as a shoer of driving horses. Like many other cities, the master shoers formed an organization some years ago, when all signed an agreement for a uniform scale of prices, but that was as far as they ever got, for in a very brief period of time some broke away, leaving everybody to regulate their own price.



Mr. Dean's Shop.

The mild Winter has had its effect on the expected rush of work usual at this season of the year, and every shop is overstocked with sharpened shoes awaiting claimants.

Cause of Interfering.

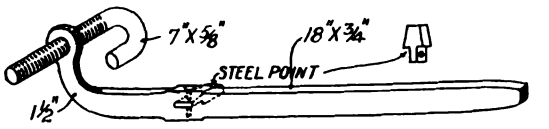
From T. E. Williamson, Texas.—I have been reading The Blacksmith and Wheelwright for two years and have gathered a great amount of information from the paper. I will write a few words on horseshoeing, as I have seen so many different ideas on shoeing for interfering. I have tried them nearly all and while some will do on some horses, some will do on others. I just want to talk a little about what causes interfering. It is caused by the same thing every time. If you will watch the horse travel, the cause will be plainly seen by the way he handles his feet. His legs are crooked and out of shape and this throws him out of balance and causes him to strike his ankles and sometimes to stumble. This must be looked after very closely and then we must start to cure the trouble. I have tried side weights which are very good in most cases, but I find unlevel feet are the cause most of the time, the inside of the foot being lower than the outside which causes him to interfere from an inside swing of the foot, and in some cases I believe that plenty of spread to widen their tread would beat all shoeing that could be done on them. I will tell you of a shoe that has done the work where all others have failed with me. I pare the hoofs low on the outside, and then calk the shoe on the inside to level the foot. This shoe will do the work. Try it.

The Question of Bad Debts.

From J. J. Hardy, Utah.—I have noted with interest the writings of some of the smiths on the credit system, and now there is one from Western Canada, in the last number, that caps them all, concerning the bad condition of blacksmiths there. It is certainly bad, but whose fault is it? I can see that the smith is most at fault. I will tell you some of my experiences. I opened up my shop here three months ago, and went to work a stranger to everybody. I had no one ask for credit for about two months, then once in a while some one would come in wanting credit. If the man asked for credit before I did the work, I would often give it to him, but if he let me do the work and said "I have no money today and will pay in a few days," my answer would be "I am doing a strictly cash business, and you can get the plow (or whatever it was) in a few days." Last spring I had to close shop on account of poor health. I had forty dollars out and I got every dollar. I wonder if it is just fool's luck or if some one will say "You didn't do much." My answer is I had all I could do nine months in the year. I think there is something wrong with a man who will work as a blacksmith has to do, and let others walk off with his money.

A Good Bolt Holder.

From J. J. Raum, Ohio.—This is the bolt holder. Length of holder from end to end is 18 inches. Length from hook to steel point 1¾ inches. Bend in handle is 1½ inches. Hook is 7 inches long ⅝ inch iron. Handle made of ¾ inch iron. Length of steel point from handle is 1 inch. Threads are cut on hook from point to bend so it is adjustable. The steel point, which goes to bolt head, is made with a shoulder, and riveted fast.



For Holding Bolts.

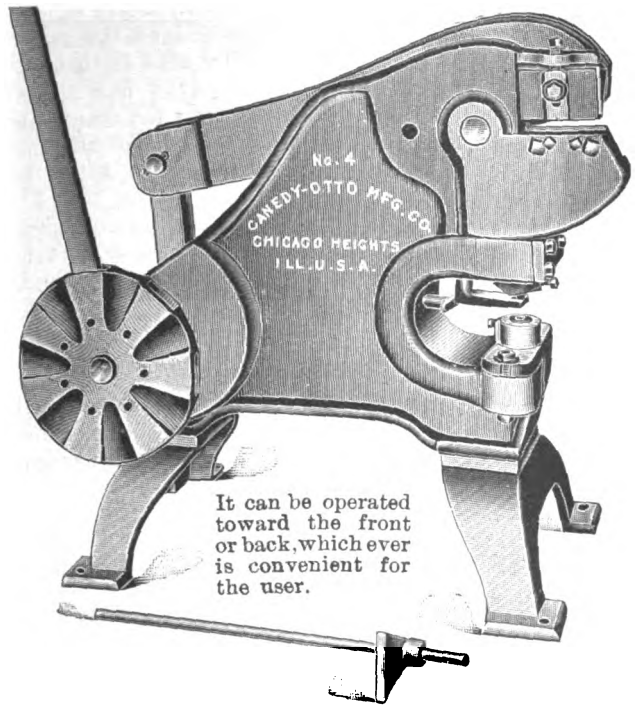
Automobile Repainting.

From W. A. Riggleman, Ohio.—Now is the time of the year for small country carriage shops and horseshoeing shops, that have paint shops in connection, to be ready for the repainting of automobiles, for they are here to stay. You will have to learn to do them cheaply and quickly for the owners say it costs so much for other repairs they cannot afford to have them painted, but tell them your prices and then I think they will finally have the work done.

When the owner of an automobile and the repairman start fixing his car, it is a case of keep at it. I have seen owners commence fixing at the engine the first day they get their cars.

Here are a few good ways to repaint them.

No. 4 Combination Punch and Shear



Will shear ¼x4-in. flat bars.
Will shear 1-in. round bars.
Will punch ½-in. hole in ¼-in. plate.
Depth of throat 6 inches.

This machine is furnished with ½-in., ⅝-in. and ¾-in. punches and dies, also a lever bar.

When choosing your blacksmith shop equipment why not get the best—

CANEDY-OTTO

It costs no more.

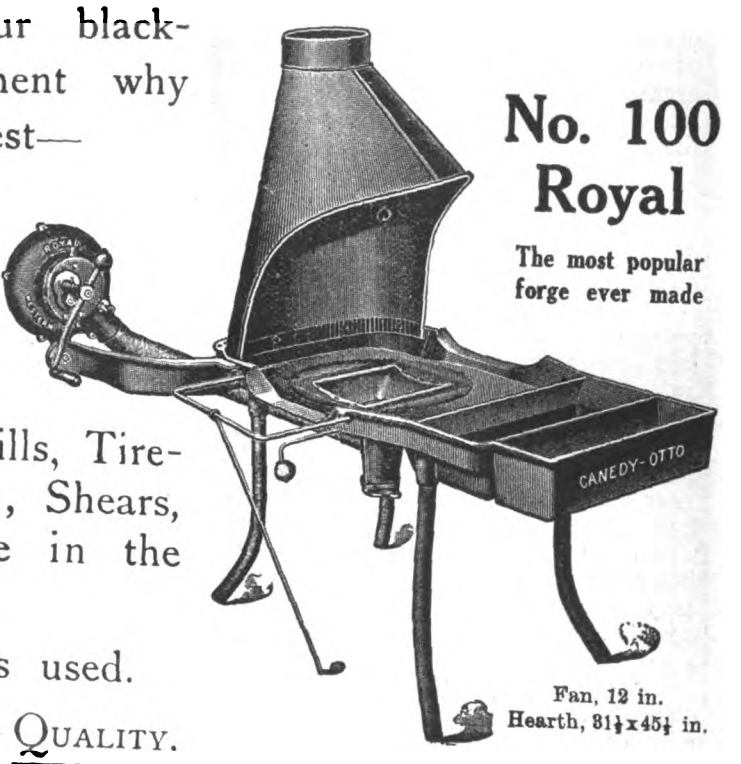
Manufacturers of the finest line of Forges, Blowers, Drills, Tire-Shrinkers, Punches, Shears, produced anywhere in the WORLD.

Once tried, always used.

There's a reason — QUALITY.

No. 100 Royal

The most popular forge ever made

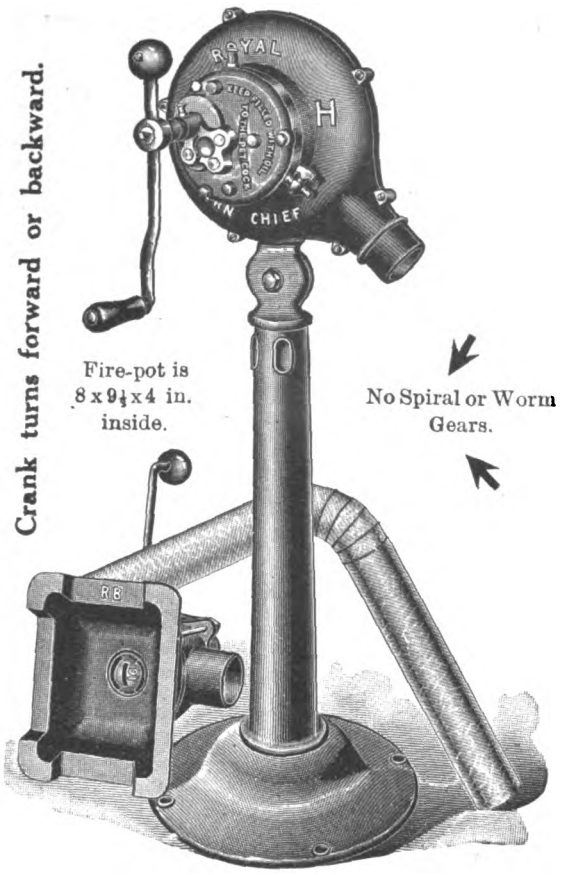


Fan, 12 in.
Hearth, 31½x45½ in.

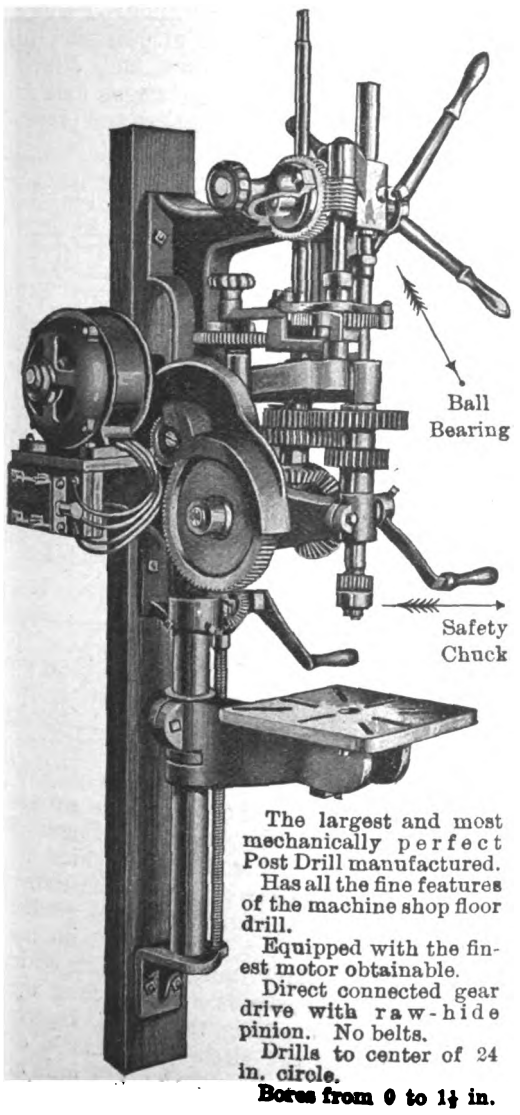
FORGES
BLOWERS

Royal Blower

(Ask the man who owns one)



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 raw-hide pinion. No belts.

Drills to center of 24 in. circle.

Bores from 0 to 1½ in.

DRILLS
TIRE-SHRINKERS

Over 200 different styles of TOOLS. We can suit every need.

Send for Catalogue

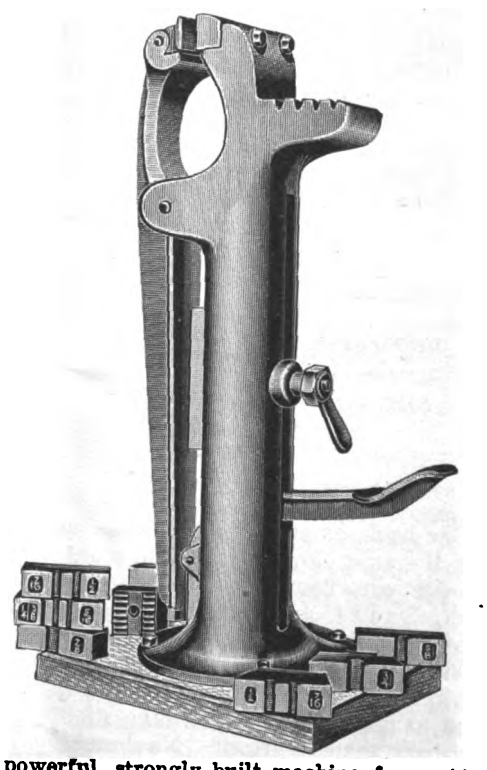
Give name of supply dealer or jobber.

CANEDY-OTTO MFG. CO.

CHICAGO HEIGHTS, ILL.

PUNCHES
SHEARS

Canedy-Otto Foot Vise and Bolt Header



A powerful, strongly built machine for making bolt heads, forming calks, shaping tools, and everything where a first-class quickly operated vise is needed.

Furnished with or without dies of the following sizes: ¼, 5/16, ⅜, 7/16, ½, ⅝, ¾.

The best of material and workmanship used throughout.

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

for the price they wish to have them done for. It is best not to try to touch them up, for the old color is faded and will not look good by putting on just clear varnish. After you get the grease off, rub the body good with pumice stone and then wash good and give a coat of the new kind of solid covering color varnish. Cover well and you can get the same color as was on the car in the solid covering kind from any of the varnish makers. After this coat is dry and smooth, just moss the same off. Then stripe and finish.

Now for the chassis: There is never much paint on it and that has probably worn off and you can't afford to put any paint or lead on, so just sandpaper lightly with old or fine paper and then dust well and get a coat of the solid covering color varnish. When dry, moss off and stripe with any good make of gear varnish. Always get a good heavy bodied varnish, clear in color.

Now for the cheap re-paint job. Do the body the same as you did the re-varnish job, only give the body an extra coat of rubbing varnish, half clear and half solid covering color varnish, unless it is cracked badly. If cracked, give the body a coat of rough stuff. When dry, putty smooth and give another coat of rough stuff and when dry give the body a coat of solid covering color varnish that will cover over a dark filler. When this coat is dry and on smoothly, moss, stripe and finish. The object is not to put on too much work for the price. Get them out quickly for the owners cannot do without them long in the good old summer time.

For the chassis, sandpaper good and give a coat of dark lead and put the same on smooth with a camel's hair brush. You need not sandpaper; just moss off good and give a coat of solid covering color varnish. When this coat is dry, moss off and stripe and finish. For a good re-paint job, just put on more rough stuff and more rubbing varnish. It is best not to burn off a job unless it has been re-painted a good many times, and the jobs they make now-a-days do not last long enough to be painted many times.

Axle Skein Setting.

From R. K. Powell, Woodstock, Kentucky.—In answer to Mr. Chewning of Missouri regarding the setting of skeins, I would like to say that there is an old saying used by almost every blacksmith in this country, which is not correct. That is, to take two-thirds off the back, one-third off the front and none off the bottom. This

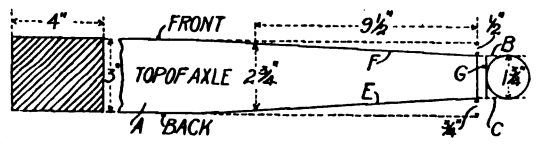


Fig. 1.

gives too much gather both at the bottom and the front. I will endeavor to give the correct way. Suppose your axle is 3x4, as at A, in the sketch, in Fig. 1. First find the size of your skein on the inside at the little end, which we will suppose is 1¾ inches. Subtract 1¾ inches from 3 inches, the thickness of the axle, and you will have 1¼ inches of wood to cut away at the point. Now take three-fifths of this off the back side, which will be ¾ inch. Now draw a line across the end of the axle ¾ inch

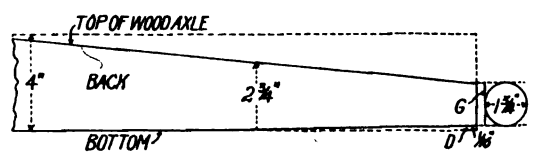


Fig. 2.

from the back, as at B. Draw a line across the end of the axle ½ inch from the front as at C. Now with your compass make a 1¾-inch circle between C and B and coming within about 1-16 inch of the bottom of the axle, as at D, Fig. 2. Then find the size of the skein at the large end, which we will say is 2¾ inches. You then have ¼ inch to take off, of which take slightly more off the back than the front. Now measure your axle to see where the large end of the skein will come and draw lines E and F. Saw or hew to lines E and F. After this is done draw a line across the end of the axle at the top of circle G. Then find the size of the skein at the large end, up and down, and mark this on the side of the axle at the point where the large end comes, as on the sides, measuring from the bottom and allowing all to come off the top. Now draw a line from this point to the end of line G and hew to same. Proceed to round up the axle, working to the circle on the end. The skeins should be 4 feet and 4 inches from collar to collar.

A Tongue Iron.

From R. K. Powell, Kentucky.—Although any smith knows how to make a tongue iron, there are possibly some who have never tried this way, which I consider a labor saver and also a neat and durable way. First cut two strips of iron ¼x¾ inches by 1 foot long, or

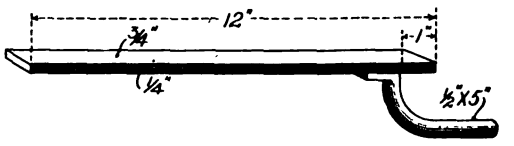


Fig. 1.

heavier if you like. Then cut two pieces of ½-inch rod 5 inches long. Swell one end of the 5-inch rod. Make a weld and stick the large end to the flat side of one of the 12-inch pieces about one inch from the end. Heat again and place the 5-inch round part through the ½-inch

Fig 2.

hole in the anvil and hammer on the flat side. This will form a button on the round rod, and make a perfect weld at the same time. Now fix the other flat and round pieces likewise. Now shape each piece like Fig. 1. Weld together as shown at Fig. 2. Now shape the iron like

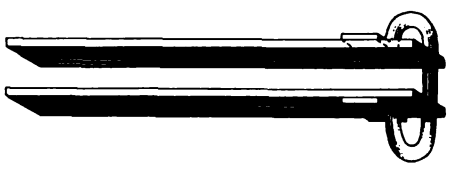
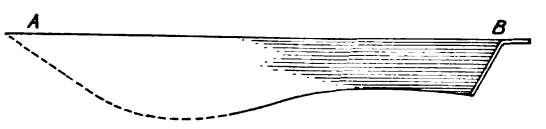


Fig. 3.

Fig. 3. I learned to make this iron while working in a factory several years ago. I have never seen one made neater, quicker or easier, as well as durable. It saves all forging. Try it. If the holes are to be punched, punch before bending the iron.

Prices and Plowshare Points.

From M. A. Trussell, California.—I send you a few of the prices we charge for work. Shoeing, $2.60 and $3, for new shoes, per set; reseting, $1.50. Setting buggy tires, $4 a set. Welding points on plowshares, 50 cents. Putting in two-horse wagon tongues, $7.50. Sharpening



Point for a Plowshare.

plowshares, 75 cents. I do all kinds of repair work. I enclose a sketch of a way I make a point for a plain plowshare, and when finished up it leaves the share the same shape as when new. The dotted line shows the edge to be drawn thin. To make this point, take a piece 1½x½, 8 inches long, the end, A, to be on the top of the share. Finish, the shape of the new share.

That Axle Problem.

From Roy Crassley, Texas.—I am going to try and answer part of the question by Theo. Chewning, Missouri, in the January number, but for fear of taking up too much space I will not attempt to give a complete answer. To find the length of an axle where you have nothing but the wheels and skeins, first measure from the back of your hub to the face of the spoke, which we will say is 6 inches. Now see how much your box is housed, say ¾ of an inch, which we deduct from the 6 inches, leaving 5¼ inches. Now measure from the front of the collar to the back of the skein, which is 4½ inches. Add to your 5¼ inches and this gives 9¾ inches. Standard tread here is 5 feet 2 inches or 62 inches. Now add to the 9¾ inches a like amount for the other end of the axle, which gives 19½ inches. Now take 62 inches, less 19½ inches which gives 43½ inches between the skeins. Measure down the inside of the skein, say 12¼ inches. Add a like amount and this gives 24½ inches, plus 43½ which is 68 inches or 5½ feet.

If you see fit to publish this and no one takes up the tuck and gather of the axle, why it is needed and how to find how much is required, I will come again.

For Holding Plow Lays.

From Walter E. Miner, Wisconsin.—I send you a sketch showing a device for holding plow lays to keep them from warping while hardening. I think from these sketches you can see clearly what I mean. The tongs, or the clamp, rather, are to be put on the mold board side of the lay. The other tool is made by taking a

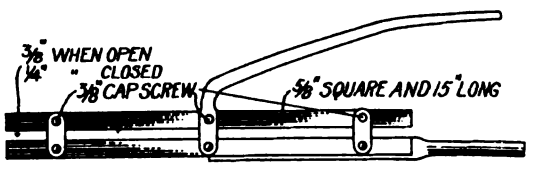


Fig. 1.

worn-out wagon tire, cutting two pieces 26 inches long, welding them faced together edge to edge, and then bending to fit a straight lay. To use these tools, heat the lay to a low red heat, lay on a leveling block, level it just right

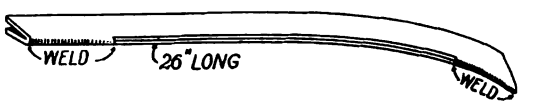


Fig. 2.

and give it the suck you want it to have. Sprinkle yellow prussiate of potash all over the surface, placing the clamp on the lay and drawing down tight, and then turn the lay over and place the other tool on the edge of the lay and hit it with a hammer so it will stay there, and when the lay has cooled off to a dark red, plunge in water having common salt in it. This will make a very hard surface and the lay cannot warp out of shape.

Gather and Set for Axle Skeins.

From John W. J. Harris, Virginia.—I notice that Brother Theo. Chewning of Missouri, in the last issue of The Blacksmith and Wheelwright, asked "How to put in a wagon axle so the wheels will have the right gather and proper

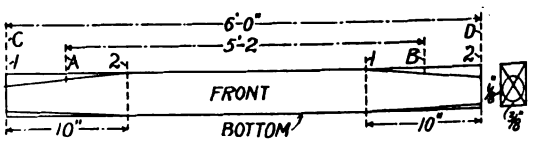


Fig. 1.

set." This is my method and I have always met with success. The first thing I do is to measure the track, which is 5 feet 2 inches, as shown in Fig. 1, from A to B. Then I consider the length of the skeins. Suppose the skeins are 10 inches. Then I take half the length of the skein, which is 5 inches, and add it to each end of the track, which makes 6 feet.

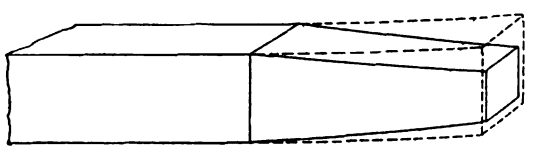


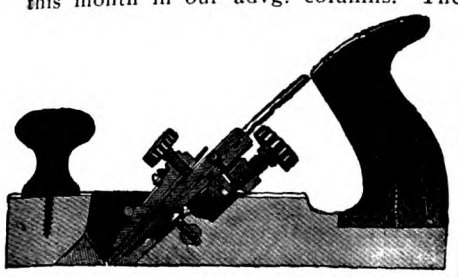
Fig. 2.

This is the length the axle is to be cut, as shown from C to D. Now mark the length of the skein on the axle, as from 1 to 2. Find the center of the axle by drawing lines from corner to corner, as shown in Fig. 1. Then I get the size of the skeins at the small end, with my dividers. With the same radius, I mark a circle the same size as the skeins are in side at the small end. When marking this circle, I place my dividers so that the circle will come ⅜ of an inch from the bottom side and ⅛ inch to

The Gage Self-Setting Plane

This plane illustrated herewith, can be perfectly set for the finest work without trouble. This self-setting feature is a great convenience, and the tool is besides as good as it can possibly be made. The adjustment is such that the cutting iron may be set square with the face of the plane, even if the cutting iron is not ground square with itself. So accurate is the self-setting device that one can take six or more shavings, removing and resetting the cap and cutting iron after taking each shaving and the extreme variation of thickness of the six shavings will be less than four one-thousandths of an inch. This plane will be put out on 30 days' trial to any reader who will mention this magazine. If the plane is not satisfactory it may be returned and the money refunded.

A special offer on this plane is made this month in our advg. columns. The



The Gage Self-Setting Plane.

manufacturers offer to send to any reader who will mention this publication one of their souvenir pencils free, also what they call their "dollar certificate" which entitles the holder to a discount of $1.00 on the purchase price of one of these planes, if within 30 days from its receipt it is sent in with money order for the list price of any beechwood self-setting plane made by them, with 10 names and addresses of other plane users. Or if you will merely send in the names of 10 plane users a second souvenir pencil will be mailed to you absolutely free. Do not forget that it is necessary to get the benefits of this offer to mention The Blacksmith & Wheelwright. Address your correspondence to the Gage Tool Co., Vineland, N. J.

Rubber Tires.—No reader can fail to notice the attractive announcements which have been running in The Blacksmith and Wheelwright, relative to rubber tires manufactured by the Firestone Tire and Rubber Company of Akron, Ohio. These tires have won for themselves a high place in the estimation of all owners of carriages who have used them. They are very resilient and durable. It is said they wear down to the wheel and do not crumble or break. Any reader who has failed up to this time to accept an agency for the sale of rubber tires should write to this company at once for their special proposition and price list. Blacksmiths are particularly well situated to put on rubber tires and there is a good profit in the business for them.

The Paramount Spoke Wedge.—This wedge is manufactured from selected hickory by Albert Wadsworth, of Brownsville, Ind., and is sold at such a low rate that no wheelwright or wagon maker can afford to make his own wedges. If your dealer does not keep them, write to the manufacturer, as above, for further particulars and price.

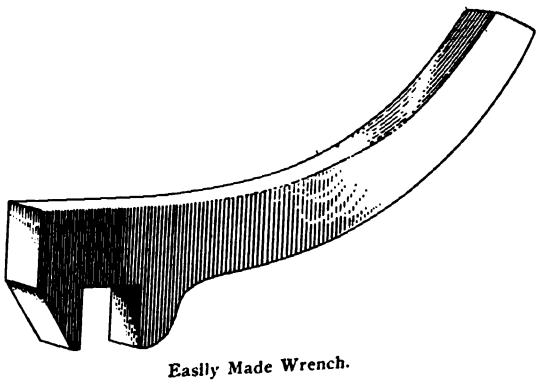
the front side. This will give the wheels the proper set and gather. Then get the size of the skein at large and mark same on axle, as shown in Fig. 1. Mark off, with diagonal lines from the circle to the size of the skeins at the large ends and rip according to the lines, as shown in Fig. 2. Then the ends are round and the skein fitted. I always found that putting on skeins, it is best to put just a thin coat of paint on the wood, this makes the skeins slip on easily.

Setting Axle Skeins.

From J. T. DeSprain, Kansas.—I will give the Missouri brother my way of setting skeins on axles. For 3 inch axles the front and bottom should be straight. If not, put a straight edge to them so it fits each shoulder, then measure from the straight edge from the bottom up 1½ inches, then from the start at the front back 1½ inches, this gives the center of the axle. Then measure from this point down ⅛ inch, then front ⅛ inch. Take this for the center of the point of the axle. It will be the right gather. To get the length of the axle measure the hub from the front of the spoke to the back end of the box. If this is 6 inches the axle would have to be 4 feet between the shoulders of the skeins where the box fits to make a 5 foot tread.

How He Makes Wrenches.

From O. J. Hymel, Lions, Louisiana.—From the illustration you will see how I make all my wrenches, or nearly all, instead of the regular S wrench. They are just as handy and will catch a bolt where the ordinary S wrench will. They are easier made, and work fine. I some-



Easily Made Wrench.

times run across some wheels where the boxes turn in the hub and are too worn to wedge, such as the all iron wheels used on cultivators, and so on. I take some sulphur and melt it so it runs like water, but care must be taken that the fire don't catch in it when melting, because it will be enough to smother anybody. If the fire does catch in it, simply dip your hands in some water and sprinkle over it, and then use it the same as Babbitt, and it makes a good job. Hoping you will understand my sketch and wishing you all success, etc.

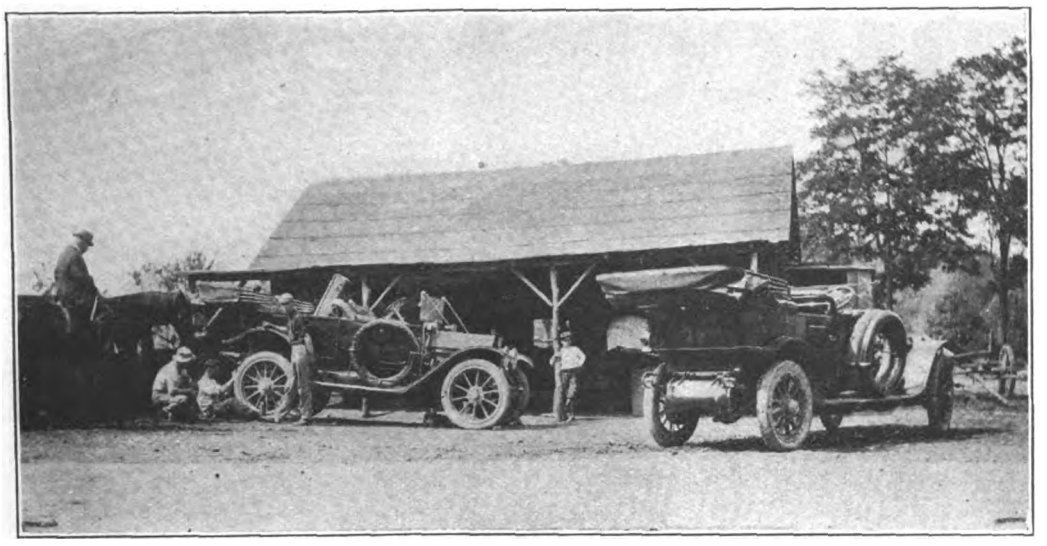
Vehicle Spring Making.

From Ed Bohrer, Kansas.—Will you kindly tell me through The Blacksmith and Wheelwright, the process of modern vehicle spring building? How the ends of springs are rolled for the bolt and how the ends of leaves are drawn out thin. Is there any machine for such purpose? How the tempering is done and what kind of a fire is used to heat the steel in for tempering?

(Note.—You would find it necessary to apply to some spring maker for the information you wish. But even then, you probably would not get it. Most processes of this kind are a trade secret and manufacturers do not usually make public their own way of doing the work. The following are some of the leading spring makers: Wm. and Harvey Rowland, Philadelphia; Spring Perch Company, Bridgeport, Conn.; Tuthill Spring Company, 754 Polk street, Chicago; The Cleveland-Canton Spring Company, Canton, O.)

Evidently They Do Automobile Work.

From J. L. Woodson & Son, Virginia.—We send you a photograph of our shop. We have two Royal H. Western Chief blowers in our



Shop of J. L. Woodson & Son.

shop and have been using them for some time and they have given perfect satisfaction in every particular.

Shoeing for Interfering.

From F. M. Armstrong, Ohio.—I noticed in The Blacksmith and Wheelwright an article on shoeing an interfering horse. One blacksmith pared the outside of the foot the lowest; another pared the inside, and another made a special shoe real thick and heavy on the inside. This is all very well, but it takes lots of work and time is worth something. Now, I will tell you my way of shoeing a horse that interferes. First, I examine the horse's foot, and if it is low on the inside of the hoof, which is the case nine times out of ten, I get a piece of good sole leather which I always have handy, and cut a piece just as wide as the shoe, and fit it where the hoof is worn or broken off; use just enough leather to make the hoof level. Then shoe with a light shoe. Where my brother puts the heavy part of the shoe I put the leather. It is much quicker and is just as good. In my 25 years of experience shoeing horses I have never failed to stop interfering.

A Lien Law Probable in Kansas.

From George W. Wilson, president of the Blacksmith and Wheelwright Association of Kansas.—It may be of interest to the trade in other States to know that as president of our association I have succeeded in getting our bill reported for passage in the house judiciary committee creating a lien on personal property, and feel much confidence of its final passage. I quit the business ten years ago but am as much interested in mechanics as when I was in business.

An Automobile Lift.

From John Sefcik, Kansas.—I would like to ask my brother readers how to build an automobile lift, something that can be moved from one place to another. I have begun to do automobile work and think a lift would be better than a pit. I would like to have a sketch given, but any information will be appreciated.

Won by a Boy.

North Dakota farmers to the number of 513 entered a corn-growing contest last spring. The winner is the youngest farmer on the list—Harper Brush, aged twelve. On a four-acre plot he grew an average of 71.7 bushels of corn to the acre, for which feat he receives a prize of $50 in gold.

A Big Shop.

The largest railway shop in the world is, according to one authority, that of the London and Northwestern Railway, at Crewe, England, which employs 10,000 men. A rival claimant for the distinction is Altoona, Pa., where the Pennsylvania Railroad employs 12,000 men in the busy season.

How to Grind Knives.

From Dubuque in The Woodworker.—A knife-grinder or emery wheel should not be set up in a dark place or some hole that cannot be put to any other use, but rather set up the machine in front of a window, so that a good light will strike on the work.

Do not at any time think that an inexperienced mechanic can know all about knife-grinding until he learns it. There are cases where a man of no experience with machine knives may develop into a very competent knife-room man, if properly cautioned and instructed. All "skilled" men had to learn how, but some of them, in learning, spoiled knives worth a good many dollars without knowing it, and the result was, the employer paid dearly for the workman's experience.

Never be hasty in grinding knives or think it takes too long if the grinding seems to go slowly. Skilled operators know that a knife ground slowly cannot be spoiled by having the temper drawn, or edge cracks started. A light cut in grinding is best, and a knife slowly ground will need grinding less frequently, for the reason that the temper has not been impaired, and its cutting edge will remain keen for a longer period.

Do not think that any wheel will cut well. Wheels vary exceedingly, and may be furnished in grain, grade and hardness suitable for the work. If oil reaches the face of the wheel, it is next to impossible to keep the wheel from glazing. Frequent use of an emery wheel dresser is the only remedy. Long experience has demonstrated that free-cutting wheels are the best to give good results; in other words, wheels that are not too hard. In regard to speed, a wheel should make a mile a minute, rim speed, for good results.

POWER

In this department an expert will reply to any questions our readers may propound as the result of their experience, or inspired by a desire to become acquainted with the value of power in the shop. All inquiries should be addressed to the Editor of THE BLACKSMITH AND WHEELWRIGHT, P. O. Box 654, New York City.

FIXING THE PUMP.

This Trouble Is Not As Complex As It May Seem.

W. F. Schaphoost in The Gas Engine.—"Bill, I wish you could fix the pump on that gasoline engine so it would work the way it should."

That's what the boss said to Bill. Bill had charge of the operation of a 15 H. P. gasoline engine of well known make. He was a good fellow and was proud of the fact that an engine of such enormous size, as he considered it, was entrusted to his care. The engine furnished all the power necessary to operate the only machine shop in the small community in which Bill lived and it was generally acknowledged to be a large engine by most mechanics in that region.

The trouble with the engine was this. It was everlastingly threatening to stop. It would seemingly cough, choke, and then gradually die down, the stored energy in the fly-wheel being sufficient to keep the shop a running for about ten seconds. Bill would hastily stop his lathe, race over to the engine and desperately manipulate the hand pump that is usually provided in some form or other with gasoline engines. The engine seemed to know Bill, so Bill claimed, for it would immediately take new courage and start again. Thereupon, Bill would feel much relieved, would mechanically examine the oil cups, give the pump stuffing gland an extra twist, would open the peep hole to be sure that the engine was getting plenty of gasoline, would wipe the perspiration from his brow and then would wend his way back to the lathe feeling that the boss should raise his salary for knowing so much about gasoline engines as well as for being the shop's crack machinist.

Somehow or other Bill's boss, who had made note of the state of affairs in his machine shop, evolved the idea that the pump needed repairing; so he told Bill, as already stated, that Bill should try to repair the pump.

Bill chided himself for not having thought of so simple a thing himself. He was a good conscientious worker and had always meant well, but he knew he often lacked initiative and this was one of the many instances where he should have asserted himself sooner. So, after the shop had closed for the day he dissembled the pump and carefully examined all of its parts. The plunger seemed to be slightly rough, and being a machinist, Bill decided forthwith that the trouble lay in its imperfection—that it caused leakage of air. He placed the plunger in a foot lathe, turned off a very thin layer, polished the plunger until it shone like a mirror, and then reassembled the pump. He replaced the old packing with new, heartily congratulated himself on the thoroughness and excellence of the job and then went home.

Next day Bill was grieved to find himself following the usual vexing program. The pump still balked, although he thought he perceived a slight betterment. He tightened the stuffing gland again and again but in spite of all he did he never failed to find himself back at the old job at regular intervals churning the hand pump.

Suddenly a new idea struck Bill. He believed he had found the correct solution. He discovered that oil, poured into crevices of the packing gland, would remain there some time before seeping through to the gasoline side of the packing. He asked himself, "Why not make the packing thoroughly oil-sealed? I'm positive there could be no leakage of air through such a stuffing box." He immediately turned out a neat brass collar and press-fitted it onto the packing gland. That night he gleefully wrote the manufacturers of the engine that he had improved their gasoline pump, sent them a detailed drawing, and told them he would be pleased to have them adopt the oil packed stuffing box on all their standard gasoline engines. Bill was ambitious, but, his letter to the manufacturers was never answered.

In fairness to Bill we should draw a veil over the next day, because he was thoroughly disappointed. All of his work had been in vain. The oil-sealing stunt worked fine, that is, the oil sealed the stuffing box perfectly, but the result sought, namely, gasoline for the mixing valve, was no better than before.

As a last resort he ground the check valves. He white-leaded the pipe plugs to be sure that no air could enter the pipes. But, the old story repeated itself.

In desperation he finally frankly admitted to the boss the impossibility of repairing the pump and advised that a brand new pump be ordered. The boss had faith in his machinist and did as he was bid without questioning.

However, a couple of days after the pump had been ordered and was on its way by express to alleviate Bill's troubles, a new thought suddenly struck Bill. He remembered that he had never once inspected the pipe line leading from the supply tank to the engine. He decided that he must examine it and examine it he did. He found a pipe union in the tank box and hastily disconnected it.

You, Mr. Reader, no doubt know exactly what he found there, a rubber gasket, or rather, all that remained of what once was a rubber gasket. Perhaps you guessed the trouble at the very beginning.

Bill felt mighty cheap. Anybody in his position would have felt cheap. He said nothing outwardly; he cussed inwardly; but knew his

duty and he did it. After putting in a good leather gasket and tightly screwing the union together Bill went straight home without even testing out the repair job. Bill was mechanic enough to know that the pump had never been at fault but that there had been a serious leakage of air through the union that should have been discovered months before.

The pump had never given any trouble since and Bill, of course, is much the wiser. But he had a hard time explaining to the boss the necessity of having a new pump on his hands. You see, he did not care to admit his error. "Duplicate parts," said Bill, "always come in handy so I think we had better keep the pump in case we have more trouble with the pump in the future."

The boss never understood the situation fully because Bill never explained it to him, but he clearly saw that Bill had "done something" and so, without a very good reason even in his own mind for doing so he added a neat little increase to Bill's salary.

That pleased Bill but thereafter he felt less pride in his knowledge of gasoline engines. He learned that troubles are usually not as complex and deep seated as they seem.

Pre-Ignition and Compression.

From Gas Power—In time past the compression pressure in the gas engine in general was away too low to insure the highest efficiency from the fuel used, and as it dawned upon builders that higher efficiencies might be obtained by increased compression, the clearance space in not a few engines was decreased so that the danger point of pre-ignition was reached, and especially was this so with engines that were not well designed for thorough cooling, and where no change in design was made other than the reduction of the clearance space, by plating the piston head or lengthening the piston rod. Increased compression pressure means increased heat and so long as this remains below the pre-ignition temperature the efficiency of the combustion and expansive pressure will be increased. It has been demonstrated that high compression pre-ignition and in fact pre-ignition due to almost any cause, may be controlled and overcome by the injection of a small jet of water into the cylinder during the compression stroke or even into the inhalation current. By this means the higher limit of compresion pressure may be maintained and yet pre-ignition avoided. Many an isolated operator is often troubled with pre-ignition or pounding in the cylinder that might be effectively overcome by a small pump attached to the two-to-one shaft, and piped into either the inlet or exhaust valve pocket connecting with the ignition chamber, or directly into the combustion chamber itself, so that at each compression stroke a small jet of water spray may be thrown into the compressed charge. This has the effect of cooling or diluting the mixture below the ignition temperature and holding it for ignition at the proper time by the electric spark. This has been rudely demonstrated by dropping small quantities of water into the open mouth of the inlet pipe of a pounding engine, at each inhalation. The pounding ceased at once and resumed again as soon as the water was withheld.

A Well-Equipped Shop.

From M. Larsen, Iowa.—My shop is not a big one, but it is well equipped with a trip hammer, disc sharpener, emery stand, drill, saw, etc., all run by a three-horse power International engine.

Strong Diamond Holder.

This holder is provided with real diamonds set with six points for the special purpose of dressing emery wheels. In other tools the diamond is set or

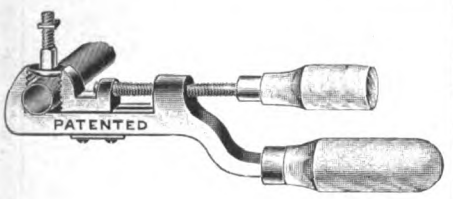
imbedded in the solid holder or clamped as in a vise and in either there is a liability of losing the diamond. In the tool which we illustrate herewith such an accident is impossible unless the cone is deliberately ground away and weakened. Each diamond rests on a copper rod or seat and the copper rod is held in place by a strong steel spring which prevents breaking or damaging the diamond when thrust too heavily against the emery wheel. These tools are made by Montgomery & Company, 105 Fulton Street, New York City, dealers in all kinds of tools, supplies and machinery.

Silver's Tools.—Our readers who may be in need of any of the tools or machines made by the Silver Mfg. Company of 335 Broadway, Salem, Ohio, should turn to the advertisement of this company on another page and write for their big machinery catalogue, or any of their booklets describing their different machines.

Subscribe for THE BLACKSMITH AND WHEELWRIGHT. $1.00 a Year.

Nonpareil Screw Wrench.

It is said that this wrench, an illustration of which we give in this connection, will overcome difficulties that have been unsurmountable among carriage builders, repairers, blacksmiths, etc., who have use for a wrench that will hold a round headed bolt and keep it from turning



while tightening or slackening the nut. This wrench will also do the work of the best pipe wrenches or tongs now on the market. It can be used as a vise or clamp for holding parts while drilling or filing, and hundreds of other things. One of the good things about it is that it is sold at a reasonable price which places it within the reach of every blacksmith. For further particulars write to the Standish Tool Works, Inc., Sebago Lake, Town of Standish, Maine.

All blacksmiths have trouble in removing old tires worn thin on the edges, and can hardly do so without ruining the felloes when the work is done with block and sledge. If they will use the Common Sense Tire Remover, manufactured by the Common Sense Tire Remover Company of Dowagiac, Mich., this trouble will be entirely obviated. The advertisement of this company will be found in our advertising department to which we refer our readers. Write for descriptive circular and prices, mentioning The Blacksmith and Wheelwright.

Trip Hammers.—In this issue the Armstrong Mfg. Co., 111 Chestnut st., Waterloo, Iowa, have an announcement of the Boss Trip Hammer. They also make a Helve type of trip hammer for light and rapid forging for blacksmith, wheelwright and small wagon shops. Thousands of the Boss and Helva-Hard-Hitter Hammers are in use in various parts of the country. They sell these hammers for a small payment down in such a way that the hammer will pay for itself practically as you go along. They have a very attractive proposition. Write to them at once for full particulars and prices.

King Roller Bearing Fifth Wheel.—The attention of our readers is directed to the advertisement of the King Roller Bearing Fifth Wheel Company, 5027 Beaumont Avenue, Philadelphia, Penna., which will be found on another page. They manufacture the King Roller Bearing Fifth Wheel, which is said to always give good satisfaction. They would like to send a circular giving further particulars and prices to every reader interested. In writing to them kindly mention The Blacksmith and Wheelwright.

Delmas Welding Plates and Powder.—Our readers who have not yet investigated the Delmas Welding plates and powder manufactured by the Chicago Metal Reduction Company, 20 West Jackson Blvd., Chicago, Ill., will perhaps find it to their interest to do so at once. Consult their advertisement on our back cover and write for full particulars.

Aprons of Quality.—Not many of our readers will overlook the advertisement in this issue of the California Tanning Company 1905 Shenandoah Avenue, St. Louis, Mo. Two styles of the aprons are described in the advertisement. One, the "Boss" Split Apron, and the other, the New Muleskin Apron. This last is a two piece apron made upon new lines and has more leather on the inside of each leg where it is most needed. It is as soft as buckskin and will not burn. A miniature apron will be sent to every reader of this paper who will take the trouble to write for it and mention The Blacksmith and Wheelwright.

Large Profits in Tire Repairing.—The Williams Foundry and Machine Company, Cherry Street, Akron, Ohio, manufactures the Akron-Williams Tire Repair Equipment which is illustrated and briefly described in our advertising department. Large numbers of our readers can make it profitable and in many cases very profitable by equipping their shops to put on rubber tires. Write at once for Catalogue "B" giving full particulars about putting on rubber tires. In writing, kindly mention this journal.

American Horseshoes and Calks.—If any of our readers fail to notice the very attractive advertisement in this issue of the American Horse Shoe Company of Phillipsburg, N. J., it will be because their eyesight is poor. This company manufactures all kinds of horse and mule shoes, as well as a complete line of heel calks, some of which are illustrated in the advertisement referred to. Every shoe made by this company and every calk bears the trade mark of the company "A" in a circle and those wanting the American shoes or calks should always see that this trade mark is on each shoe or calk. This company has brought out an interesting catalogue and desires to place one in the hands of every reader of The Blacksmith and Wheelwright. There are many interesting things in it. The company will also send a sample calk to each reader, free of charge, who will take the trouble to write for it.

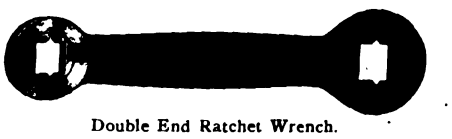
Skow's Rotary Disc Sharpener.—This machine will be found illustrated and described briefly in our Advertising Department. It is made by the Skow Manufacturing Company, Newton, Iowa. It sharpens cultivator and plow discs of all sizes by cold rolling which gives a most satisfactory edge, we understand, that will stay sharp. A disc sharpener is said to be a big money maker for any shop. They mention one man who made $28.00 in one day with one of these Skow machines. If your dealer does not sell this machine, write direct to the manufacturers as above for full particulars and price.

Novelty Disc Sharpener.—This excellent tool is manufactured by the Walker Mfg. Company, Dept. C, Council Bluffs, Iowa, and is for sale by supply houses everywhere. It will sharpen a single plow disc or rolling coulter, large or small, or a whole section of discs of any size or number, without removing the discs from the frame. Further particulars may be obtained by writing to the manufacturers as above. See advertisement on another page in which the machine will be found illustrated.

Wood's Power Tool Grinder.—The A. A. Wood & Sons Co., Atlanta, Ga., are bringing out a power tool grinder which every reader of this paper, possessing power, can undoubtedly use to advantage. This machine has a spark guard which throws the dust to the floor, and grinds anything, anywhere, at any angle. Send for fully illustrated catalogues and price list.

A Rugged Ratchet Wrench

One of the new labor saving tools for the blacksmith and wheelwright is the Bay State Carriage and Tire Bolt Ratchet Wrench of the double end type, illustrated herewith. The ratcheting



Double End Ratchet Wrench.

principle, combined with a rugged construction, makes this tool greatly appreciated by users everywhere. The wrench is made in three sizes, each wrench having two size openings. The No. 1 has ⅜-inch and 15-32-inch square openings, the No. 2 ½-inch and ⅝-inch, and the No. 3 13-16-inch and ⅞-inch—the two latter wrenches taking hex. as well as square nuts and bolts. These tools are highly practical, having been on the market for upwards of a dozen years. All up-to-date shops use them, and all dealers handle them. Circulars may be had by addressing Geo. A. Cutter, sales agent, Taunton, Mass.

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WANT ADVERTISEMENTS

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

will be inserted under this head at 2 cents a word, including the address for each insertion, payable in advance; but no advertisement will be accepted for less than 50 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 FOR INVENTIONS.
H. W. T. Jenner, patent attorney and mechanical expert, 608 F. St., 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.

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.

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.

PATENTS.
C. L. PARKER, attorney-at-law, and solicitor of patents. American and foreign patents secured promptly. Handbook for inventors sent free upon request. 926 G street, Washington, D. C.

BLACKSMITH.
Here is your opportunity to be an expert blacksmith without help. As life is short, get Toy's Modern Methods of doing hard jobs easy, forging and welding all kinds of steel solid. Also tempering all tools to a standard by colored charts. This is real plain information, not theory, all for $1.00. Send for free samples first. W. M. TOY, Sidney, Ohio.

BROTHER.
Accidentally have discovered a root that will cure both tobacco habit and indigestion. Gladly send particulars. No drugs. G. S. STOKES, Mohawk, Fla.

MECHANICS.
Send for a circular describing "Mechanics' Companions," a tri-square, a centering square, a caliper, rule and protractor. Address J. O. HESS, Oran, Mo.

WANTED.
WANTED—Traveling men who visit the carriage, implement and livery trade make big commissions selling our steel and rubber tired wheels, poles and shafts as a side line. Why don't you try it? THE BOOB WHEEL CO., Cincinnati, Ohio.

Auto Cylinders rebored. Pistons and rings fitted $8.00 to $12.00 per cylinder. Gear cutting in nickel, steel, brass, fiber, etc. Crank shafts, connecting rods, cases and axles reproduced like original. Send old or broken parts to go by. McCADDEN MACHINE WORKS, St. Cloud, Minn.

POWER USERS.
We offer one fine 8 H. P. stationary Milwaukee gasoline engine for only $115.00. Have also 50 other sizes and styles. State your power requirements before you buy. We can save you money. BADGER MOTOR COMPANY, Milwaukee, Wis.

CASH FOR YOUR BUSINESS OR REAL ESTATE.
I bring buyer and seller together. No matter where located, if you want to buy or sell, address FRANK P. CLEVELAND, 975 Adams Express Building, Chicago, Ill.

FOR SALE.
McGovern and West power tire shrinker, Moyer and Defiance hub boring machine. All as good as new at one-third the price of new ones. Address, 554 Freeman Ave., Cincinnati, Ohio.

FOR SALE.
Machinery, stock and tools. One of the best equipped blacksmith, horseshoeing and wagon shops in the State. In the heart of the famous Judith Basin. Reason for selling, failing eyesight. Address JOHN A. SANDERS, Geyser, Montana.

PATENTS AND TRADE-MARKS.
Patents and Trade-Marks secured. Highest grade of work for moderate fees. Send model or sketch for free search. HARRY PATTON, 352 McGill Bldg., Washington, D. C.

FOR SALE.
Blacksmith shop, 20x40, and tools. Barn on lot, 20x40. S. R. DETRO, Savona, Ohio.

WANTED.
Suitable location for blacksmith, horseshoeing and general repair shop. Address with particulars, ENOS J. FETTINGER, Petersburg, Ind.

WANTED.
Good all around blacksmith. First class on plow work and shoeing. Must be sober. None other need apply. Address L. HALL, Jolietville, Ind.

FOR SALE OR EXCHANGE.
Taxi-cab, half-ton truck, two touring cars. L. C. HAUBER, St. Mary's, Pa.

Auto parts repaired, cylinders re-bored, pistons fitted; prompt shipments. HAUBER AUTOMOBILE WORKS, St. Mary's Pa.

WANTED.
Articles to manufacture in wood or metal. Parties with limited capital in their business will do well to confer with us. HAUBER MFG. CO., St. Mary's, Pa.

FOR RENT.
A blacksmith shop with tools. Good location. Must quit on account of old address. Address H. HEIBERTSHAUSEN, Sulphur Springs, Ohio.

FOR SALE.
1 W W Cold Punch No. 4.....$15.00
2 Trenton Vises No. 75, each..... 5.00
1 Barcus Horseshoeing rack.....35.00
1 Ideal Tire Shrinker No. 4.....10.00
2 Royal "H" Blower Heads, each..... 5.00
1 2½ horse-power gasoline engine....25.00
1 Anvil.....10.00
1 Post Drill.....10.00
All in good condition at 50 per cent. less than cost. Address J. B. HOFFMAN, Fox Lake, Wisconsin.

FOR SALE.
Blacksmith shop in good country town in good farming section, middle Texas. Address for full particulars, W. H. JONES, Box 28, Turnersville, Texas.

FOR SALE.
Blacksmith shop, 32x40. Other buildings and house. 2 acres land. 14 miles from Denver, on electric and steam road. No competition. Price, $3,500. GEO. JORGENSEN, Broomfield, Colo.

FOR SALE.
Blacksmith shop, stock, tools. Good location. Good reasons for selling. Address L. C. LARSEN, Carroll, Nebr.

WANTED.
Good horseshoer and general repair man. Good wages and a steady job in a live town of 800. Address D. M. LOVE, Winthrop, Iowa.

FOR SALE.
Blacksmith and general repair shop in Lunny, Alberta. A good growing business for the right man. Shop, lot, engine and all necessary power. Machinery for an up-to-date two-fire shop. Tools almost new; good town. Ill health reason for selling. For further particulars and price address J. RIVERS, INNISFREE, C. N. R., Alberta, Canada.

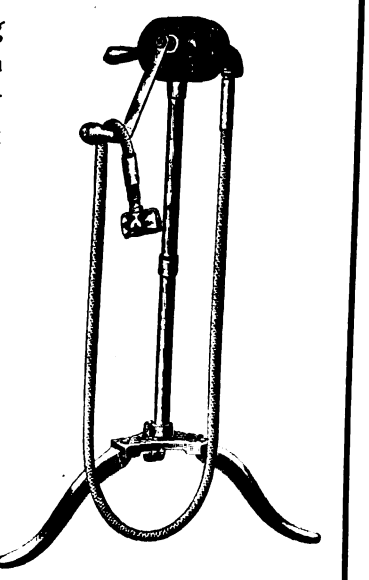
FOR SALE.
Shop 50x30 feet. Land 70x40 feet, with 6-foot right of way on 44-foot side, with dock in rear about 200x44 feet. Three forges, two furnaces, one galvanizing plant, one power hammer, one screw machine cutting up to and including two inches (this is new). Two drilling machines, two emery wheels, two gasoline engines, and other tools required for general forging. The only shop of its kind within a radius of 100 miles. The principal work is ship work—ship knees, machine forging, government work for dredges, and jobbing of all kinds with the exception of carriage work and horseshoeing. There are always vessels building in this town, besides others in the surrounding counties for which we make all their iron knees, winches and windlasses. Cost me $6,000.00; will sell for $3,000.00. Terms, $2,200.00 down, and balance on mortgage. It is a great bargain for an energetic man. The establishment is called the Gohel Iron Works. Write for further particulars to EDWARD SMITH, P. O. Box 256, Liverpool, N. S.

MAKE MORE MONEY

If you could take in, say $100 additional in the Spring and Fall months, would you refuse it? That's what a great many blacksmiths and shoers do every year by having as part of their equipment a

STEWART CLIPPING MACHINE

Here's the Stewart Ball Bearing Machine with a world reputation for quick, easy clipping and long lasting, at a price of only $7.50. It requires no expert; anyone can run it and do fast, good work.



Get one from your supply house or send $2.00 and we will ship C. O. D. for the balance.

We make the most modern and complete line of hand and power operated machines. Write for complete catalogue. Send now and get in on the Spring clipping business.

CHICAGO FLEXIBLE SHAFT COMPANY
630 LA SALLE AVENUE CHICAGO, ILL.
New York Branch: 16-18 Reade Street

Clip Your Horses

using the Gillette electric, steam or hand power machine. Our cutters can be used on any other make of machine.

Send for circular showing parts and repairs.

GILLETTE CLIPPING MACHINE CO.
110-114 West 32d St. - - New York City

FOR SALE.
Shop and tools. Lots of work. Also dwelling property. Good town. Good schools. Three churches. For further particulars address M. R. REEVES, Grenola, Kansas.

Carriage painter wishes to hear from carriage or horseshoeing shop that has a paint shop. Good place, rent free. Address W. A. RIGGLEMAN, Jamestown, Ohio.

FOR RENT.
In a good location, a blacksmith shop with tools. Address for full particulars and price, JNO. MARTIN, Sea Cliff, L. I.

FOR SALE CHEAP.
Shop, House and A No. 1 lot in a prosperous country town. Good location for a horseshoer, blacksmith and woodworker. Write for particulars to JAMES MacINTOSH, Route No. 2, Hartford, Michigan.

FOR SALE.
A fine stone blacksmith and shoeing shop. Fully equipped with electric power and latest improved machinery in good R. R. town. Plenty of work and good prices. $4,000. $2,000 cash. Balance on time. A. G. BIMSON, Berthoud, Colo.

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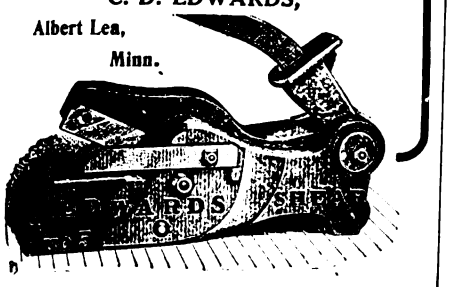

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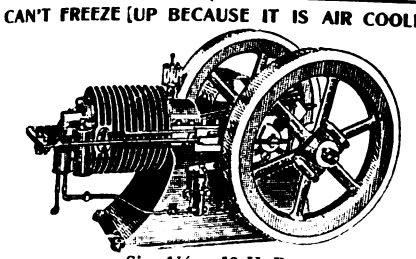

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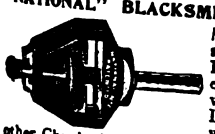

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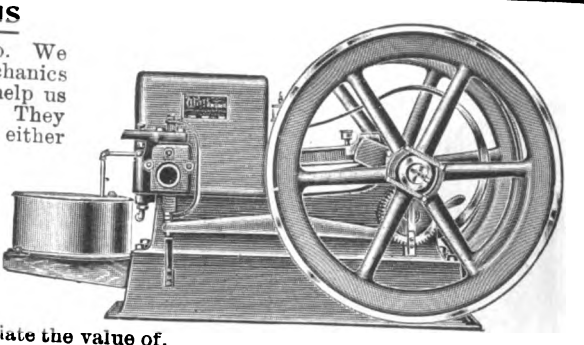

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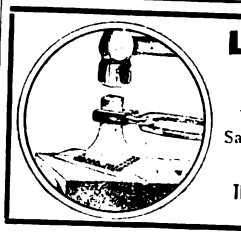

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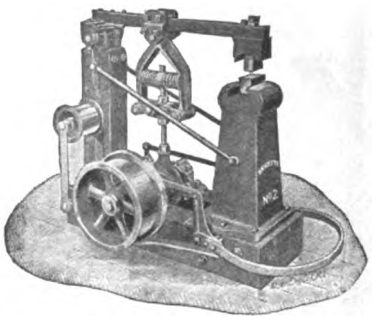

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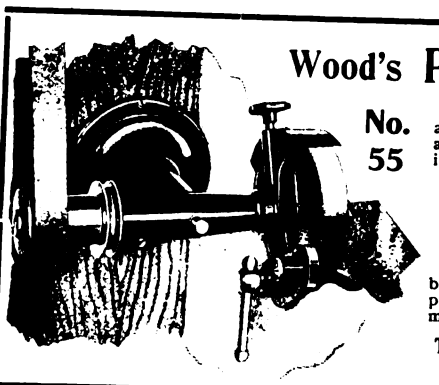

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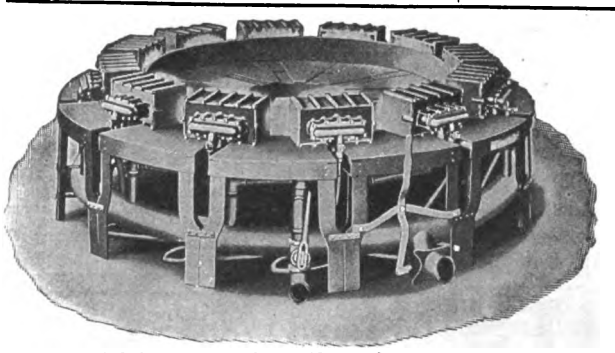

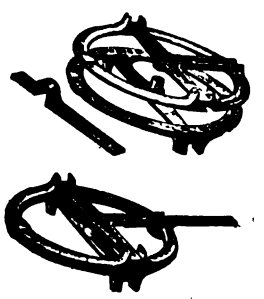

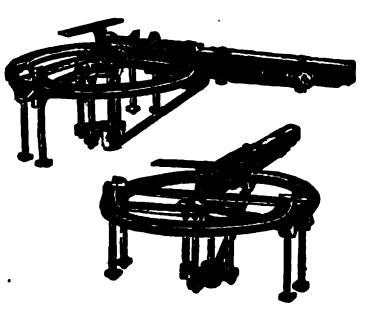

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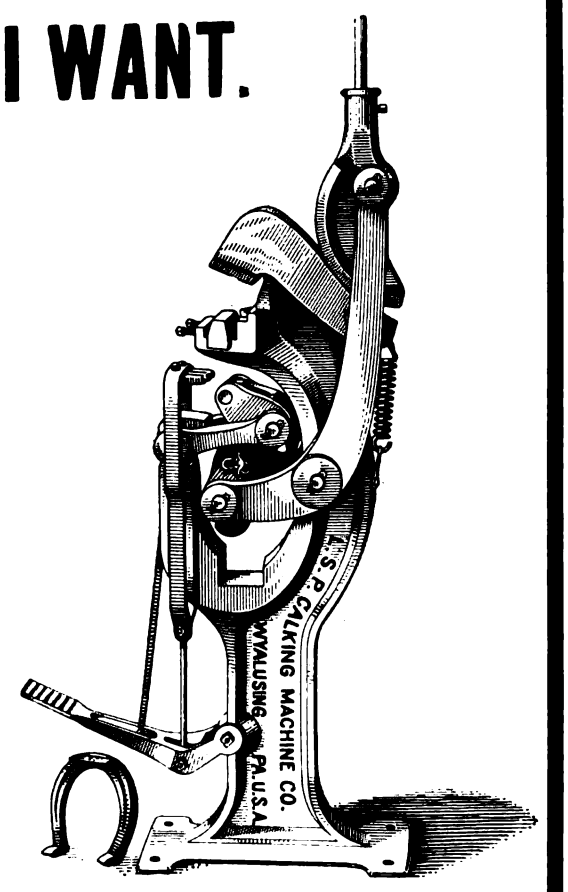

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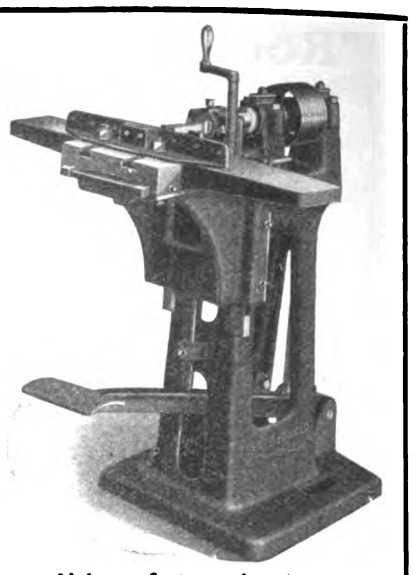

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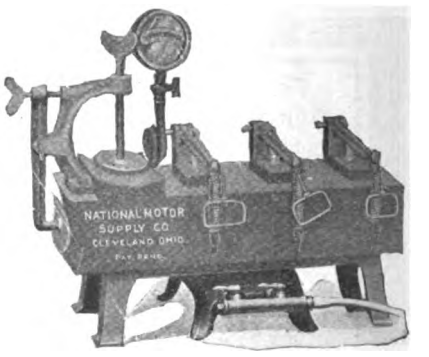

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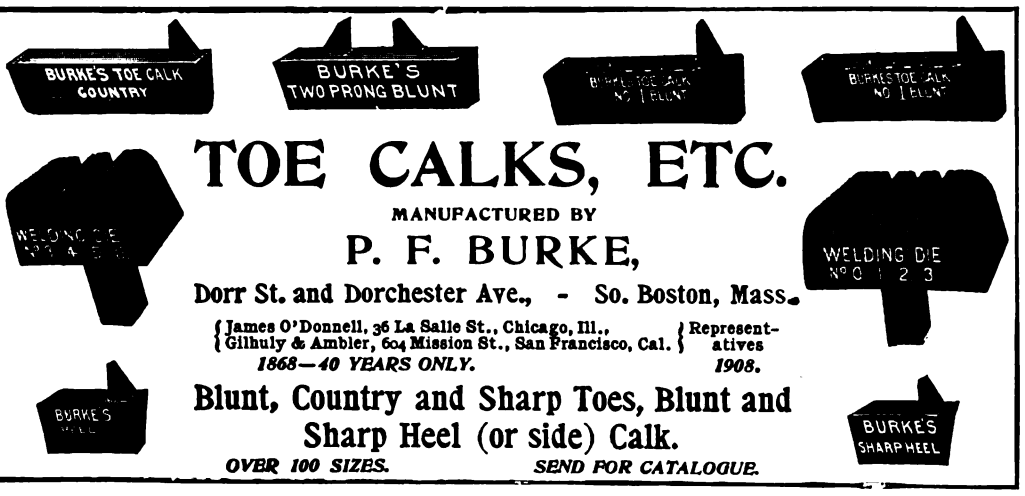

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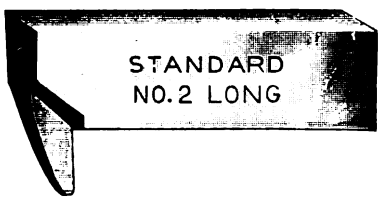

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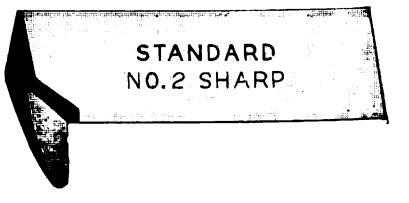

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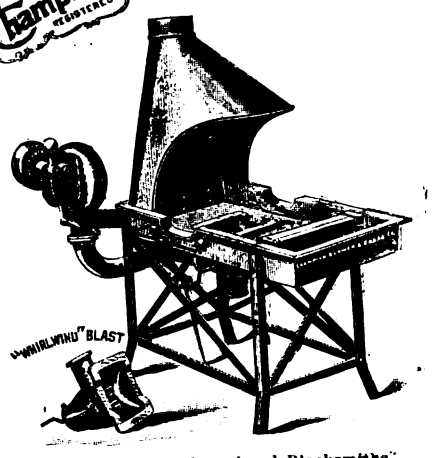

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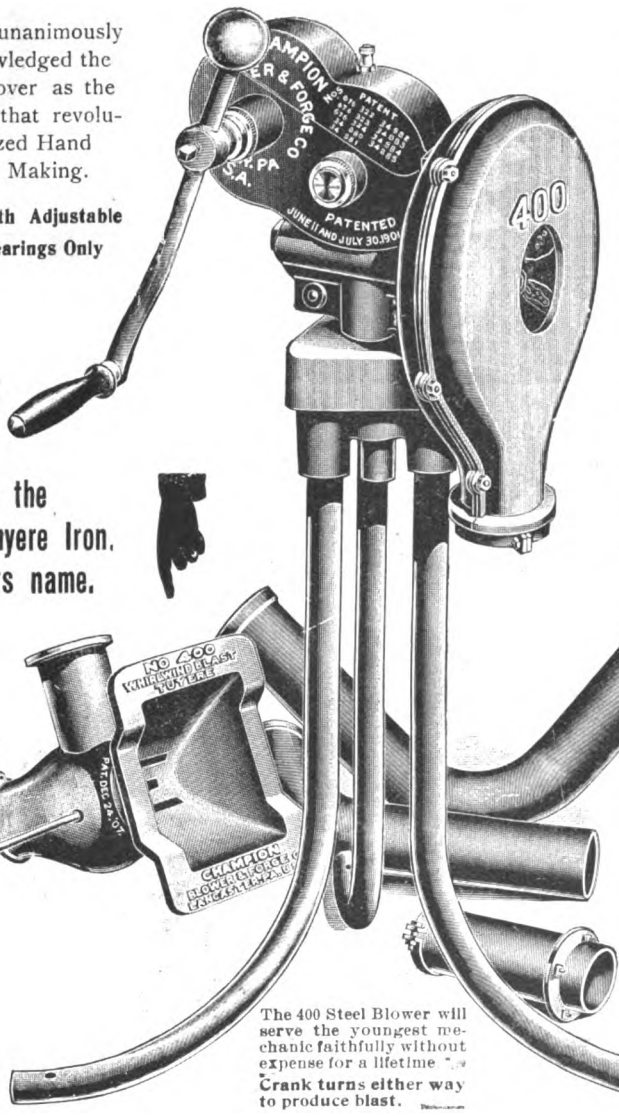
Hearth 30x36 in. Fan 12 in. in diameter.

The 400 unanimously acknowledged the world over as the Blower that revolutionized Hand Blast Making.

Made with Adjustable Ball Bearings Only



The 400 Steel Blower will serve the youngest mechanic faithfully without expense for a lifetime. Crank turns either way to produce blast.

Don't miss the "Whirlwind" Tuyere Iron. It is true to its name.

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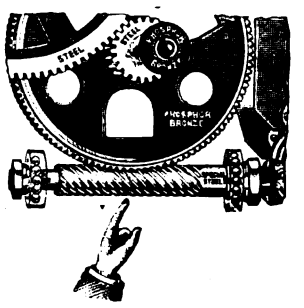
Hearth 32x45 in. Fan 12 in. in diameter.

THE FAMOUS 400



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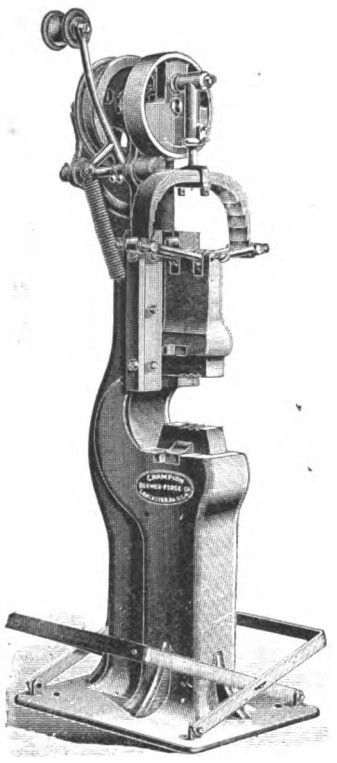
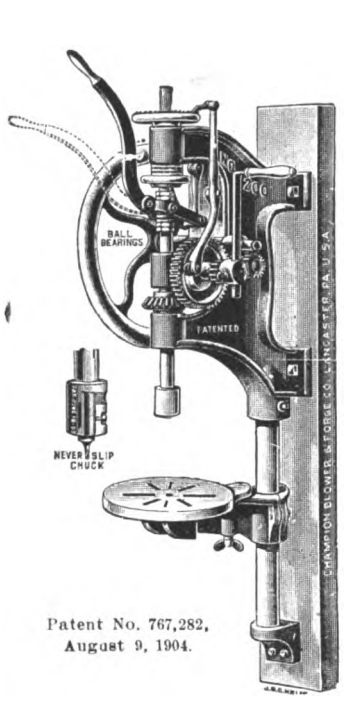
The Champion "Patented" Automatic Self-Feed and DOUBLE COMPOUND LEVER-FEED UPRIGHT POST DRILLS. Made with Cut Gears and Ball Bearings.



The Champion "Patented" Power Hammer.
Made in Two Sizes.

No. 0 Champion "Patented" Power Hammer, with one regular set of dies for plow work, upper die 3x1¼ inches, lower die 3x2 inches. Size of base of Hammer 18x25 inches. Height over all 5 feet 4 inches. Weight of ram 30 pounds. Pulley 9x2¾ inches. Speed 400 RPM. Capacity 2 inches, square or round. ½ HP required to operate same. Weight 900 pounds.

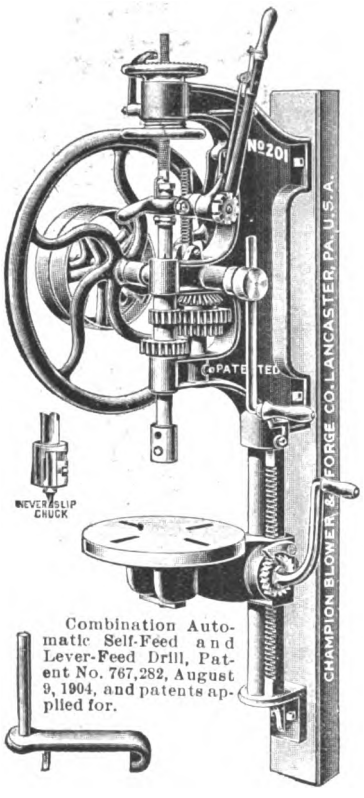
No. 1 Champion "Patented" Power Hammer, with one set of dies 2½x6½ inches, with plain surface 2½x3 inches, and two plain grooves and one tapering groove across one end for forging round iron, straight and tapering. Size of base of Hammer 20x27 inches. Height over all 5 feet 8 inches. Weight of ram 65 pounds. Pulley 10x2½ inches. Speed 300 RPM. Capacity 2¼ inches round or square. 1 HP required to operate same. Weight 1,250 pounds.



Patent No. 767,282, August 9, 1904.

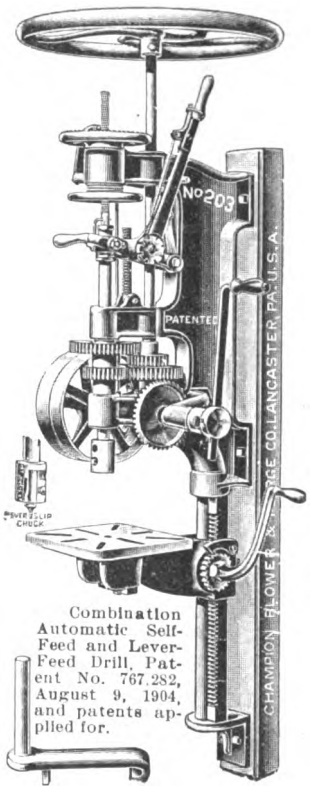
No. 200 DRILL

Combination Automatic Self-Feed and Lever-Feed Drill.



Combination Automatic Self-Feed and Lever-Feed Drill, Patent No. 767,282, August 9, 1904, and patents applied for.

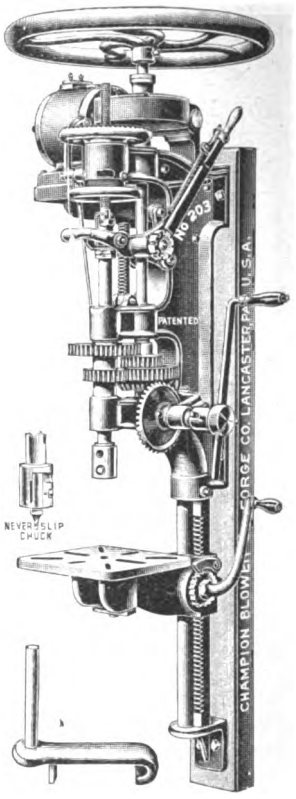
No. 201 DRILL



Combination Automatic Self-Feed and Lever-Feed Drill, Patent No. 767,282, August 9, 1904, and patents applied for.

No. 203 DRILL.

The Double Compound Lever-Feed produces 80% more pressure or drills holes 80% larger, with the same labor, than any Lever-Feed Drill



No. 203 Champion Combination Automatic Self-Feed and Double Compound Lever-Feed ELECTRICALLY DRIVEN Upright Post Drill.

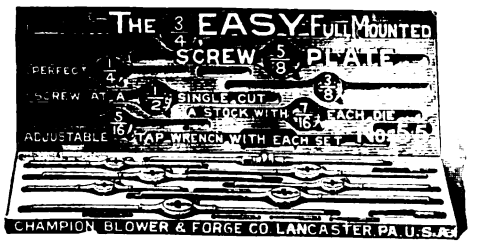
This Drill has the motor direct connected to the upright back gear shaft, which represents what we consider a perfect up-to-date Electric Drill and one that is worthy of most careful consideration from the up-to-date mechanic. It represents simplicity, durability and no loss of power.

REMEMBER

There is no TURNING BACK of the FEED Screw NUT WITH EITHER FEED.

The DDUBLE COMPOUND LEVER-FEED Saves 200 Per Cent

IN TIME AND LABOR in drilling holes, reaming, countersinking, etc., and makes the drill a first-class Wood Boring Machine.



Screw Plates in four styles cutting up to 1½ inches.

Our New Catalogue can be had free upon application, showing the very latest and greatest inventions in the blacksmith line in the world on Blowers, Forges, Drilling Machines, Tire Benders and Shrinkers, Power Hammers, Punches, Shears, Screw Plates, Power Blowers, etc. It will pay you to see our catalogue. Write for it.

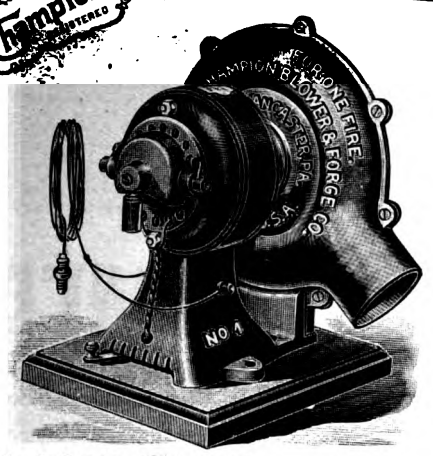
THE CHAMPION BLOWER & FORGE COMPANY, LANCASTER, PA., U. S. A.

THE CHAMPION ONE-FIRE, VARIABLE SPEED ELECTRIC BLACKSMITH BLOWERS

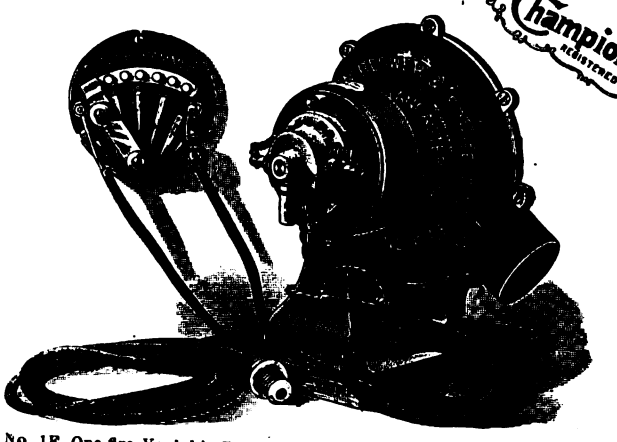
THE ELECTRIC SUCCESS

Motor Capacity 40% above requirements

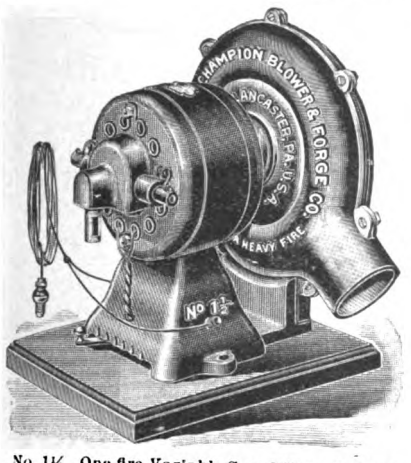
The illustrations show a very complete line of Electric Blowers, running up to nine fires. We recommend, in every instance, each fire to be equipped with its own individual Electric Blower, so it gives each operator full and complete control of his own individual fire and a large saving in the consumption of electric current. The material, workmanship, etc., used on these Blowers are of the very best.



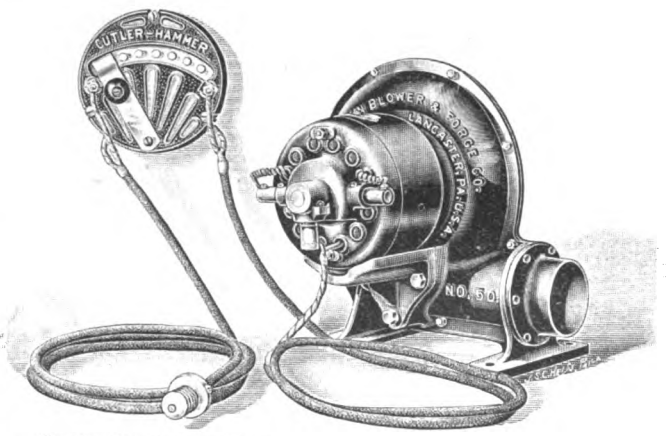
No. 1 One-fire Variable Speed Electric Blacksmith's Blower with six speeds, for light and medium fires.



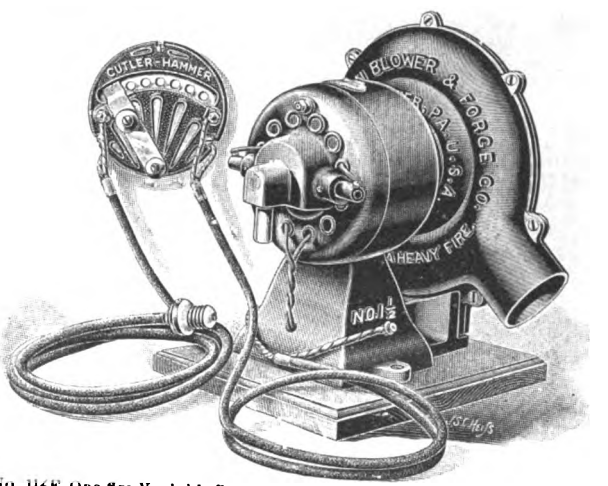
No. 1E One-fire Variable Speed Electric Blacksmith's Blower with universal motor and detached rheostat, with six speeds, for light, medium and heavy fires.



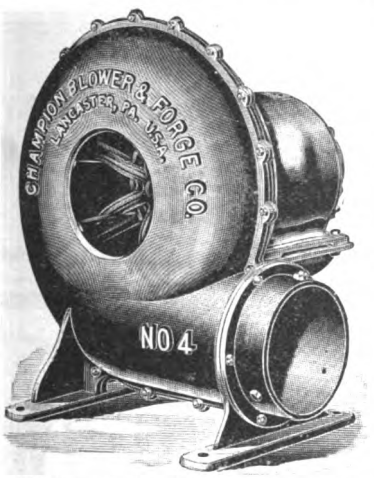
No. 1½ One-fire Variable Speed Electric Blacksmith's Blower, with six speeds, for extra heavy fires.



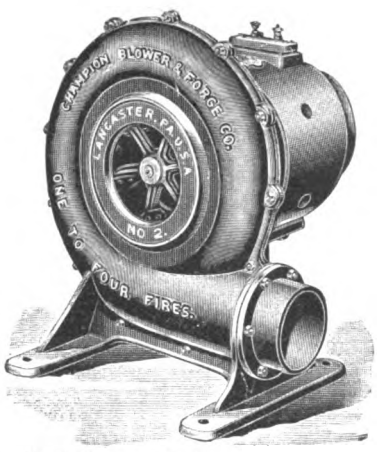
No. 50 For Regular Blacksmith Fire with Universal Motor, Detached Rheostat and Steel Pressure Case.



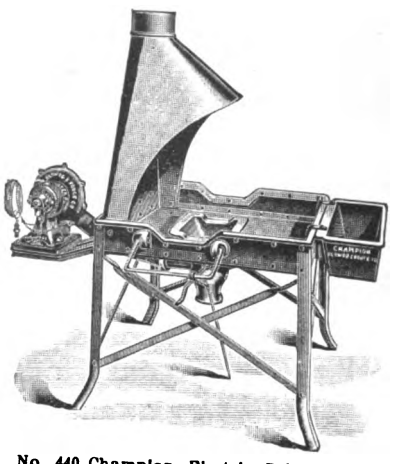
No. 1½E One-fire Variable Speed Electric Blacksmith's Blower with universal motor and detached rheostat, with six speeds, for extra heavy fires.



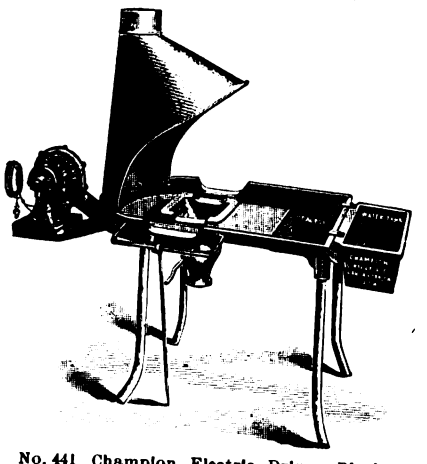
No. 4 Electric Blacksmith's Blower will blow from one to nine fires.



No. 2 Electric Blacksmith's Blower will blow from one to four fires.

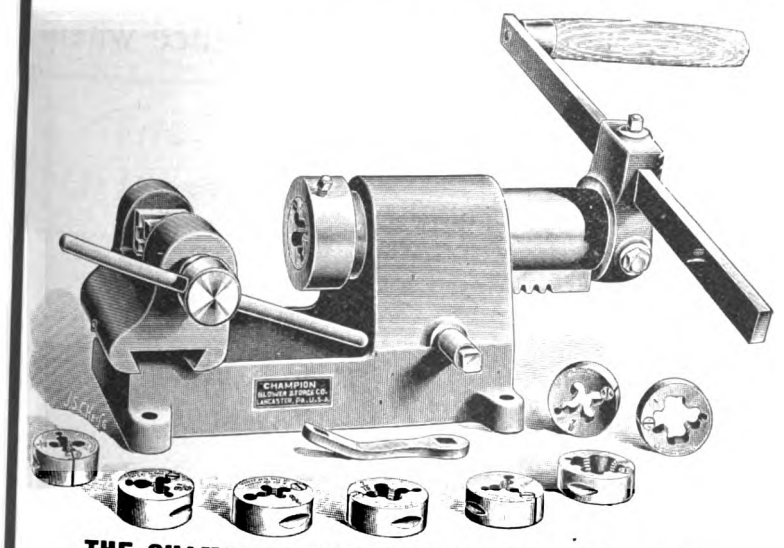


No. 440 Champion Electric Driven Blacksmith's Steel Forge.



No. 441 Champion Electric Driven Blacksmith's Cast Iron Forge.

THREE NEW CHAMPION TOOLS

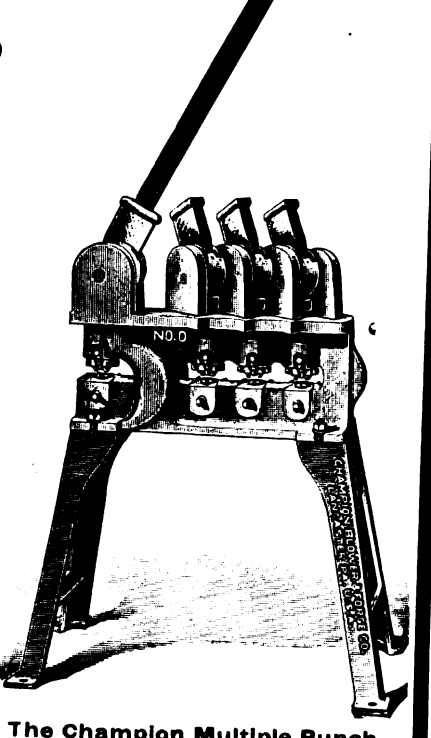


THE CHAMPION THREAD CUTTING MACHINE

Thread Cutter to do Quantity Jobs Equal to Machines Costing Ten Times the Price.

No. 1 Champion Thread-Cutting Machine with Dies Only cutting ¼, 5/16, ⅜, 7/16, ½, ⅝ and ¾ inch. Weight 40 pounds.
No. 2 Champion Thread-Cutting Machine with Dies Only cutting ¼, 5/16, ⅜, 7/16, ½, ⅝, ¾, ⅞ and 1 inch. Weight 45 pounds.
No. 3 Champion Thread-Cutting Machine with Dies, Taps and Tap Chuck, complete-cutting ¼, 5/16, ⅜, 7/16, ½, ⅝ and ¾ inch. Weight 45 pounds.
No. 4 Champion Thread-Cutting Machine with Dies, Taps and with two Tap Chucks, complete, cutting ¼, 5/16, ⅜, 7/16, ½, ⅝, ¾, ⅞ and 1 inch. Weight 55 pounds.

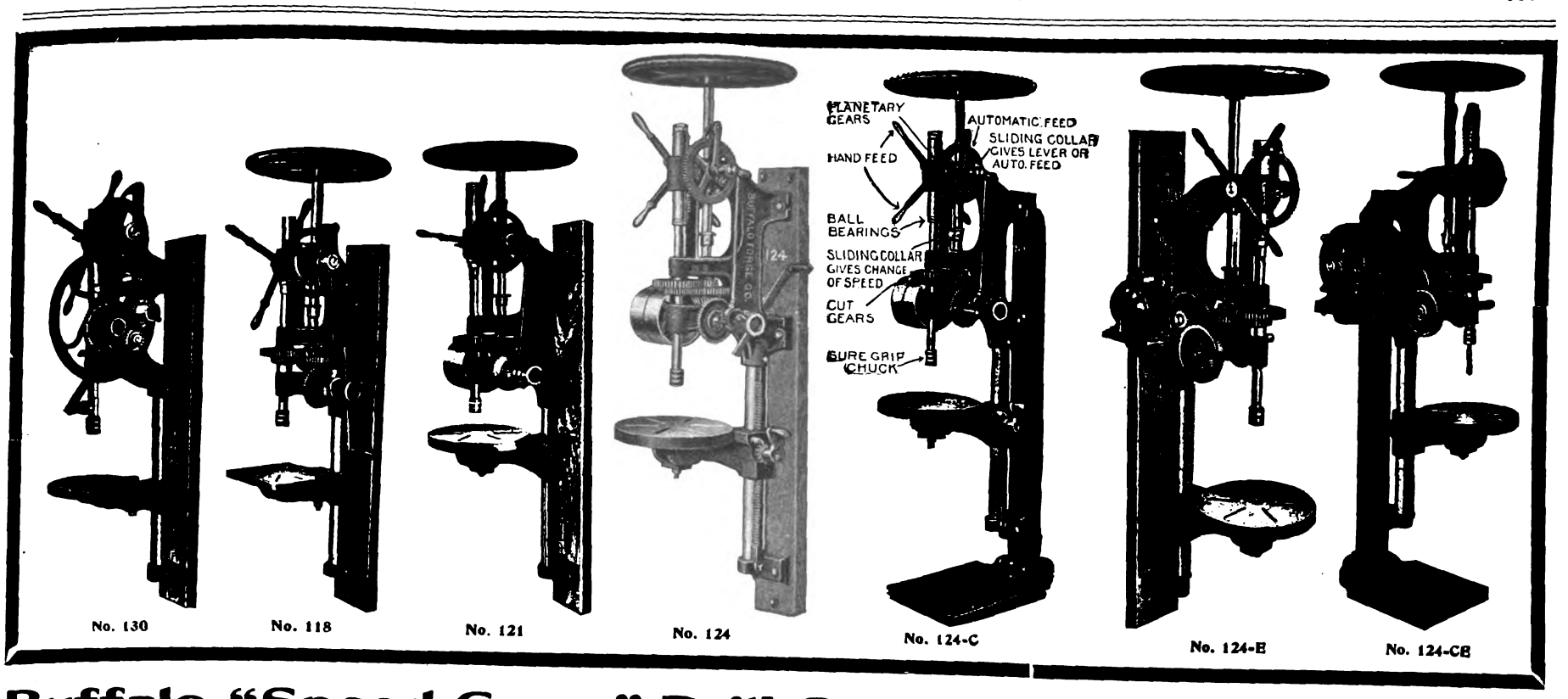
No. 5. Champion American Tire and Axle Shrinker.
HAS TWO SHRINKING LEVERS.
1st Lever for Light Tires, 2nd Lever DOUBLE COMPOUND.



The Champion Multiple Punch.
Regularly furnished with ¼, 5/16, ⅜, and ½ inch Dies and Punch. Maximum capacity ⅝x½ inch.

Our 1913 catalogue can be had upon application, showing the very latest and greatest inventions in the Blacksmith Line in the world on Blowers, Forges, Drilling Machines, Tire Benders, Tire Shrinkers, Screw Plates, Power Blowers, Power Hammers, Punches and Shears, etc. It will pay you to see our new catalogue.

THE CHAMPION BLOWER & FORGE COMPANY, LANCASTER, PA., U. S. A.



Buffalo "Speed-Cross" Drill Series

The Culmination of Drill Perfection.

The "Speed Cross" is the most extraordinary series of drill values as yet brought to notice of blacksmith drill users.

We have put into these drills an amount of thought, experience and persistent effort rarely bestowed on the production of blacksmith drills. We have gone into the matter of scientific shop management, involving MEN as well as LARGE—CAPACITY, TIME ECONOMIZING machine tools extensively and with thoroughness, in a determination to achieve **uniformity** and the **highest accuracy** in the **cutting** and **fitting** of gears and racks, the turning and finishing of spindles and shafts, the **testing** of castings, the **inspection** of all parts before and after assembly.

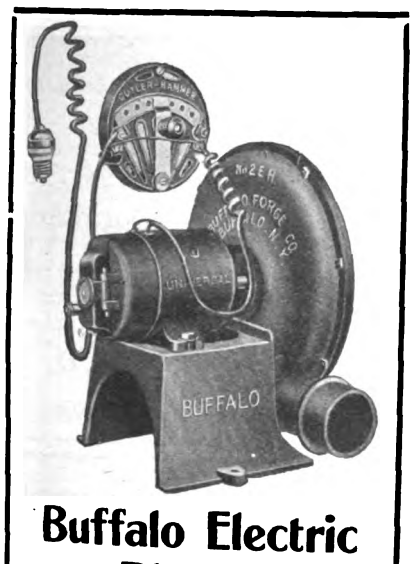
Thus we have produced a **Real Drill,** in keeping with the best modern machine shop standards, placing it before the progressive blacksmith, ever alert to improvements in tools and equipment, **at a price** beyond the reach of competition.

We were enabled through **simplification of design** and **standardization of methods,** to effect surprising economies in the shop cost. Quantity output was the **first requirement,** satisfactorily settled by our adopted policy of creating a **LEADERSHIP** in drills.

Common to all of these drills is the **multi-compound four-arm lever feed,** the hub of which is geared to a machine—cut broad rack keyed to the feed head. This gives a most **powerful leverage for fast boring** in wood, **reaming** and **drilling** holes in steel of small and medium size. For the largest holes is used Planetary-geared **Automatic feed** with three speed changes, change of feed being effected by a simple **Sliding Collar** on cross-pin. Nos. 116, 118, 121, 124 and 124-C have **machine-cut gears and racks.** All have **ball bearings** at top of spindle and "**Sure-grip**" chuck. The prices will interest you. Write us for full particulars.

Buffalo "Speed Cross" Electric Drills

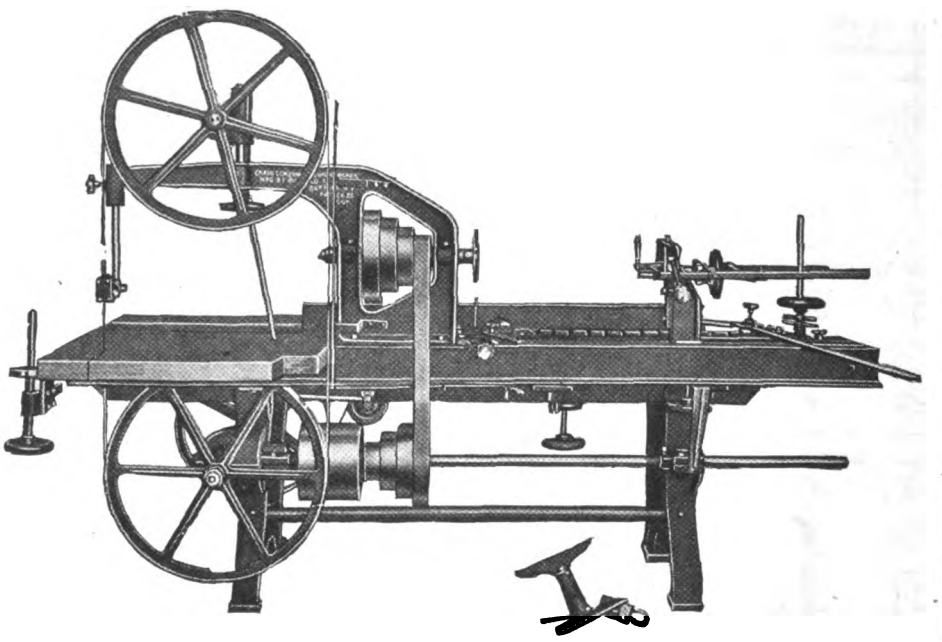
The above are the two largest and finest "Speed Cross" drills equipped with **electric motor drive,** connected by reducing gears, machine-cut, silent and smooth running. Motors of ⅛, ¼ and ½ H. P. capacity can be furnished, according to the drilling capacity desired. Both **feed** and **speed** are changed in a second by convenient **Sliding Collar,** an exclusive Buffalo feature. The key of the collar is provided with a spring, so that it will **slide at any point** and **seat itself automatically.** The table is raised and lowered by means of rack.



Buffalo Electric Blower

The largest and most powerful one-fire electric blower on the market, being **fully 15" high,** and furnishing **twice as much blast** per revolution of fan as the usual 10-inch one-fire blowers. **Compare the size! One** Buffalo Blower has repeatedly been known to do the work of **two** other blowers. It does with **ease** and **minimum power consumption,** what other blowers do only at a **great strain,** and it therefore **lasts longer** and never causes trouble.

The leading hardware jobbers now recognize the "Buffalo" as the standard, and will usually furnish it on their regular terms to you. If not, write us, and we will arrange it for you.



Crain Combination Woodworker

Besides the large capacity, conveniently arranged and easily operated **Band Saw, Circular Saw, Planer and Lathe,** this machine posseses features of peculiar interest to blacksmiths, being the invention of Mr. Crain, a practical wagonmaker, for 25 years prominent in his trade. Its facilities for **wagon manufacturing** in general and for **drilling tire on wheels, equalizing and tenoning spokes, rounding and boring rim of wheel,** etc., in particular, are illustrated in our woodworker catalog, which we will be glad to send you. This machine has the unqualified endorsement of every smith who is using it, and is in itself a complete little woodworking power shop. Can be driven by belt from electric motor or gasoline engine.

Buffalo No. 200 Silent Blower

Did you stop to think why it is that the standard "Buffalo" No. 200 is now made with **14" fan,** while other blowers are usually sold with 12-inch fans? The explanation is: The superior gearing of the "Buffalo" makes the operation of the 14" fan **as easy** as 12" fans in other blowers. You get **22% more blast** from the "Buffalo" and save a corresponding amount of **time** and **hard work** on every heat.

Ask for circular, "*The Meaning of a 14-inch Blower.*"

Buffalo Forge Company

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THE

BLACKSMITH AND WHEELWRIGHT

Vol. LXVII. No. 4. NEW YORK, APRIL, 1913. TERMS: ONE DOLLAR A YEAR

MOTOR WAGON BODIES.

Several Styles for Both Gasoline and Electric Chasses, and of Varying Dimensions.

BY WAGON MAKER.

Wagons driven by electric motors differ only in the under parts, or running gear, when compared with the gasoline car. The bodies are generally identical. But the front part of the body must be made to suit the chassis which can be best observed on Fig. 1. On this body, there is a round cornered iron dash which shows that the body is built to be driven by electric motors, on which the frame is generally made to suit the length of body, while the gasoline frames have fixed dimensions, and if the body is too long, or the frame too short for the body, the overhang is resorted to, which is very seldom seen on electric driven cars.

The lengths of bodies are generally taken from the rear of the driving seat to the rear end of the body and the dimensions are from 5 to 16 feet. The 5 and 6 feet length is the 600, 800, or 1,000 pound light delivery wagon, but the increased length does not always signify greater capacity, as the bulk of the load differs considerably in size, but nevertheless the length of bodies is generally increased one foot, up to 16 feet. This length is generally used on furniture vans on which the driving seat is on the inside. This rule holds also good across the body and the dimensions are taken between and is called the loading space. These spaces start from 3 feet 6 inches up to 6 feet, depending on the required space, same as the length of the body, and the weight to be carried is as much as 10,000 pounds, but in exceptional cases a great deal more is carried.

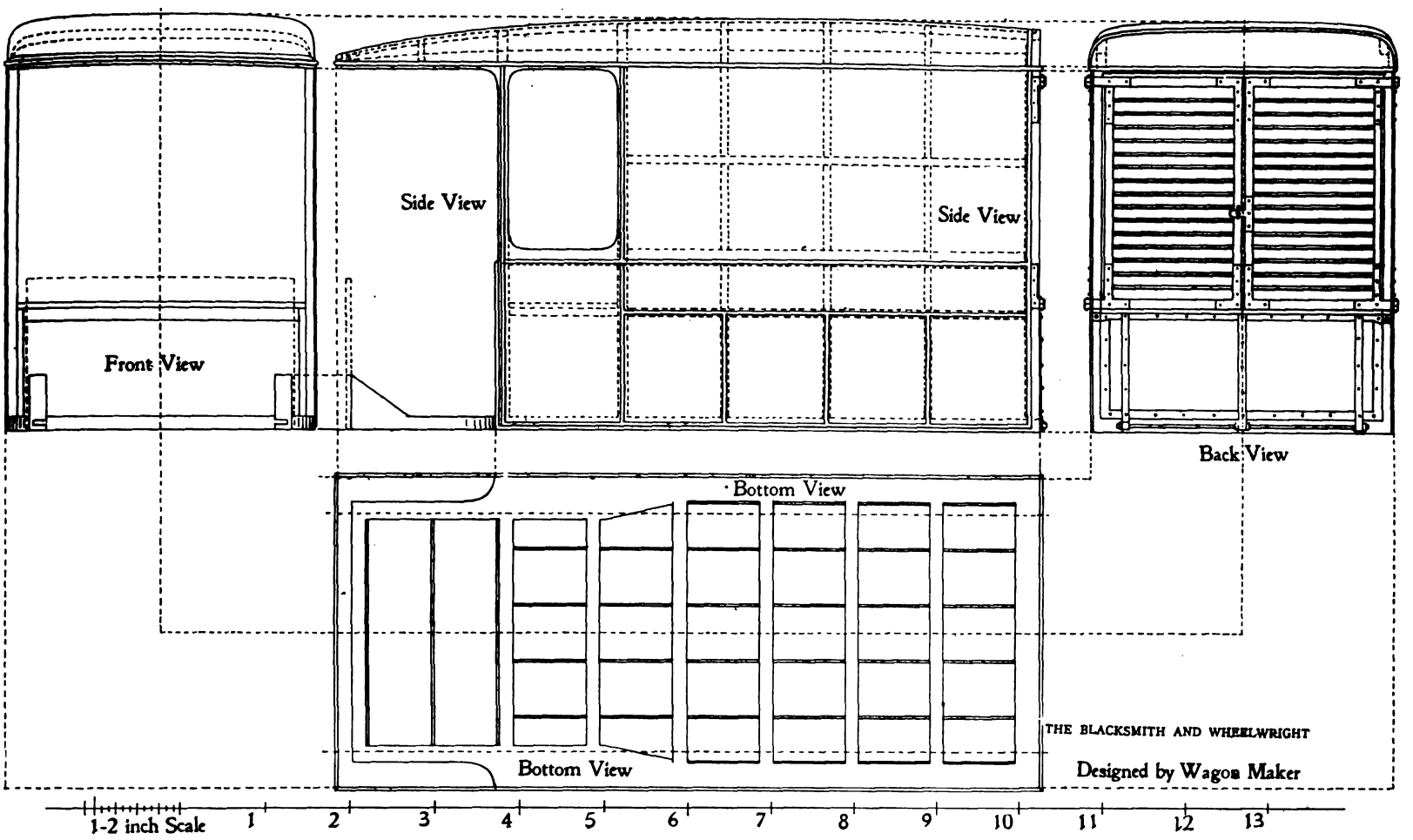


Fig. 1.—Light delivery wagon body resting on frame, fitted with electric power. Note cut-out for towing front wheels.

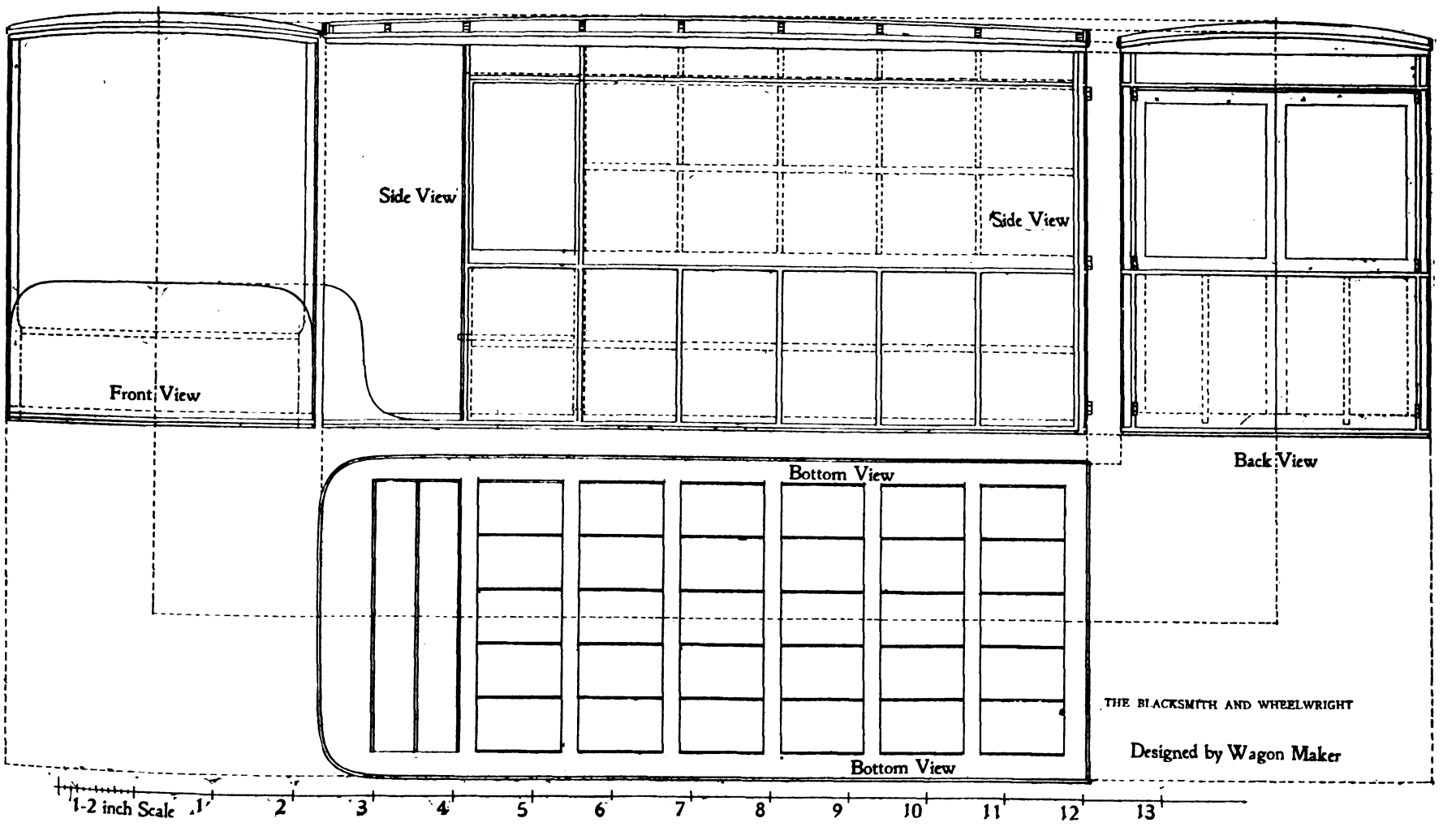


Fig. 2.—Store delivery wagon body, resting on a frame, fitted with electric power.

If the length of the loading space is 6 feet and the wheelbase 7 feet, the wheelbase can be lengthened 6 inches for each 100 pounds for each foot

length of the body, the wheelbase for a 15 foot body can be 11 feet. These are very good proportions to go by. This can be best seen by drawing the different lengths of body, and the wheels under it. By this method the weights for each can be tabulated to suit the proportional lengths.

There is a great diversity of opinion and practice in placing the wheels under the body. On many of them the wagon maker's practice has been carried out and this is generally the case on electric driven wagons, but many frames on gasoline machines are entirely too short, the entire load being carried on the rear wheels. For this reason those who have the seat above the engine are the ones best fitted for business wagons. The length of this body, Fig. 1, outside of corner posts is 6 feet 6 inches; deduct 15 inches from this length for the seat space there will be left, 5 feet 3 inches' loading space, without deducting the thickness of the gate. The width across inside, that is the loading space, is 41 inches.

Suppose this body with a length from dash to rear end of 8 feet 3 inches would be fitted to a Maxwell A A runabout, which has a length from dash to rear end of 5 feet 9 inches, the body would have an overhang of 18 inches which is about the limit or should be the limit for appearance and practical reasons. The practice of using somewhat worn runabout or touring car chassis for delivery wagon use, has become one of the best assets the wagon builders have been driven into, not of their own choice but of necessity to fill up the gap which has been created by the loss of horse delivery. There is so little difference in the construction of such motor bodies when compared with horse drawn, it is a wonder why the wagon builders do not try harder to obtain the orders for fitting new bodies and repair the old ones, which is all in their line, but it must be built to suit the owner and be satisfactory when finished, and also when in use. Motor bodies wear out sooner than horse drawn bodies, because they run faster, they are used more and longer, and are overloaded, which is more damaging than any other cause. For this reason the bodies must be built better and the very best material must be used if they wear as well as horse drawn.

As the body rests on the chassis the sills should be a trifle heavier than on horse drawn bodies. For 500 to 600 pounds carrying capacity, the sills should not be less than 1⅜x3 inches and the cross bars 1⅜x2½ inches, and for 1,000 pounds 1½x3¼ inches. The cross bars should be 1½x2¾ inches.

The sizes of the two front posts depend on the various constructions. If made with glass frames to drop, they must be made heavier; if not, 1¼ or 1⅜ inches square is sufficient. For framing the posts into the sills the lapping is preferable, because the lap can be made ⅝ inch thick, leaving a shoulder of ¼ inch for the ⅞ inch thick posts. If well fitted and screwed, it will make a strong job. The rails for a light job are ½x1¼ inches, but for a heavier one, ⅝x1⅜ inch rail should be used, except the center rail which is 2¾ inches by ⅝ inches thick. All posts are lapped into the top rail ¼ inch. If the top rail is ⅞ inch thick and when the panel laps over the top rail. If the panel is fitted into the groove, forming a molding on the outside ¼ inch thick, the thickness of the top rail should be one inch. If built up panels are used less than ⅜ inch thick the posts should be 10 or 12 inches apart, as the panels are liable to sink in between the posts and rails. This holds good on top boards; but as the top is curved from both sides, the liability of sinking is not so great.

The upper part on the rear is paneled, and below are two doors, hinged to the corner pillars and locked in the center. The upper and lower bars are lapped while the center bar has tenons. If lapped the side pieces are liable to turn out of the straight line.

Fig. 2 is a longer and wider body and is different from Fig. 1, which has a cut-out in front for the front wheels to turn into, while Fig. 2 body is suspended higher, for the wheels to turn under the sills. In such a case the body must be at least 4 inches above the tires. If the tires have a diameter of 32 inches, the body must be 36 inches from the floor.

If the chassis is lower, which is generally the case on gasoline machines the difference in height is made up in cross bars. If the body is narrow across and if there is sufficient space for the wheels to turn without striking the body, its height from the base is optional.

This body is 9 feet 9 inches long, and 4 feet wide or a loading space of 3 feet 9 inches across and 6 feet 6 inches lengthwise. Its entire height is 5 feet 3 inches. The length outside of corner posts is 8 feet. The side window space is 16x25½ inches and made with or without glass frames to drop. On the better grades they are invariably made with frames to drop and lined on the inside to cover the frame and glass to keep it from breaking. There are seven posts in all on each side, and all of them have different sizes. The front cover posts when made with glass frames to drop are 1½x2 inches, tapered somewhat toward the top, starting from fence rail. If built without glass frames, the posts are same as indicated on front view. The rear window posts when made with window to drop are the same as the front ones, but when built without the frames to drop they are either 1⅜ or 1½ inches square from top to bottom. The eight center posts, four on each side, are dressed either ⅞ or 1 inch square. When eight posts, four on each side, for the length of body are used, they will be 15 inches apart, which is about the right distance when covered with ⅜ inch thick poplar panels, but when covered with built-up panels they should be as close as 12 inches, but the posts are made ⅞ inch square. The top rails are 1¼ inch square and the panels rest in the groove. To cover the side surfaces five different panels are used for each side. The lower and upper two panels of the same width are joined and glued together, before they are put in its place. By doing this the joints can be glued and clamped when on the threstles, and when well fitted, glued and clamped make the best possible joints. These joints rest always on the rails and are well glued to it. To do this

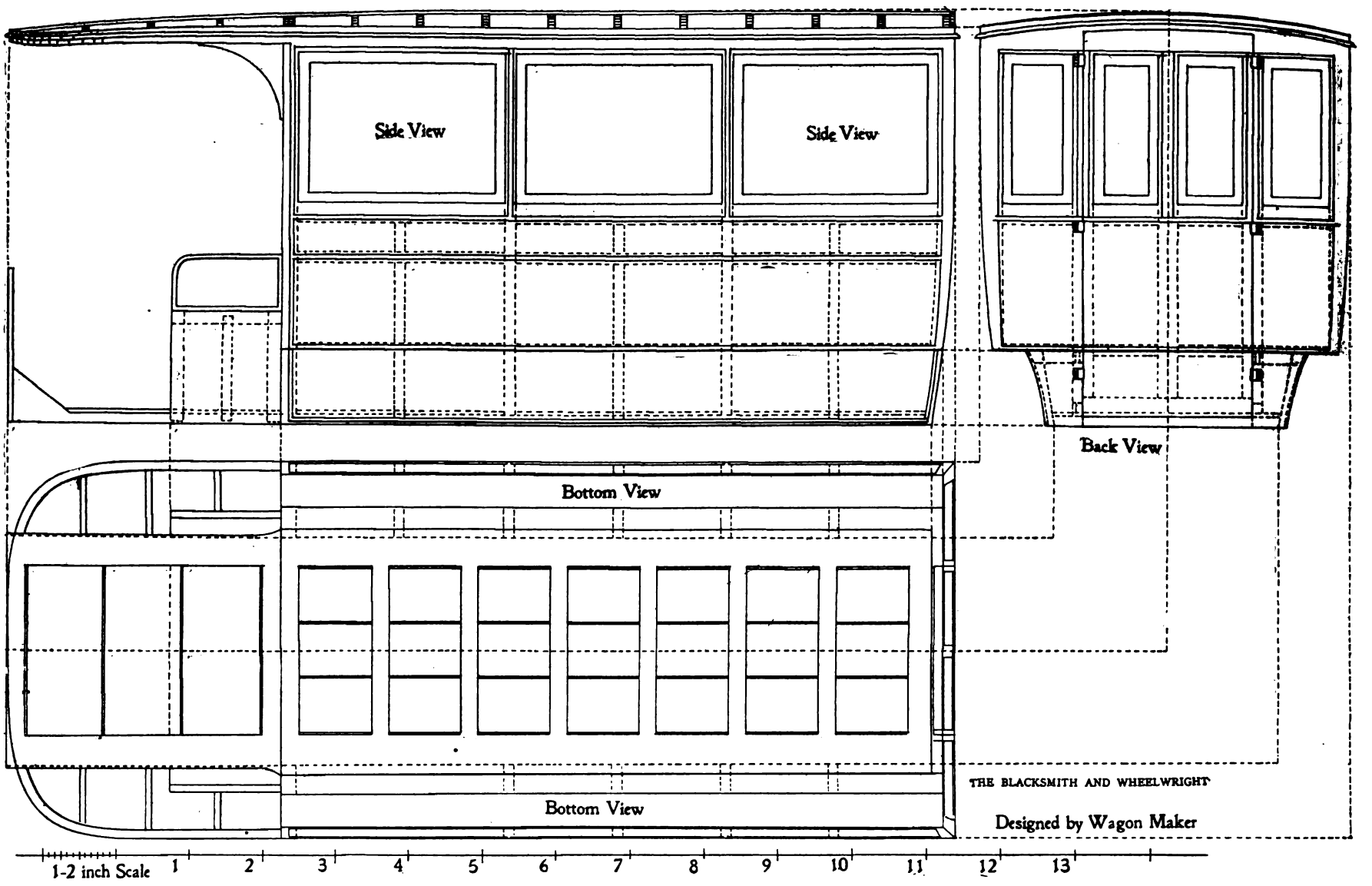
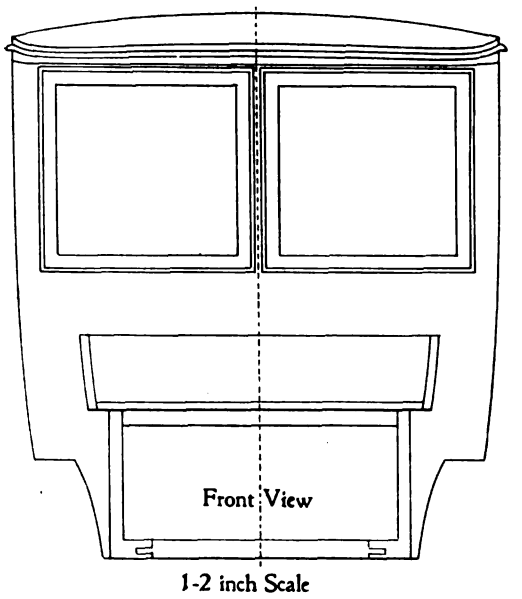


Fig. 3.—Fourteen-passenger omnibus body, including the chauffeur, fitted to a gasoline chassis.



Front view of omnibus body with two glass frames to drop, with room for chauffeur and one passenger.

take a poplar or ash strip ⅜x1½ inches, put in nails every 6 inches apart to have all prepared before gluing. When the panel is put on with glue between the joint, the strip is put on the joint and all the nails driven through the panel and rail back of it. When dry the strip and nails are removed. Wire nails with large heads are used for this purpose to form the panel against the rail. The sills on this body are 1½x3½ inches, the center cross bars 1½x2½ inches, 15 inches apart center to center and end cross bars 2 inches thick. The bottom boards are ⅝ inch thick. The ⅛ inch difference in thickness is tapered level with the cross bars. The rear end has two doors, hinged to the corner posts and locked in the center.

Fig. 3 is a complete working draft car carrying fourteen passengers, including the chauffeur. The side surfaces of body have 2 inches turn under and 5½ inches recess on each side, 12 inches above the bottom sill line. This will give plenty of room for the rear tires with a 4-foot 8-inch track, center to center. The length of body is 9 feet 2½ inches outside of corner posts, and 12 feet 10½ inches over all; making the front seat, which can be separated from the body, 3 feet 9 inches long. The width across is 60 inches outside of posts, 56 inches, minus the amount of turn under on base of posts; 49 inches on rear, and 39 inches across the sills on moldings.

The size of sills is 1½x5½ inches. Another sill is fitted edgeways to top of main sills 1⅝x2 inches; 1⅝ inch is the thickness of the hinge pillars and the 1⅝x2 inch extra sills are fitted directly into the posts with a tenon as shown by dotted lines on back view. There is another rail, one on each side frame, also into the hinge door pillars directly under the seat board, and two parts between upper seat rail and lower extra sills on each side. This kind of construction helps carrying the weight and gives stability to the body.

The chassis to which this body is fitted is 36 inches across and is indicated by dotted lines showing that the body on sills has a recess of 1¾ inches on each side, therefore the sills can be bolted to the chassis on any place without any interference with the posts. This design may be too short or too long as the case may be. If too long put the back part forward as much as needed and divide the two center posts in equal parts. If too short add to the length and add also a center post, making three instead of two and again divide in equal parts.

The door is made in two parts and the door space is 27 inches between posts, with lock in the center. They are also made with hinges to the right, also hinges at center and lock on the left, but in both cases the door space is 3 inches wider than when one single door is used.

WEIGHT OF WOOD.

Cottonwood Lightest and Shagbark Hickory Heaviest if Absolutely Dry.

From Hardwood Record—It is a surprising fact that a great many men who are continually engaged in the wood and woodworking business have very little idea of what a thousand feet of any specific kind of lumber would weigh, or what would be the weight of a carload of such lumber.

The actual weight of wood—the real wood substance, with all air, water and other foreign matter excluded—is as constant as the weight of iron, lead or any other metal. If we could get down to actual wood, and deal only with that, there would be no disagreements over weight, for so many cubic feet would always weigh so much, never more, never less.

Ordinary wood, as everybody knows, is made up of cells, tubes, fibres and the like, most of them too small to be seen except with a microscope. The mass may be compared to a wasps' nest, but it is more complex than a wasps' nest. The cells and tubes form an intricate mass, complicated in the extreme. To the naked eye it looks like a solid body, but it is far otherwise. In some woods, as oak and chestnut, some of the pores are large enough to be seen without a glass, but the real cells are very much smaller.

If a piece of wood could be compressed until all water, air, etc., were expelled it would practically be a solid substance. What would it weigh per cubic foot? In round numbers it would weigh just one hundred pounds. A cubic foot of it would weigh just the same whether it were white pine or iron-wood. Therefore, all real wood substances are the same, and, bulk for bulk, weigh the same. A thousand board feet of pure wood fibre (a thing impossible to get) would weigh about 8,333 pounds.

Yet small pieces of practically pure wood are not hard to obtain, with proper apparatus. Wood cells are nearly pure wood substances after air and water are gotten rid of. They sink in water. They are exceedingly small and are generally invisible, except with a microscope.

Green lumber weighs more than dry because the cavities in the wood contain more water. When seasoning begins, some of the water passes out, and either air takes its place, or the wood shrinks to close the cavities that are emptied of water. The more water gotten rid of, the lighter the lumber.

A thousand feet of green lumber may contain 2,000 pounds of water, and even the best air-dried lumber has more than ten per cent. of its original water in its fibres.

No dry-kiln can drive all the water out of wood without heating it sufficiently to destroy the fibre—make charcoal of it. Therefore there is no such thing in practice as absolutely dry wood. We will give a list of several important hardwoods with figures showing the weights per thousand board feet, if the lumber were absolutely dry.

Cottonwood	2,020 pounds
Yellow Poplar	2,187 pounds
Basswood	2,350 pounds
Tupelo	2,697 pounds
Soft Maple	2,737 pounds
Sycamore	2,940 pounds
Cherry	3,023 pounds
Red Gum	3,070 pounds
Black Walnut	3,176 pounds
White or Grey Elm	3,379 pounds
Red Oak	3,396 pounds
White Ash	3,397 pounds
Beech	3,574 pounds
Sugar Maple	3,590 pounds
Cork or Rock Elm	3,771 pounds
White Oak	3,862 pounds
Sweet Birch	3,956 pounds
Locust	3,800 pounds
Persimmon	4,107 pounds
Shagbark Hickory	4,347 pounds

These weights are only given for approximations in order that it may be possible to calculate the freightage on lumber received. The variations in weight are due to the fact that some woods are more absorbent than others. If wood were absolutely pure, dry fibre it would be commercially useless as its tensile strength would be gone.

North Dakota Lien Law.

A bill is under consideration in the legislature of North Dakota to amend the law of 1907 relating to a lien for repairs upon personal property. The amendment is as follows:

"Any blacksmith or machinist having an established place of business within the State who makes, alters, repairs or who does any blacksmith, wood work or machine work whatever upon any personal property at the request of the owner or legal possessor of the property, shall have a lien upon the same for his reasonable charges for work done and materials furnished, until the charges are paid, and said lien shall have priority over all other liens, chattel mortgages or incumbrances against said personal property; provided, however, that any person entitled to a lien, under this section, shall, within thirty days after materials are furnished or labor performed upon such personal property, file in the office of the register of deeds of the county a statement in writing, verified by oath, showing the labor performed or materials furnished, the price agreed on for the same, if no price is agreed, then state the reasonable value thereof, the name of the person for whom the work or labor was performed, or to whom materials were furnished, or both, and descriptions of the property, upon which the lien was claimed; provided, that when the person retains possession of this property so altered or repaired no statement is required to be filed as above provided; provided, that if any person makes, alters or repairs more than one article of personal property for the same owner or legal possessor thereof, he may include all such articles of personal property so made, altered or repaired, within thirty days preceding the filing thereof, in the same statement, and the statement so made shall have the same force and effect as to each article enumerated therein as though a separate statement had been filed for each of said articles so made, altered or repaired. Unless the person entitled to said lien shall file such statement within the time aforesaid, he shall be deemed to have waived his right thereto; provided, further, that the person holding such lien on property that has been previously encumbered by mortgage, before the foreclosure of same, shall give to the record holder of such mortgage twenty days' notice in writing of his intention to foreclose said lien before beginning action or proceedings for foreclosure of the same, which notice may be served by sending same in a registered letter, addressed to such lienholder at his last known post office address; and provided, further, that the holder of any mortgage against property on which the lien herein provided for shall have been filed, may at any time previous to sale, pay off the amount due on such lien, the holder thereof shall assign the same to such person and thereafter he shall be entitled to all the rights that the person filing said lien would have been had the same not been paid."

OXY-ACETYLENE WELDING.

How to Use the Machine After It Has Been Made by the Repair Man.

From J. N. Bagley, Nebraska.—In our last article we told how to make an acetylene welding machine up to charging the oxygen tank and starting the torch for the first time. Before going farther we will prepare to charge the oxygen tank. As to the acetylene tank we will consider a storage tank, or the carbolite tank as mentioned in the last article.

As to the chemicals used to manufacture the oxygen it will be best to buy them from some

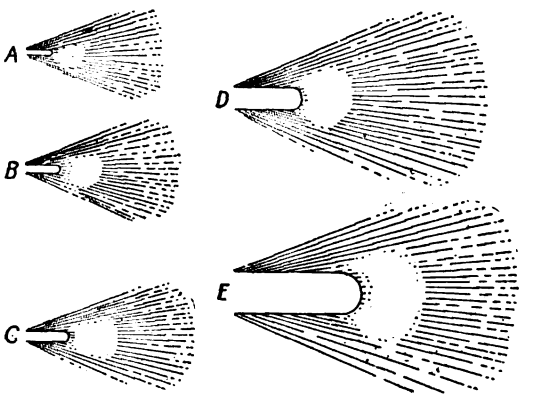


Fig. 1.

supply house for the local druggist will ask a price that one cannot afford to pay. The chlorate of potassium comes in one hundred pound kegs and costs from 12 to 14 cents, depending on the house you buy of. In some instances I have had the druggist ask me 50 cents per pound for this. The manganese dioxide is considerably cheaper, costing from 5 to 7 cents per pound. The oxygen is prepared by mixing one pound of the manganese of dioxide with seven pounds of the chlorate of potassium. After thoroughly mixing these two chemicals they should be placed in the generator and the cap screwed on secure. Next in order will be the mixture for purifying the oxygen as it is given off from the generator. This is brought about by passing it through a solution of caustic soda and water which is placed in the small filter tank. One ounce of the caustic soda to one gallon of water (soft preferred) is sufficient to free the gas of the impurities that it contains as it is given off in the generator.

Next in order will be the torches under the generator, which should be started burning. As soon as the gas starts to generate it can be heard bubbling up through the water in the small tank. This will continue so long as the chemicals in the generator are giving off oxygen gas. When this ceases the torches should be turned out and the valve closed between the small tank and the storage tank and the gas is ready for use.

Seven pounds of the chlorate of potassium and one pound of the manganese dioxide will generate in a thirty-gallon boiler of about one hundred pounds of the pure oxygen, and this amount of oxygen will do a great deal of welding after the operator has had a little experience, as in learning to operate the machine considerable gas is wasted in experiment that will be saved later on.

Protecting the Eyes.

Before starting the welding torch a protection for the eyes should be considered, as the light is

so intense that if some protection in the way of a colored glass be not used the practice would nearly destroy the eyesight, unless the operator had uncommon good eyes. A colored glass can be purchased from some stock house where the welding rods and chemicals are purchased. It will cost from $2 up, depending on the size of the glass and the way it is mounted. One should not start the welder, not even for a moment with the eyes unprotected. I have seen bystanders watch the welder for possibly not longer than a minute and when they turned to leave the building they could hardly find the door, especially if the room were a trifle dark.

The desire to light the torch for the first time should not result in slighting the making of the machine. I remember when making my welder I could hardly wait to assemble the last few parts to get the machine started. But there will be plenty of time to use the machine and all parts should be made the very best.

All in readiness, we will light the torch for the first time. In the first place, we should put on one of the smallest tips, one with a hole in it a little smaller than an ordinary lathing nail. Open the valve leading from the acetylene tank a trifle and light the flame. Gradually turn it on until the flame is burning about the capacity of the tip; that is, until the flame is just about ready to leave the tip. Now open the cock and let a quantity of oxygen into the torch. The flame at once begins to turn white as more oxygen is turned into the torch. Continue turning in the oxygen gas until the flame has come down to a small white tip about three-eighths of an inch in length. The tip should be just as long as possible without, however, having a tail to the little flame. If a little white tail is noticed on the flame it indicates not enough oxygen gas and the valve should be opened just enough to make a clean

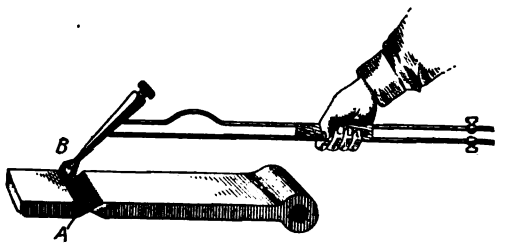


Fig 2.

cut flame. In Fig. 1 we have the shape and size of five different sized flames that are produced by five different sized tips. The larger ones are used for the heavier work. For welding little rods and very small castings tips 1 and 2 are used. For gas engine cylinders the other three, depending on the size of the cylinder.

The First Job.

We are now ready for practical work and to begin with we will try something easy, a straight casting for instance, as shown in Fig. 2. The casting was broken as shown at B. The first thing to do with any casting is to get it in shape to weld, and a great deal of success depends on the operator, as different conditions will require different operations and preparations. All straight, as well as many irregular castings, should be ground from both sides near the fracture, leaving a V shape from both sides if possible as shown at A in Fig 2. Now we are ready to apply the heat to the casting. Take a welding rod in one hand and the burning torch in the other, and turn the heat on from one place to the other along the fracture until the parts begin to get red hot. Then start at one side B and hold the flame until the parts begin to melt, at the same time holding the welding rod near enough the flame to have it quite hot. Now dip the end of the welding rod into the borax and place it directly under the flame. It will at once melt and flow like liquid. Continue this across the face of the piece, being particular to leave the built up metal a little higher than the casting itself to allow for grinding down after welding.

We have now welded one side of the casting and are ready for the other. No time should be lost, for the cooler the casting gets the more gas it takes to bring it back to a welding heat. Turn the casting and weld the bottom side as the top was welded, building up a little higher to allow material to grind off, making the surface flat and smooth as before. The corners should be well built out to allow squaring up in case they were square before. As soon as the part is welded it should cool gradually, never place in water. Many times if the metal at the weld is too hard to file it may be softened by burning sulphur on it while hot. This hardness comes from not having the mixture of gas quite correct, or crowding the weld a little too fast.

The welding rods are made of a cast composition and may be purchased of a welding supply house. Rods for all kinds of work may be purchased in different sizes, 3-16 and ¼ inch being the sizes most used for the small work. They melt easily and are easily handled. As they burn down too short to handle they should be placed in a box and the pieces welded together, or a small pair of tongs made to use up the pieces.

Our next weld, shown at B in Fig. 3, is a trifle different than the one just described, and in order to retain the same shape of the casting after welding as before, we will have to proceed

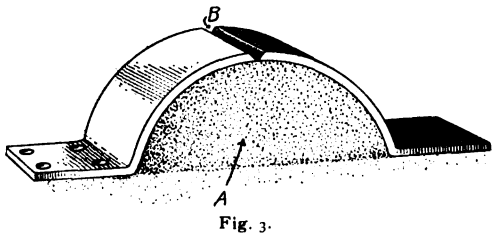


Fig. 3.

a little differently. An experienced welder would have no trouble in welding this shaped piece without getting it out of shape, but the beginner must not spoil a job, thus hurting his business at the outset, therefore in this case we will place the casting in its shape with the fracture placed close together and build under it with molding sand to hold it in shape. The molding sand is shown at A in Fig. 3. Now that we have the correct impression in the sand we will carefully lift the broken parts from the sand and grind the V notch in the fracture, as shown in Fig. 2, at B. In this case if the casting is not heavy it is best to grind the V all from the top side. After the V notch is ground it is not a bad idea to remove a bit of sand directly under the fracture, allowing the metal to pass entirely through and leaving a little metal to grind away, making both sides perfectly smooth.

A great many of the smaller castings may be held in a vise while the weld is being made, while the smaller pieces may be held in position with a small hand vise. The getting the various parts in shape and holding them cannot be described or treated in print in a lifetime, as every day something new will come up different than has come to the shop before, and for this reason the operator must have ability to figure out the best method of doing the job.

In case the casting is broken in a number of pieces it will be necessary to place the pieces together and hold them in shape with molding sand, but whatever the method of holding, the V notch must not be overlooked, as a weld that does not go entirely through will amount to but very little, as the metal will not flow through a

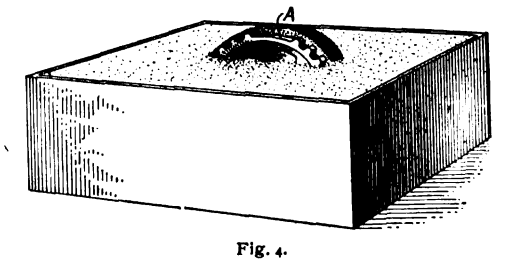


Fig. 4.

fracture like common spelter in brazing. Flat small pieces may be placed on an asbestos board while the weld is made, and the small irregular ones can be placed on molding sand placed in a box and kept in shape for the purpose.

If the casting is in such shape that it can be heated in the forge before welding it will save a great deal of gas, besides making the job easier, and can be left in the ashes to cool gradually. After making a weld always paint the job up in nice shape as it pleases the customer.

In Fig. 4 we have something entirely different than the other just mentioned and it will be treated a trifle differently. We have a small gear with a number of teeth broken out. This may at first look a little difficult, but will be just as simple as the welds just described. In the first place we will get the box of molding sand and bury the wheel all but the extreme top where the teeth are broken out, as shown in Fig. 4 at A, only leaving the sand project above the height of the teeth, and wider than the thickness of the wheel. Now with a larger tip than used on the smaller jobs this place should be welded full, leaving metal enough above the surface to allow of grinding down to correspond with the balance of the teeth.

The sides should be first ground down to the correct thickness and we are then ready to cut the teeth in the wheel. Of course, if a gear cutter or a miller is at hand this will be an easy job, but if it is to be cut by hand it will be a trifle tedious, although it can be accomplished if pains are taken to get the teeth exact. In welding spokes in small, or even large wheels, the entire wheel must be heated good and hot; that is, hot enough to "sizz" when water is dropped onto it. If it is not heated it will crack at some point about the wheel, owing to the uneven expansion and contraction.

ALL ABOUT FOOT WEAR.

Of Interest to Those Whose Shoes Hurt Their Feet and Others.

BY JAMES F. HOBART, M. E.

There is a very truthful old adage to the effect that "The shoemaker's wife and the blacksmith's horse are always ill-shod," but that saying doesn't tell a word about how the smith is shod, and that personage is often far worse off than either his horse or the shoemaker's wife! Not but what the smith's shoes may be good enough; that isn't what I mean. It is that the smith's shoes hurt his feet and he don't know it!

Seems like a pretty tough statement to say that men wear shoes which hurt their feet without knowing it, but such is the case, and I can go right out, at any time, and lay hands upon dozens of good smiths who are complaining, and who are not aware that the fault is with their shoes, and is easily remedied at that. But such, nevertheless, is the case, and I'll prove it in the following paragraphs and also show how one man at least has rid himself forever of feet troubles.

How are your feet, Mr. Reader? Do they hurt you, especially along the edges, on the outside of one or both feet, just back of the little toe? They do, eh? And what causes the trouble? "Bunions, chilblains." Bosh! You are another of the men whose shoes hurt their feet and they don't know it! Now just take off the shoe from the tenderest foot—one foot always hurts more than the other, don't it? Queer, but that's usually the way of it, and with smiths, I find it usually to be the left foot which gives the most trouble except when both feet hurt so blamed much that he can't tell which to limp with!

Now, just take off the worst hurting shoe, put a hand inside, and see if you don't find a sort of little "sidewalk" along the side of the shoe just where the hurt is the worst? Fig. 1 shows what I mean. This engraving represents a shoe which has been cut off across the instep, a little back of the ball of the foot. The "sidewalk" is shown at A, and some things which cause this trouble are also shown as denoted by the other reference letters.

The high place, A, is what hurts, and the way to cure the trouble is to find why the high place exists and then "abate the nuisance." When the shoe was made the upper leather was brought around the last and tacked to the inner sole, A G B, and is one piece, although shown broken in Fig. 1, in order better to illustrate where the "hurt" comes from. When the outer sole D was put in place there would be a cavity between B D and C H, where the upper leather—the "vamp" they call it—stood away from the soles a distance equal to the thickness of the vamp.

When shoes were built "like grandfather used to make," this cavity was filled with good honest leather and the smith's shoes never hurt him as they do now. But pretty soon they found leather too good for filling and put in skivings from the sole leather. This was bad enough, the insole settled down a little as the skivings packed under foot pressure, and shoes didn't feel as easy as they used to.

But pretty soon they couldn't even afford skivings to fill cavity E with, so somebody—a fiendish chap he must have been, too—patented a ground cork filling which is to-day used in very many makes of shoes. No sooner was cork used and soft ground cork at that, than the misery of the writer and of other smiths began at once.

In a few days, after but little wear, especially after the shoes had been dampened, the cork flattens right down where the greatest pressure comes, the inner sole is pushed down as shown at G, while the outer edge remains in place as at

A, and forms one of the ridges or "sidewalks" which tortures so many feet.

The writer, after suffering for years with tender feet, finally stumbled upon the fact that his shoes had a "sidewalk" in them which did all the torture work. An old shoe was ripped in two on a circular saw, and the cause of the trouble was revealed, as described above. The next thing was to cure the trouble, and this was accomplished by ripping off the soles, scraping out the remains of the ground cork and then fitting good solid leather into the cavity E between the soles and the edges of the vamp.

The above treatment proved a complete cure, and how good it did feel to have feet again which did not hurt all the time, and more! But how those shoes did squeak! Not a move could be made, or a step taken, without advertising the fact to everybody within gunshot. Why, even

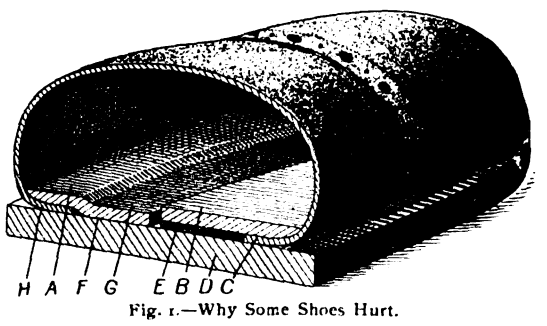


Fig. 1.—Why Some Shoes Hurt.

the minister stopped his sermon and looked to see whether the Salvation Army or Coxey's Battalion had invaded his church, when a pair of those shoes came into church late and squeaked down the aisle! But I soon learned to prevent the squeak. A little talcum powder, or pulverized chalk scraped off a bit of carpenter's chalk cured the squeak completely.

But it always jarred a fellow to take a brand new pair of shoes to the cobbler and see those fine new soles ripped off and the shoes made into old ones before they had been worn a dozen times. So I hit upon the schemes shown by Figs. 2 and 3. Fig. 2 shows the method once employed whenever the new shoes chanced to be a little too large, and contained room enough inside to admit of this method being used. An inner sole, I, Fig. 2, was cut out to fit the inside of the shoe. A very good way of getting a fit is to put a piece of stout paper inside the shoe. Crease the paper all around at the outer edge of the inner sole, using the finger or the finger-nail to rub down the paper along the edge of the inner sole. If this job is carefully done a perfect pattern of the inner sole will be obtained when the paper is trimmed off along the creased line above described.

Next, cut out the inner sole, using the paper pattern, which may be used for both shoes by simply turning the paper pattern t'other side up. Fit the inner soles with the hair side of the leather next to the foot. That side is the smoothest and the best for that purpose. Mark and cut the inner sole away to fit the "sidewalks" J and K, leaving the leather full thickness in the middle at I, and cutting channels for J and K of exactly the right thickness so the top side of the inner sole will be flat and smooth after it has

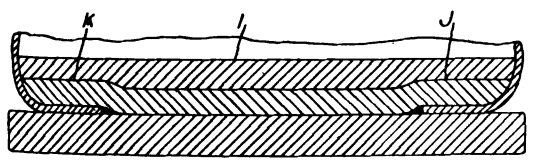


Fig 2.—Curing the Hurt.

been fitted inside the shoe. Trouble will be met with in getting the channels of exactly the right width. If they are cut too narrow, the shoulder will ride on top of the "sidewalk" and the foot will feel as if a terrible corn existed just under where the leather lapped too soon. But if the channel is cut too wide the inner sole will sink down at that point, after a little wear, and there will soon develop a nasty groove in the top of the inner sole, a groove which will give trouble and the edges thereof will hurt the smith's foot. Better cut the channels a little too narrow than too wide, and fit them a little after it is found, as soon will become apparent where further cutting is necessary.

The third method of building up the inside of a shoe is shown by Fig. 3, and it is about the same as the method illustrated by Fig. 2, except that the new piece of leather is placed outside the shoe and becomes a tap-sole instead of an insole. It is much easier to fit on piece L, Fig. 3, than it is to fit in the inner sole I, Fig. 2. The writer now uses the latter method, shown by Fig. 3, altogether, and when purchasing a new pair of shoes, those are selected which have a rather thin sole. Thus the placing of the tap sole outside will not make the whole sole too thick or cumbersome.

The manner of fitting piece L, Fig. 3, over the "sidewalks" is plainly shown in Fig. 3, but if the job is done while the shoes are new it is hard to tell just where the edges of the "sidewalks" are located, therefore it is better to wear the new shoes a few days until the leather flattens down, the cork filling becomes compressed, and the "sidewalks" reveal themselves as at A, in Fig. 1.

As long as the shoes don't hurt, why, wear them, by all means, but when the edge of your foot begins to sting and you wonder what is the matter with your feet, then get busy, slap on a pair of leveling tap soles and your feet will feel easy again as if by magic.

Fig. 4 shows the manner in which a tap sole has usually to be cut, in order to level up the insole properly. The leather is left full thickness at O, over a space corresponding to the cavity filled with cork, between the soles and the edges of the vamp. The sole should be trimmed down at toe and instep, for if the leather is left full thickness at these joints, the job will sure be a bungling one. The writer cuts down at P and Q, a distance equal to thickness of vamp or shoe-upper, then trims the entire edge of the sole to the same thickness. This makes a fine looking job.

Sometimes, when available leather is too thin, the portion O may be built up either from a single piece of leather, of several thin pieces, or on one occasion, a piece of wood was used with excellent results. Thick felt is a first class material for packing the soles, but if you are doing a job which must go until worn out without

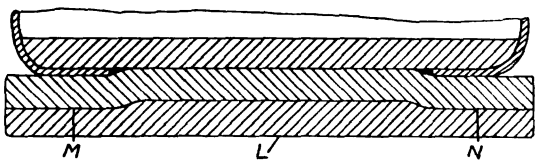


Fig. 3.—The Latest Cure.

further tinkering, then make the filling of solid leather.

The packing, O, Fig. 4, made separately, is preferable to packing cut upon the tap-sole as shown in that illustration, for the reason that with the separate packing a new tap sole may be quickly fitted at any time, using the same packing or filling, whereas, when the packing is cut from the tap sole, then the work of cutting and fitting new packing must be done all over again. But no matter whether a detachable or solid packing is used, or whether it be made of one thickness or half a dozen, be very sure to place talcum powder between each two layers which come in contact with each other. By so doing you will get rid of the squeak which otherwise will be unbearable, as two pieces of leather cannot slide or rub over each other without telling their troubles.

The next thing is the fastening of the tap soles to the shoes. I have tried all ways, nailing, sewing, cable-screw wire, pegging and cementing, but the way which suits me best, and the one I have used for the past ten years, is illustrated by Fig. 5, and consists of screwing on the half soles with small flat-head brass screws. In the estimation of the writer this beats all other methods a mile. The taps can be put on easily, taken off easily and quickly, and without tearing or straining the leather or getting the shoe out of shape. And if the equalizing taps are put on before the corners of the sole have become worn appreciably, then just as fine a job can be done with screws as with sewing awl and thread—and a great deal cheaper at that.

Including the double row of screws at the shank, and a little thicker grouping of screws at the toe than along the sides, two dozen screws are ample for each tap on all shoes up to No. 10, and the smith who wears a larger shoe than that number—well, he is big enough to afford a couple more screws, that's all! I use one-half inch No. 2 screws for thick soles, and three-eighths inch No. 2 screws for thin soles. The former in winter, the latter in summer. If you can get hold of a piece of leather belting, cut from a double belt, at least eight inches wide, then you can find nothing better for making shoe-taps from. Belt less than eight inches wide is not desirable, for such narrow belt is usually cut from the sides or flanks of the hide, while all belt, over 8 inches wide, is supposed to come from the middle of the back although some hides must have backs four feet wide judging by the amount of "short lap" A-1 belting the belt-makers can get out of them. In double belt the two flesh sides are cemented together and the resulting tap sole is a dandy. It simply can't be beat.

First, soak the belt until very soft, and soak the shoes, too. Wet them well, and a much better job can be done than when the leather is dry. Cut the tap soles, Fig. 5, nearly to size of the shoe, leaving a little all around to trim after they are screwed on. Then with a nail, or an awl, scratch line S, all around the tap. This line marks where the screw-holes are to be made.

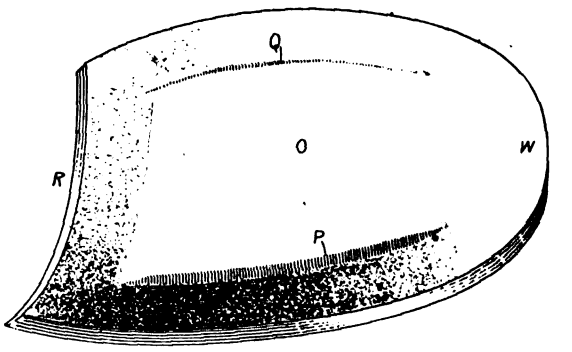


Fig. 4.—Prepared Half Sole.

The holes may be made with an awl, or a regular pegging awl may be used, driving it in with a hammer, but the writer prefers to use a "spiral drill" made by the Goodell, Pratt Company, Greenfield, Mass. All that is necessary with this tool is to place the proper size drill in the stock, press the drill against the leather and moving the drill stock back and forth drills the hole in short order. The drill cut both ways, when the handle is moving forward and when it is moving back.

Next, take a pocket knife with a narrow blade and countersink each hole as shown at U, the drilled holes being indicated at T T. Place a screw in each hole and hit each screw a light tap with a hammer, as shown at V V. This will make the screws stand up and stay in the holes until the screw driver reaches them.

Be sure that the countersinks are deep enough. The leather should wear off a good bit before the screw heads begin to touch the ground. I prefer to let the screw heads at least 1/16 inch below the surface of the leather, and then draw them down as far as they will go. After the taps have been worn a couple of days you can give the screws a couple more turns, and that should be done. Then no more attention need be given the screws until the taps are worn out, when, by cutting off the leather and leaving a

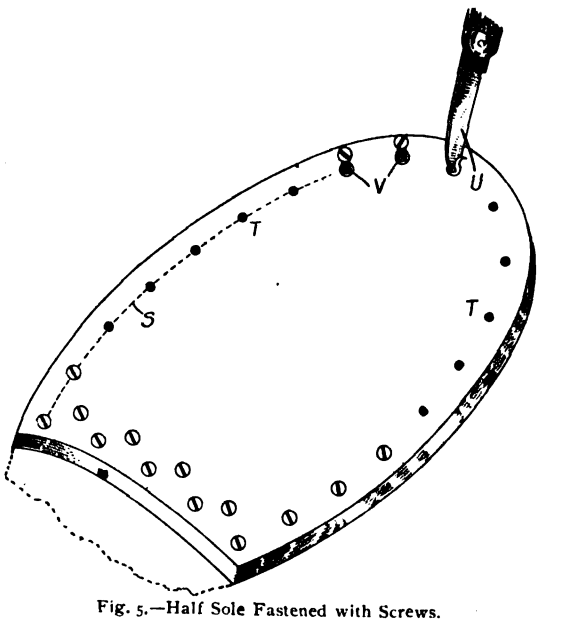


Fig. 5.—Half Sole Fastened with Screws.

little square bit around each screw the screws may be easily backed out of the leather, leaving the shoe as smooth and clean as the day the taps were first put on. The writer is now wearing a pair of vici kid shoes, without a break in the uppers, with the original soles intact but which have worn out three sets of taps and three pairs of rubber heels.

The strong point of the screw-tapping method is that should the shoes become soaked in water and the soles become "crimped" some portion of the sole invariably settles or comes up, resulting in unusual pressure which hurts the foot like blue

murder. With the screw-fastened sole, it is very easy to cure this hurt. Just take out three or four of the screws and pack under the low place, or around the high one, replace the screws, and there you are with the shoe all leveled up again and the foot feeling fine on a smooth leather surface.

A "hurt" developed in the writer's shoes, a few days ago, after getting the shoes very wet. It only required fifteen minutes to take out a few screws, skive the edges of a couple of pieces of felt, place the pieces where they were needed and replace the screws. Result—the hurt vanished like magic.

Each and every smith who is troubled by his feet is invited to try this method of leveling up his shoes, and he will sure find it of great comfort to him. There is one thing which should be done in connection with the method above described—just wrap a piece of sand paper around a stick and rub the hard corns and callouses from your feet as fast as they form. Do this a year in connection with the leveled soles and you won't have a corn or a sore spot left.

ENAMELLING BRASS PARTS.

If the Work Is to Be Lasting It Requires Trouble and Care.

Blacksmiths and carriage makers often have customers call to have the brass or nickel parts of their carriages or automobiles repolished and they think, as a rule, that the job is a simple one —"just rub on some one of the various polishes advertised," and the job is done. They do not seem to know that the polish first put on in such cases was a long one and required a baking oven and considerable time.

This being the case, the question arises, what is the best method, all things considered, to use in finishing these brass surfaces in paint colors, principally black?

In the first place, an oven must be provided in which to bake the enamel on these small parts, in the case of automobiles, such as lamps, wind shield rails, handles and other attachments. Probably an oven anywhere from four feet to six feet square, or in any shape, but containing about the number of square feet which these four or six feet ones do, will answer the purpose for many of our readers who simply wish to take up the enameling work on a small scale, and handle only small parts. Gas as an oven heating medium is to be preferred for substantial reasons, chief among which is the fact that it is not only a safe medium, but a very quick heating one.

Previous to enameling, the brass should be put through a process of preparation that will not only remove all the dirt and grease, but all the old lacquer.

Enamel cannot be safely baked on a surface carrying a glaze of lacquer applied when the brass parts were polished and made ready for service, and since which time it has become almost as hard as the metal itself. Where the cleaning and enameling is to be done on a considerable scale nitric and sulphuric acid dips may be provided, these being the quickest and most thorough methods of removing the old lacquer, but this system is rather expensive to install and maintain.

As a good and efficient substitute make a dip of water and caustic soda in the proportions of five pounds of caustic soda to 20 gallons of water. This caustic soda bath, while removing the lacquer, does not remove the tarnish, so that in case the lacquer is being taken off for the purpose of repolishing and lacquering it is essential that the brass be given a second immersion, this time in a dip of oxalic acid and water, the proportions of which are ¼ pound of oxalic acid and 20 gallons of water. To make the practice plain, first give the brass a thorough bath in the caustic soda solution, then remove it to the oxalic acid solution, after which remove, wipe dry and polish with some approved metal polish.

In the event of letting the brass parts go in a polished condition they should be given a coat of lacquer as soon as they are cleaned and polished, for upon exposure to the air the brass quickly tarnishes and begins to deteriorate in appearance. Having stripped the lacquer off by means of the caustic soda solution, it is next a good plan to slightly roughen the surface with No. ½ sandpaper, at the conclusion of which work it is ready for the baking enamel.

For lamps, wind shields and parts of this class apply as a first coating metal primer or a primer shop mixed and called by the same name. The bought-ready-to-use metal primer, if secured from a standard color house, is usually reliable, and, on the whole, cheaper than the shop made material. Make primer consist of equal parts of raw linseed oil and turpentine stained with enough white lead to give the mixture a baking body. Apply to the surface with a camel's hair brush. Heat the oven to 200 degrees F., and bake the primer for three hours at this temperature. If the parts are to be finished in black, next apply two coats of black enamel, baking each coat six hours at 180 degrees. All these parts may, of course, be finished in any desired color, the firms making enamels supplying them in a wide variety of colors and shades. For larger parts of the car, such as hoods, panels, etc., bake the metal primer on the surface for three hours at 200 degrees. Then tint up a baking surface, or shade it out, as the case may be, to act as a ground color, and with the oven at a temperature of 240 degrees bake for three hours. Then with No. ½ sandpaper slick the surface down smooth and fine and apply a coat of the desired enamel. In this connection it is well to understand that colored enamels, other than black, require less heat to bake them than the black. The black should be baked for from five to six hours at 200 degrees.

Most of the blue enamels bake at 125 degrees, whereas the greens require 140 degrees, and even more. Baking white enamels at a temperature higher than 100 or 110 degrees is likely to throw a dirty yellow shade into the white. Grey enamels, such as are used quite extensively at the present time, may be baked at from 120 to 140 degrees without affecting the quality of the color. Brown enamels are baked from 125 to 140 degrees, and reds from 130 to 175 degrees. Yellows should not be baked more than 175 degrees and a lesser heat is to be preferred. If more than one color of any of the enamels are applied, rub the last coat of enamel with pumice stone, flour and water, and finish with two coats of good varnish, baking each coat at 150 degrees for five hours.

FOUR OLD-TIME BLACKSMITHS.

Reminiscences of Men Who Formerly Worked at the Forge in an Old New England Town.

From the Bristol, R. I., Phoenix.—Elihu Burritt, the distinguished blacksmith-linguist of New England, was held up for decades to the small boys of the countryside as one of the prodigies of great learning and a remarkable intellectual genius. So we boys of the "great little" town of Bristol knew there had been at least one learned blacksmith outside our own borough. But we also knew he was not the only one of distinction in New England, since there were a number more right amongst us living the lowly, everyday life.

Each of these was, too, a man of the finest personal characteristics and worthy of a certain amount of admiration for his skill as a good blacksmith, and, in a larger degree, for the sterling qualities of manhood he possessed.

The senior was William P. Monro, who lived in the old homestead on Thames street, where his father had lived before him, and where our friend resided during a long and honorable career of over seventy years. He came of a Scotch ancestry dating back before the Revolution, and was made up principally of the distinguishing traits of the Scotchman delightfully intermingled with the American, and was one of the finest examples of what the public school and a natural nobility could do for a man in the kindly atmosphere of a town like Bristol.

His days in the blacksmith shop had mostly passed before my time, but he loved to talk about them in his reminiscent moments when I best knew him. He had always been very studious, a great reader of the Bible, and was a member of St. Michael's Church all his days, but his sympathies with and liking for all the people of his dearly-loved town were strikingly evidenced by the interest he took in visiting the Sunday schools of all the churches and mingling with all the little ones whom he fascinated by the charming talks he made to them in his recitals founded on the Bible narratives.

He had a pair of sparkling brown eyes, a keen wit and a ready eloquence which made him a most interesting story-teller, and his round, shapely head with its curling locks of grey, and a cheerful, ruddy countenance made him agreeable to look upon.

His household stories covering "Old Put" (Israel Putnam), who was not only one of his heroes, but who, I should judge from the steel plates in the old histories, was built much like himself, and of the other distinguished Americans who had fired his youthful fancies, his descriptions of his experiences as a member of the Bristol Artillery during the tragic days of the Dorr War, and his kindly analyses of many of the characters of the nation, state and town made his hearthstone a desirable and cosy corner on a winter's night. His fund of intelligence was seemingly inexhaustible.

"Aunt Phoebe," his gentle, loving wife, made him a fitting counterpart. She had an adoration for him which actually shone forth from her soulful eyes and radiant countenance while he delighted the listeners who hung wistfully upon his humorous delineations and witticisms as he wove together his charming "Winter's Tales."

Then, on Thames street, again, further along, there stood at the anvil for many years another thorough-bred American. His personality was as distinctive as that of Mr. Monro, but where one was round, rugged and short, the other was tall, rugged and more like a sycamore. How he made those sparks fly! How diligent and faithful in his calling was very evident for years full of busy days. To the boys of Bristol Jonathan D. Waldron was one of the representatives of the best there was in brain and brawn in the town. His presence was distinguished and he and John Adams, the shoemaker, expressed in their individualisms to me what such men as Andrew Jackson, Patrick Henry and Nathaniel Greene might have been in their day. Mr. Waldron's face was clean cut and fine, his head a noble one, and he had the high, intellectual brow which generally denotes the man of thought and intelligence. Around his well-developed neck he wore that open-front standing collar which was the acme of perfection for the old-school gentleman, and while he was only a modest blacksmith he was a mighty fine looking man and a master of his trade .

His boys and girls had one of the best of fathers and the town of Bristol one of the best of citizens. There never was sign of affectation or pretence about him, but the strong, sterling characteristics of the self-reliant, independent man. He was one of those who stood high in the estimation of the boys of the town (which has had not a few men worthy of their admiration and emulation). During my "ken" he was a member of the school committee, a leader of the St. Michael's Church, and always interested in the betterment of the town and country—to whose defence he sent one of his boys in her time of need.

On Franklin street, opposite Deacon "Jim" White's house, which is now the Home for Aged Women, there was another blacksmith shop, and in that "arts and crafts" establishment of that day another Bristolian spent most of his days in handling the bellows, welding the hot irons, driving on horse shoes, forging bolts and chains, and filling a place which required proficient skill as a workman and sincerity as a good square business man.

Quite a different make-up from the other two blacksmiths, but just about as distinct and noticeable in his characteristics and personality as they. Retiring in his expression and demeanor, but always pleasant, cheerful and gracious in his manner, his treatment of boys and men in every-day intercourse gave Alfred Luther, the blacksmith, a strong hold on their affections and respect and they carry for him now a green spot in heart and memory.

I never knew of either of these men using a disagreeable word and am sure the world all about them was made better and sweeter for their having lived the alloted span. Mr. Luther's boys and girls tell a tale, too, to their father's credit. They developed along the "Learned Blacksmith's" lines and followed the intellectual life. It would seem that the location of the blacksmith in early days allowed of thought as well as action, and some of its tendencies are hereditary.

The color line was never very closely drawn in Bristol. Racial prejudice had not culminated into disagreeable antipathies. So Richard Snively, another blacksmith, found a place for his skill and application in town in "the Smithy" and he could shoe a horse or turn a spike with the best. He also had the respect of his townspeople, and is entitled to a meed of credit, with kindly recall

and remembrance in this little sketch. A very black descendant of the African clime, he was yet a very good looking man, and his vocation gave his physique a sturdiness and strength which made him a marked individual on the street or at the forge. He sustained the reputation of a good mechanic and craftsman in his day and is not to be forgotten in ours.

Well! Bristol has developed some intellectual and distinguished blacksmiths as well as brave soldiers and hardy sailors, and she can well afford to take a little pride in this particular branch of her civilian sons. J. A. Reid.

BRAZING BAND SAWS.

An Easily Home Made Apparatus Described and Illustrated.

An English publication called "Work" gives the following description of a device for brazing saws up to 1½ inches wide, Fig. 1 giving a general view of the apparatus. It may be made of iron and the principal dimensions are given in Figs. 2 and 7. The base A and the bridge piece B are 2½ in. wide by ⅜ in. thick in section, the bridge-piece being bent up to the shape and sizes given. The base and bridge-piece are fixed together with rivets as shown in Fig. 5. The rivets, three in number, are ⅜ in. in diameter, and have their heads countersunk as shown. The guide-pieces C are 1 in. wide by ¼ in. thick in section. They are fixed to the top of the bridge plate—level with the back edge—with two 5/16 in. rivets in each plate, as shown in Fig. 6. The jaws D, which hold the saw in position on the bridge-piece, are four in number. They are 3 in. long by 2½ in. wide by ¼ in. thick, and are shaped as shown at Fig. 4. The jaws are held in position and tightened on the saw by means ot the bolts and fly-nuts E. The bolts are 5/16 in. in diameter, and pass through the bridge-plate, guide-piece, and jaw, and are fitted with fly-nuts at the top as shown. A washer ⅛ in. thick should be placed between the jaws and nuts.

The tongs, of which two pairs are required, are made up in two portions, which are held together by a ⅜-in. rivet as shown in Fig. 7. The jaws of the tongs are 2 in. wide by 1 in. thick, shaped as shown in Fig. 8. The ends of the tongs are drawn off to about ½ in. round in section at the back.

In brazing together the portions of a saw, the broken ends are first filed off square. Each end, for a distance of 1 in. to 1½ in., is then filed off to form the joint, as shown in Fig. 9. A wide fine-cut flat file should be used for filing the joints, and care should be taken that these are flat and true. The saw is then placed in the apparatus, and is held in position by the jaws, which are tightened by the fly-nuts. The ends of the saw should come exactly in the centre of the opening in the middle of the apparatus, and should overlap each other the length of the joint. The back edge of the saw must be fixed against the guide-pieces, so as to ensure a straight joint being made.

Some brass filings, or a thin piece of sheet brass, together with a quantity of borax, are then placed between the joint on the ends of the saw. Instead of brass filings or sheet brass, a piece of brass wire may be wound round the ends of the saw and between the edges of the joint.

One pair of tongs is then placed in a clear fire and heated to a bright red. The inside surface of the jaws is then cleaned off, and the tongs are quickly placed over the saw as shown in Fig. 1, the jaws being placed exactly above and below the joint. The tongs are held tightly together until the solder in the joint is melted. They are then quickly removed, giving place to the other pair of tongs, the jaws of which are only slightly warmed, and are held over the joint of the saw for a few minutes.

The saw should be removed from the apparatus, and the joint examined. The joint, if found to be satisfactory, should then be cleaned off, the teeth of the saw over the joint being then sharpened and re-set.

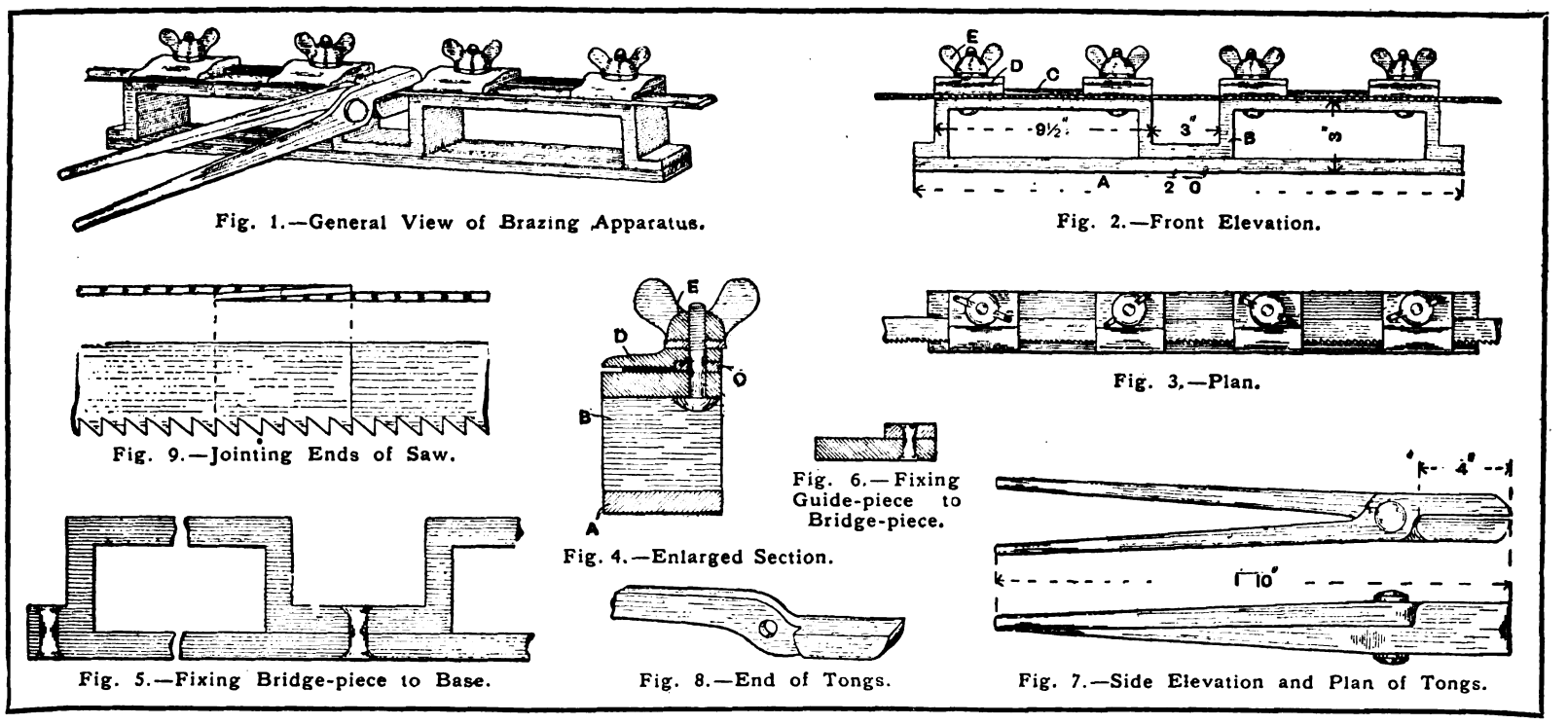


Fig. 1.—General View of Brazing Apparatus.
Fig. 2.—Front Elevation.
Fig. 3.—Plan.
Fig. 9.—Jointing Ends of Saw.
Fig. 4.—Enlarged Section.
Fig. 6.—Fixing Guide-piece to Bridge-piece.
Fig. 5.—Fixing Bridge-piece to Base.
Fig. 8.—End of Tongs.
Fig. 7.—Side Elevation and Plan of Tongs.

For Band Saw Brazing.

ELBOW HITTING.

A Hard Matter To Remedy and How To Do It.

From R. E. Nash in the Horse Review.—One of the most prevalent faults of gait at present is that of elbow hitting, and I believe that horses will bother more that way in the future, for they are getting more and more front action. It is a difficult matter to stop this habit, and there is no universal recipe for so doing. I have shod hundreds of elbow hitters, with more or less success, but will use as examples only two cases, because the cure as applied was different in each.

Charley H. 2:07½, the brown trotting gelding in the stable of Will Rash, was a pronounced elbow hitter, and, as a consequence, an unsteady, bad-breaking horse. Will came to me at Peoria, Ill., and insisted that I experiment with the gelding. I did not have my own tent up, but took Charley over to Johnny Fisher's outdoor parlor. The son of Cicerone 2:12½ wore, at the time, a nearly new pair of bar shoes, making it unnecessary to change them. I removed the shoes and brazed a long, sharp calk, about an eighth of an inch in height, across the heels of each. Will stood, watching the work, and after I had finished remarked: "Well, he only hit his elbows before, but with that sharp calk on I presume he will cut them off." He asked me to explain the purpose of the calk, and I told him this:

"You said the horse couldn't carry any weight; so I put the calk on to prevent him from snatching his foot up rapidly and drawing it backwards with a flip. It will not interfere with his break-over, but I'll have nothing more to say until the horse is tried."

I am pleased to remark that Charley H. beat a field of Grand Circuit horses that afternoon, taking his record of 2:07½ and trotting as perfectly as any horse could. Had he not subsequently gone wrong behind, I believe this horse would have taken a record of 2:04 or 2:05, for he was extremely fast, and once he went clear of his elbows, as steady as a clock.

The other case of elbow hitting I refer to, I came across when I was shoeing for Penn Valley Farm, Morristown, Pa, where Andy McDowell was then the top jock. Andy was having his troubles with Allen Winter's sire, Ed Winter (2:12¾), then a green horse. Ed had plenty of natural speed and a fixed desire to trot, but pounded his elbows fearfully. Always, on work-out days, I had my fire going full blast, for I realized that the stallion would require several experimental shoeings. We tried him with light shoes, also with toe-tips, but finally Andy and I came to the conclusion that the lighter he was shod the harder he hit. Naturally, one would think that with added weight his fault would be aggravated, but the opposite proved to be the case.

I said one day to Andy, "Let's try him just once more," to which he assented, remarking, "Here goes the last button off of Gabe's coat."

I tacked a pair of plain 14-ounce shoes on, and from that day on Ed Winter was a trotter, not coming within four inches of his elbows. He gained confidence rapidly, went flat and straight, and was willing to extend himself. Shortly after he won his first start at Saginaw, Mich., where he took his record.

Here were two horses—Charley H. and Ed Winter—afflicted with the same trouble. Both wore short toes, but were shod vastly different in order to remedy the same fault of gait.

And here is a case where a great mare was, by mere accident, correctly shod to obviate elbow hitting. This was Nightingale 2:08, who will be remembered as one of the gamest and best race mares that Mr. Geers ever campaigned for Village Farm. She wore very long toes, with the idea of lengthening her stride and keeping her off her elbows. One day, in a race, she threw a shoe and broke one of her toes off so badly that the shoe could not be placed back on in the same nail-holes. As a result, the toe had to be shortened, and the opposite one likewise, in order to make them correspond. She had lost the first two heats in the race, throwing her shoe in the second, but with the shortened toes went on and beat Onoqua 2:08¼ and others, taking her record that day, in one of the best races ever trotted up to that time.

Cleaning Brass Sign Plates.

An acid is useful for this purpose, oxalic acid being perhaps the best, but whatever acid may be employed it must be cleaned off afterwards with water, then when dry rub with sweet oil and tripoli powder which will preserve the brass from tarnishing for quite a long time.

Soft soap and rotten stone are also good cleaners, as also a paste made from oxalic acid and whiting. This latter is to be applied wet, then let it dry, finally rubbing with a brush.—The Modern Painter.

Black Varnish For Iron Work.

For making black varnish that has a gloss, fuse three pounds of Egyptian asphaltum; when it is liquid add one-half pound shellac and one gallon turpentine.

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APRIL, 1913.

PARTIAL CONTENTS.

THE ROAD AWAKENING.

Blacksmiths and wheelwrights are naturally interested in the road question and like to be kept posted as to what is being done to improve the highways. The matter is specially prominent just at this time when in so many localities travel is about out of the question owing to the depth of the mud.

But the activity being displayed for good roads by many States is as pronounced as it is gratifying. From accurately compiled statistics given out at Washington it appears that returns from twenty-six States report 1,363,711 miles of roads. Twenty-three States have 21,032 miles of improved highways.

New York, for instance, is credited with 80,000 miles of roads, of which 11,052 are improved. There are 7,092 miles of macadam roads and 8,500 miles of stone roads in the State. In 1912 New York built 662 miles of new roads and improved 11,052, spending $14,915,141. Massachusetts, with 23,000 miles of highways, has 20,700 miles improved, probably the best showing of any of the States in the Union. Iowa is full of good roads enthusiasm, and last year paid out $7,000,000 for highway improvements. It has 100,000 miles of dirt roads, 2,500 miles of stone and 4,500 of macadam. Kansas also is showing commendable activity, having spent nearly $5,000,000 in 1912. Of its 98,000 miles of roads, all but 1,000 are made of dirt. In 1912, 10,000 miles of these roads were improved and 60 miles of new highways constructed. Wisconsin with 65,000 miles of roads has improved 12,000 miles of them. In 1912, 500 miles of new roads were built and the cost of highway improvement was $1,250,000.

Illinois is credited with having spent $7,500,000 in 1912. It has 100,000 miles of roads of which 10,000 are improved. Last year 61 miles of experimental roads were constructed. Mississippi spent $3,500,000 and Missouri $3,000,000. Michigan with 70,000 miles of roads only has 1,500 improved. Most of the thoroughfares are of dirt, and in 1912 240 miles of new roads were built. Only $125,000 was spent by Michigan.

Statistics regarding the other States also are interesting. North Dakota has 64,784 miles of roads and spent $700,000 in 1912; the District of Columbia has only 472 miles of roads, and spent $223,000 last year. Utah has 39,953 miles of roads and its 1912 expenditures amounted to $570,000. Montana has 33,500 miles of roads, and last year spent $750,000; North Carolina has 48,235 miles of roads and spent $1,569,140 in 1912; Connecticut has 12,583 miles of roads and last year spent $1,500,000; Colorado has 34,000 miles of roads and spent $1,900,000 last year; New Jersey with 15,000 miles does not report its expenditures; Pennsylvania spent $4,000,000 last year and has 86,696 miles of road; Washington has 39,062 miles of road and spent $5,000,000 last year; South Dakota has 65,000 miles of roads and spent $250,000.

This wonderful awakening to the necessity of better highways is largely due to the idea that they will somewhat reduce "the high cost of living," and to the additional fact of the advent of the automobile which is practically useless at this season on the average dirt road.

Yet the automobile is both a cause and an effect; a cause of the agitation for better highways and an effect of their rapid deterioration if used at high speed, which is usually the case. In fact, they destroy macadam roads so rapidly that according to reliable reports they are being discarded in Michigan for concrete which is found far more durable and of less cost of up-keep.

The macadam road is economical and in every way desirable when confined to horse-drawn vehicles but for automobile traffic it is claimed they are not much better than dirt roads. If we have been correctly informed, concrete roads under average conditions cost about $11,000 a mile, while the cost of macadam averages about $8,000 a mile. But concrete is practically indestructible, while macadam costs something like $400 a mile per annum for up-keep when used by automobiles.

Meantime, the value of the road drag is being more and more appreciated, while the old-fashioned plan of highway repair where the plow, the road scraper and the shovel are used to haul the dirt back into the road from which it is annually washed into the ditch, has been practically abandoned as being the grossest waste of money.

TROUBLES LOOKED FOR.

There is an old saying to the effect that the troubles we look for never come, and there is rather more truth in it than in the average of wise maxims.

Quite likely the reason we do not often encounter the troubles we look for, is because we usually prepare ourselves for them, the real troubles coming like a clap of thunder out of a clear sky.

Take, for illustration, the parcel post law. It was predicted for several years before the law went into effect, that it would ruin the country merchant and put a blight upon those small towns scattered all over the country which are centers of frequent rural gatherings and which are both a social and business advantage if not an indispensable element of the public welfare. It was also claimed it would give the catalogue houses a strangle hold, as it were, upon the purchasing public. It was likewise predicted it might ruin the express companies, and although the general public did not repine at this, the parcel post would have doubtless come a few years sooner had it not been for express company opposition and whatever influence may have resulted from "express franks" by which members of Congress had their express packages small and big, delivered for nothing.

But we have finally got the parcel post, and thus far we fail to note any of the dire forebodings that were expected. The country storekeeper is still doing business at the old stand, the express company wagons are still rushing through the streets of the large cities, and from all accounts the general public—in whose interests all such legislation should be measured—is greatly benefitted.

Owing to the zone system of parcel post rates, the country merchant can now deliver goods to his patrons at far less cost than ever before, while the catalogue house finds its long distance rates of transportation very little, if any, reduced.

Meantime, the catalogue houses have a new difficulty to confront in the "minimum wage" movement, which may result in compelling them to add to their prices and thus give the country merchant still another advantage in this struggle for trade supremacy.

Thus a movement that foreshadowed decided economic changes with the possible injury if not positive ruin of certain interests, has resulted in no great harm to any one of them, as far as we can learn, save in the case of the express companies which will hereafter be obliged to return a more equitable *quid pro quo* for their service.

This is often the case. Things are never so bad when they come right before us as when seen at a distance. When out on the prairie a little weed not more than three feet high, when seen a few rods away with nothing beside it with which to make comparison, will often seem to be a giant tree. Potential troubles are often as much magnified.

HOURS OF WORK FOR ANIMALS.

It is reported that a bill is to be introduced in the Pennsylvania Legislature through the efforts of the Society for the Prevention of Cruelty to Animals, regulating the hours of service of draft animals. The bill has the support of the Federated Humane Societies of Pennsylvania. The principal provisions of the measure are: "It shall be unlawful for any person to lead, drive or work any horse, mare, mule, ox or other animal, whether belonging to himself or otherwise, for a longer period than twelve hours in every consecutive twenty-four hours, and then only when such leading, riding, driving or working does not violate the laws against cruelty to animals." Violations are punishable by a fine of not less than ten nor more than one hundred dollars, or by imprisonment for not more than six months.

If the clause quoted is literally correct, not only is the wording of the provision unusual, but it would seem that such a law leaves the matter about where it is at present. It appears that under this provision an animal may be worked more than 12 hours provided it does not violate the existing laws "against cruelty to animals," and if it does violate this law, of course the authorities or the cruelty to animals society, have the means of punishment of the guilty parties. This being so, why the proposed new law?

The subject would hardly be referred to here except for the astounding tendency to multiply

laws of all kinds. By and by there is likely to be complaints of too much interference with individual personal liberty. In Germany where the people are encompassed with a network of law they already begin to chafe at its restrictions.

We relinquish first place to no one in hatred of cruelty to animals, and especially to the most admirable and patient of all—the horse. But is not the usual general law forbidding cruelty to animals enough? Or if the penalty is not severe enough, could not the present law be amended to cover the needs?

A LEAF FROM THE PAST.

The article headed "Four Old-Time Blacksmiths," copied from a Rhode Island paper and printed elsewhere in this issue, is of local rather than general interest, and yet it is well worth reading by the craft everywhere. It reveals the character of the old-time New England blacksmith more clearly than is often done, and shows him to have been a most substantial citizen—high-minded, unselfish, loyal and respected.

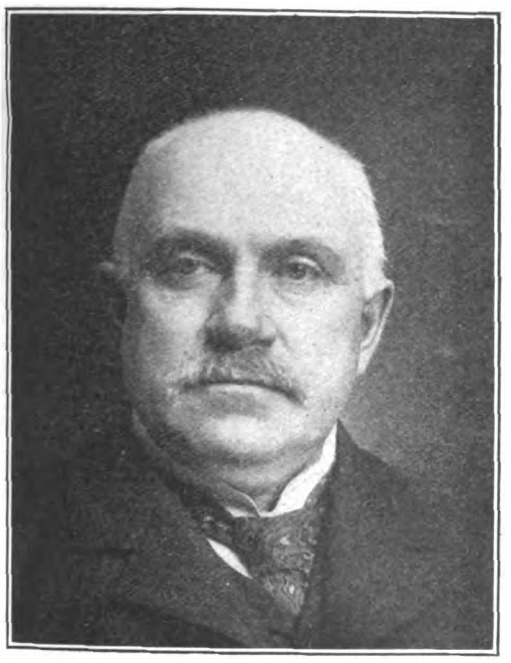
As we have often stated, those who desire to get a living "by their wits," who are ambitious to acquire great fortunes without giving a fair return, or who feel that honest industry is not honorable, do not as a rule become blacksmiths. They drift into something easier.

It is well enough to recall these old-time smiths occasionally. Most of us of New England birth can remember them, and the article referred to will freshen that memory.

Moreover, the article is a fine example of the literary excellence often found in country weeklies of the better sort.

Death of Silas W. Kent.

Many of our readers will be pained to learn of the death on January 22 last of Silas W. Kent, of Cazenovia, N. Y., at the age of 62. He had



The Late Silas W. Kent.

been known to the senior member of this firm for some thirty years, and with constantly increasing admiration for his qualities of mind and heart. Mr. Kent was born in Remsen, N. Y., the son of Chester G. Kent. He was graduated from Wesleyan University, Meriden, Conn., in the class of 1872. He resided in Meriden, Conn., from 1873 to 1898, but for the past fourteen years has made his home in Cazenovia. For about thirty-five years he had traveled, having a territory extending from Iowa to Maine. He represented wagon and automobile spring manufacturing companies. Last spring he retired from that business.

Mr. Kent was a Mason and a member of the Methodist church. He had long been a prominent Methodist, knowing personally nearly every bishop of the church. At one time he was a trustee of Cazenovia Seminary.

He is survived by his widow and six sons.

In one of the local papers, Prof. A. S. Roe, of Worcester, Mass., who was for many years principal of the high school of that city, gave an extended obituary notice based upon an acquaintance dating from boyhood. Mr. Roe says:

"Always bright of face, cheery in voice, with the very heartiest of handclasps, all who ever knew him remember him with pleasure and it is difficult to think that he has gone forth, never to return. Having given up his vocation of traveling last spring, he had engaged in business in Cazenovia with his oldest son and seemingly there were many years before him of pleasant, useful, earthly living, but heart failure, as a feature of an attack of the grip, ended his life among mortals. If Silas Kent had an enemy I never happened to meet him."

Maine Master Horseshoers' Protective Association.

The fifth annual convention of the Master Horseshoers' Protective Association of Maine was held at Norway, March 11. The following officers were elected: President, A. T. Grant, Bangor; Vice-President, L. E. Bates, Lewiston; Secretary, W. B. Mills, Bolster Mills; Treasurer, W. E. Carr, Orono; Organizer and Statistician, E. H. Leland, Norway.

The forenoon session was opened by the local president, W. B. Mills. Hon. A. S. Kimball gave the address of welcome. This was responded to by Rev. J. S. Little of Bethel. Addresses were given by National Secretary C. J. McKenney; John Hogan, representing the American Horse Shoe Company; Lasher of the Cable Horse Nail Company; Harris, representing the Phoenix Horse Shoe Company; Dr. Robbins of the Standard Nail Company; P. J. Lally of the Verden Iron Company, and Frank Fison of the Rhode Island Perkins Horse Shoe Company.

The afternoon session was devoted to business pertaining to the association and in the evening a banquet was served, about fifty being present. S. J. Records of Norway officiated as toastmaster and addresses were delivered by Rev. J. S. Little, known as the horseshoers' minister, and E. J. McGinnis of Brooklyn, N. Y.

Legal Department

All legal questions answered free of charge. Address Communications to Editor "Legal Department," THE BLACKSMITH AND WHEELWRIGHT, P. O. Box 654, New York City.

Holding Personal Property.

From Alex. Anderson, North Dakota.—Can I hold a farmer, who ordered a special make of sleigh from me this winter and now refuses to take it away from the shop. I live in Foster county. Can I sue him for the money? If I can, how shall I proceed?

Answer.—If the price of the sleigh is less than $50 you can recover the purchase price from the farmer. Assuming that the price of the sleigh is $50 or more, the answer to this question lies in the statute of frauds of the State of North Dakota. This statute is as follows:

"No sale of personal property or agreement to buy or sell it for a price of $50 or more is valid unless: 1—The agreement or some note or memorandum thereof is in writing and subscribed by the party to be charged or his agent; or 2—The buyer accepts and receives part of the things sold * * * ; or 3—The buyer at the time of the sale pays a part of the price.

"An agreement to manufacture a thing from materials furnished by the manufacturer or by another person is not within the provision of the last section."

It being conceded that the farmer has not received the sleigh it follows that you cannot successfully sue him unless, 1—You have a written order for the sleigh signed by the farmer or by his duly authorized agent; or 2—The farmer paid you something on account of the purchase price of the sleigh at the time he ordered it from you; or, lastly, 3—If the sleigh had to be specially built for the farmer by you from materials furnished either by you or by some one else.

If your claim comes within any of the above cases you can recover the price of the sleigh from the farmer, and your next step is to employ a competent local attorney to commence suit against the farmer. If your claim does not come within any of the above cases you cannot recover against the farmer and the best thing for you to do is to try to sell the sleigh to some one else.

Improper Use of Reamers.

A reamer should never be employed to ream out a pipe of any kind. The scale inside the tubing caused by the flux used in welding or brazing is as hard as glass, and no reamer can be made hard enough to cut it.

Correspondence

Advertising and What Shoeing Costs.

From Charles Barker, Rhode Island.—I have asked several blacksmiths the questions, "What is the best way to stimulate publicity and what are you doing to advertise your business?"

Some never advertise. Others use the columns of the local paper, while one said he utilized the moving picture curtain. A very common plan among blacksmiths is the annual distribution of calendars, but results obtained whereby new business is secured are reported very meagre, if any. One man said he spent $44 for elaborate calendars but regrets the outlay now. Several feel that their location has been established so many years that everybody ought to know where to find them, therefore it would be useless for them to advertise.

A blacksmith in a small town containing six shops said: "I let the merit of my work be my best advertiser," and he seemed well contented at that. Perhaps as good a plan as any is to

A Striking Sign.

have a well displayed sign, but as a rule you will find a small sign over the door of a shop which can only be seen when passing closely.

One of the most conspicuous signs ever noticed is the one represented in the picture. It is supported on a pole set on the edge of a sidewalk and overhangs the roadway, being visible from either direction up and down the street, being about 5x3 feet in size. Mr. Arthur Crepeau of Arctic, R. I., the owner of the shop which it adorns, says he believes in signs as the best advertising medium and made up his mind to have a good attractive one. So he gave his order from his own design to a local wood carver, and considers the price, $75, a good investment.

The central figure of horse and man is carved from a solid block of wood, even to the detail of harness, hames, etc., and the painting adds to the splendid miniature effect.

It is a well known fact that a strong spirit of rivalry exists among horseshoers in most every town in New England, ofttimes resulting in the cutting of prices, which leads to one of the most detrimental conditions of the craft. Many instances are known where master shoers have organized and signed a uniform scale of prices, only to be forgotten in a few days. One horseshoer in a flourishing Rhode Island town when asked if there was a master shoers' association in town said: "There was. There isn't. For about two years we all got together and agreed on prices and the first one to begin slashing was the president himself, followed soon after by the secretary, consequently we had only one meeting, the first and the last. No more joining an effort to better ourselves for me. Now every one for himself."

The prices range hereabouts from 90 cents to $1.50 for all round shoeing. Where does the 90 cents man fit? He is like Casey who said, "Give us work and plenty of it; divil a bit do we care about the pay." I am indebted to A. B. McClellan, Pawtucket, R. I. for the following figures:

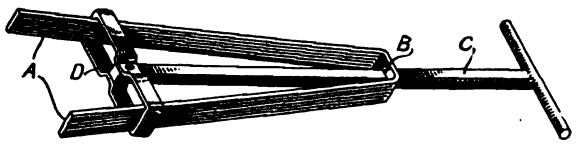
Cost of 1 set No. 6 shoes.....$0.50
Cost of No. 8 nails..... .10

Cost of calks, hand made.....	.12
Cost of labor, 2 hours.....	.60
Cost of rasp	.01
Cost of wear and tear tools.....	.01
Cost of general expense, light, rent, coal, etc.....	.03
Cost of transportation charges...	.01
Cost of loss of bills.....	.10
	$1.48
Net profit	.02

While Mr. McClellan has an up-to-date equipped jobbing and repair shop his horseshoeing department seems simply a pastime for him. Still he has held his own for 27 years.

An Adjustable Wrench.

From Orlando Jones, Indiana.—Herewith is an article on "How to Make an Adjustable Wrench." First bend a piece of steel in the shape shown at A, and make a square hole in it at the bend B. Fit a square piece of iron C in this square hole. Rivet a band D to the lower

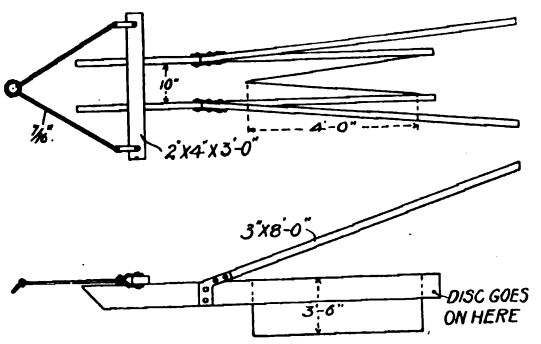


A Novel Adjustable Wrench.

end and weld a handle on the upper end of the iron C. When using this wrench, the jaws AA are pushed through the band D and placed on the nut in the socket. Pressure on the handle in turning will cause the jaws to grip the nut. The wrench can be made in various sizes according to the requirements.

A Weeder and "Go-devil."

From T. J. Thrasher, Texas.—I send you a sketch of a weeder and "go-devil" combined. The "go-devil" disc goes on the rear end of the frame. I use the Emerson disc as it is the easiest and most durable for the purpose and the best friend the farmer has got in this country for weeds and grass. Anybody who can work steel and wood can make them. They can be



Top and Side View of the Weeder.

sold for from $6 to $7 each, according to the width of the row they are made for. I also make and put them on cultivators. I hope the reader will understand by the sketch how the thing is done. This is the first time I have ever sent in anything for publication, but I should have done so before, for I get much help from the paper and especially from the ideas given by its readers.

Dreaming and Doing.

From A. E. Bachman, Pennsylvania.—"And Joseph dreamed a dream and he told it his brethren: and they hated him yet the more."—Genesis, 37:5. One night I lay down to sleep and dreamed that I was a blacksmith and was working by myself and for myself, but that I had never learned my trade thoroughly. I thought I could advance myself later and become an accomplished hand while working by myself, but when I was away from my boss I learned backward instead of forward as I had anticipated. I knew I was not advanced enough to be a success at my chosen profession, as I could not put a finish on anything I made, and while I liked the work well enough, I had neither the ability nor patience to finish my work as it should have been finished, neither did I have good tools, and if I did get a good tool, I soon had it used up so that it was not fit to work with and make a good job. I could not keep my shop in a good condition and it took me three times as long to make an article as it should. I was so careless that when I took a job apart, I dropped parts of the job, such as nuts, wrenches, hammers, pinchers, etc., on the floor, and when I was ready to put my work together I had everything so mixed up that I did not know where it belonged. Then when I had it partly together, I would see that it was not right and would take it apart and do the work over. I was often in an awful predicament, owing to my careless ways of working. I thought it would not pay me to keep a helper, and I did not believe in power in small shops. I could not make money enough to pay the interest on the investment for an engine and the necessary machinery, and I knew I could not learn to run an engine and the necessary machinery, so I kept on in the old rut. I would have paid a good deal to have had my shop in good order, but it was always in disorder, tools, both new and old, nuts, washers, iron (old and new), coal, ash cinders, dust shavings, etc., being scattered all about. I often tried to put it in proper condition, but somehow I could not get it accomplished. I thought I could work well enough but when I came to make a weld on either iron or steel, I found myself in a corner. When it was done it did not look right—it would be somewhat burned and had no finish. I did the best I could but it was not satisfactory either to me or anyone else.

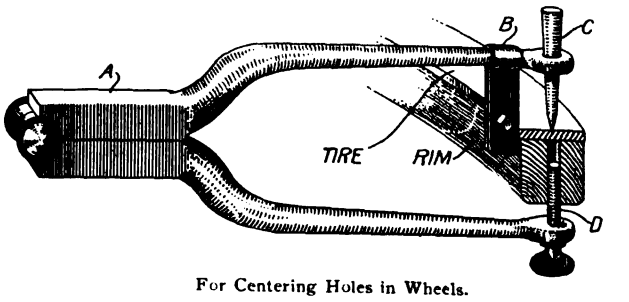
Well, this is the result of not learning my business right from the beginning. In shoeing horses I have the old way. I use the buttress, and cut the sole of the hoof too thin. I put a big tip on all shoes to make them stay on longer. I turn my shoe concave, and file the hoof on the outside to make it look better. In tiring wheels I give them plenty of dish, say from one-half to one and a half inches, according to the size and weight. I did not believe in advertising, neither did I take a trade journal, such as The Blacksmith and Wheelwright. I find that my unaccomplished way of working and my dismantled shop makes me take a back seat in my profession.

At another time I dreamed I was a blacksmith who had served with a good boss who understood his business so thoroughly that he could make a perfect job of any and everything he commenced, and he taught me everything belonging to our business. I took a great pride in my work and learned everything that could be learned in the time that I served as an apprentice and in having a good shop and the best of tools. I now have a shop large enough to place my engine and all my machinery in comfortably. My engine is a 5 h.p. It runs a power hammer, which saves me a helper and my own arm, also a power fan, two large emery wheels, two small emery wheels, polishing outfit, two large grindstones, one lawn-mower grinder, one drill press, one bolt cutter and nut tapper, one double disc grinder, one speed lathe, one circular saw, one band saw, one planer, and one outfit to turn logs for field rollers. I do not run them all at the same time but one or two at a time. My tools are all in first class condition. With my first class tools and my advanced condition I am ready and able to turn out an article on very short notice. In my shop I have a place for everything and everything in its place. I keep my benches and shop scrupulously clean. I can find any one of my tools at a moment's notice, in the darkest night. When I take a job apart I put every part by itself, the bolts and nuts by themselves, and all the small tools I need in place, then I have no trouble to put my job together in short order. I do a large amount of axe dressing, tempering and grinding, also dress quarrying drills, grind mower knives, scissors and paper knives (large and small). I have a good tire staver, good anvil, one large Fisher vise, one bull-dog vise, one blacksmith vise, large mandrel with the face plaid surfaced on one side, and three sledges—one six, one eight and one fourteen pounds. I keep all my tools in first class condition. I have my shop and tools insured against fire. I take The Blacksmith and Wheelwright and it is my best instructor as I am constantly learning from it. In shoeing horses I work according to the latest ideas, use the I X L farrier knife, put no tip on my shoes, leave enough sole on the horse's foot and do not rasp above the nails at all if I can finish without. I make my shoe level on the foot side. I find that an uneven top of the shoe causes seedy toe in most every case where it exists. In hooping wheels I give them from an eighth of an inch to three-quarters draw, according to size and weight. I advertise in our local papers, also send out cards to each farmer, which bring me in lots of work. I am well satisfied with my position and condition. A good shop and plenty of the best and latest tools, all the stock on hand that is needed for a successful businesss shop full of work, and a large custom well pleased with the work and prices that they get here.

I have given my two dreams in as few words as possible and if any brother can get any good out of them he is perfectly welcome to them.

Center Punch and Guide.

From F. Denman, Salesman Phoenix Horse Shoe Co.—Herewith find a sketch of a tool which I have seen in only one shop in all my travels, which includes most of the shops in Oregon, Washington and Montana, with a portion of Idaho. I saw it in the shop of Mr. Joe Mayer, Lebanon, Oregon, and I think it worth having in all repair shops. It is a combination center punch and guide for centering old wheels with new tires for drilling. It has a gauge for differ-



For Centering Holes in Wheels.

ent width tires so the center punch hits the center of tire by placing the screw into the old hole in the rim and punch on the tire so the gauge touches the side or edge of the tire.

A is the holder made with the knuckle of a buggy top. B is the gauge and set screw made of metal bent over the holder, to slide, placing the punch in the center of the tire. C is the centering punch fixed into the holder and welded. D is the screw to insert into the old hole in the rim. It can also be used on plow work by having a set screw to fit the holes in the plow.

For Making Light Spokes.

From Thomas B. Gallatly, Massachusetts.—The writer was called upon to make some spokes for light wheels, and having no helper in the

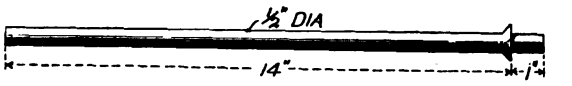


Fig. 1.

shop, devised the following method and tools: Fig. 1 is the finished article. A tool was forged to fit in the anvil, Fig. 2, and drilled and coun-

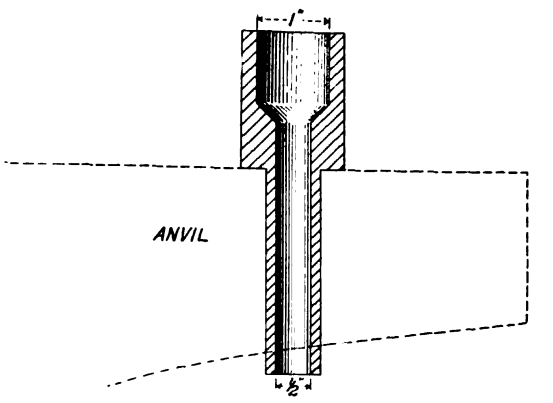


Fig. 2.

ter-bored; also a boss punch drilled and made to fit the counter-bore in the anvil tool, Fig. 3. A collar was made from ¼ inch die stock and

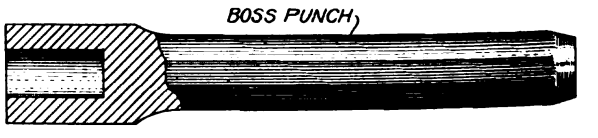


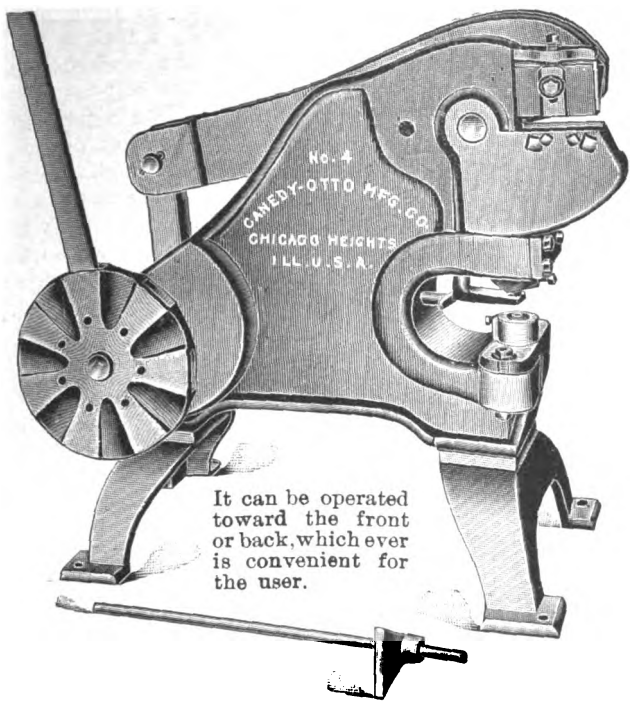
Fig. 3.

welded on the bar and then dropped into the tool, finishing in one heat. Try it and see the result.

Want a Flue for Two Fires.

From Everett Bell, Missouri.—Will some brother blacksmith kindly tell me through this paper how to build a flue for two fires so it will draw the cinders and smoke out and not be flying all over the shop? I would like to build it out of brick, one flue for two fires on the same forge.

No. 4 Combination Punch and Shear



Will shear ¼x4-in. flat bars.
Will shear 1-in. round bars.
Will punch ¼-in. hole in ¼-in. plate.
Depth of throat 6 inches.
This machine is furnished with ¼-in., ⅜-in. and ½-in. punches and dies, also a lever bar.

When choosing your blacksmith shop equipment why not get the best—

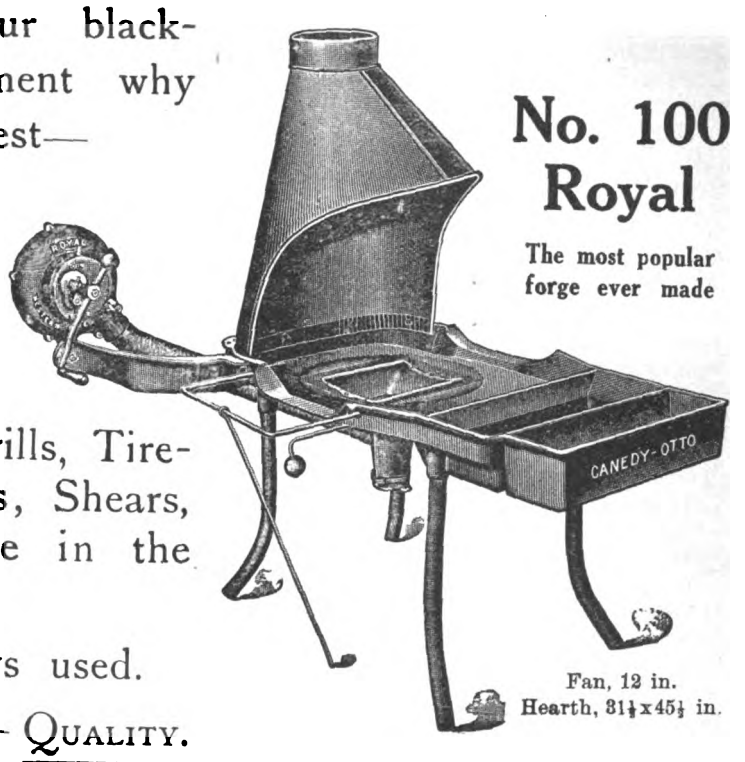
CANEDY-OTTO

It costs no more.

Manufacturers of the finest line of Forges, Blowers, Drills, Tire-Shrinkers, Punches, Shears, produced anywhere in the WORLD.

Once tried, always used.

There's a reason — QUALITY.



No. 100 Royal

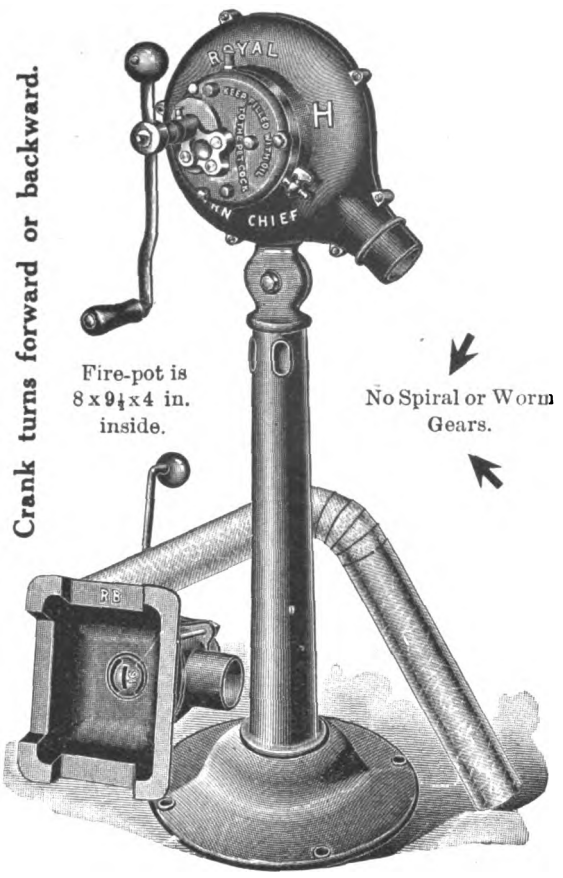
The most popular forge ever made

Fan, 12 in.
Hearth, 31½x45½ in.

FORGES
BLOWERS

Royal Blower

(Ask the man who owns one)

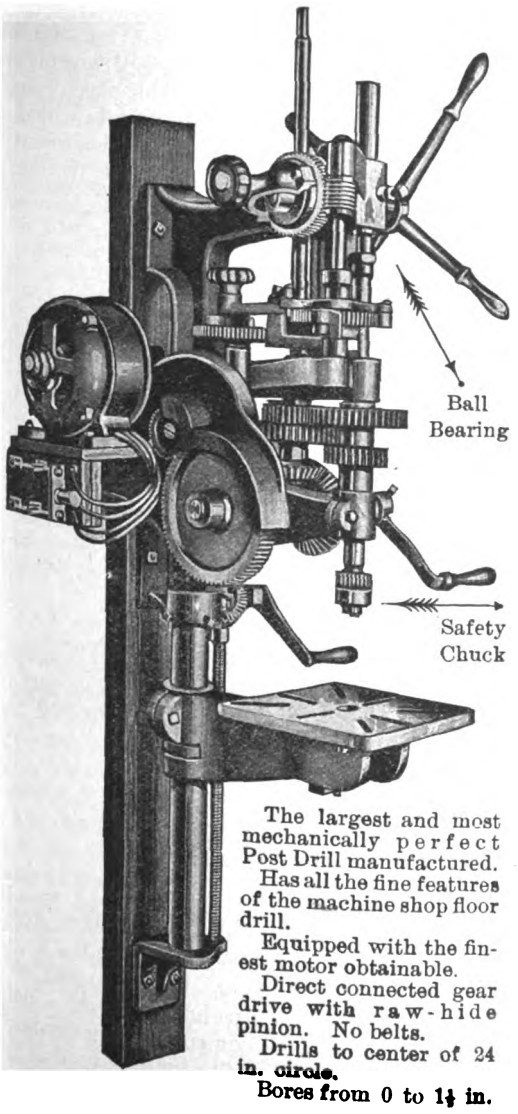


Crank turns forward or backward.

Fire-pot is 8x9½x4 in. inside.

No Spiral or Worm Gears.

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 raw-hide pinion. No belts.
Drills to center of 24 in. circle.
Bores from 0 to 1¼ in.

DRILLS
TIRE-SHRINKERS

Over 200 different styles of TOOLS. We can suit every need.

Send for Catalogue

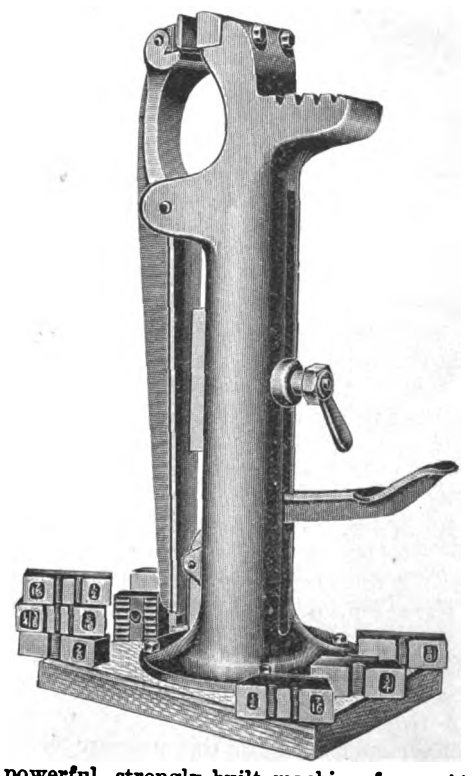
Give name of supply dealer or jobber.

CANEDY-OTTO MFG. CO.

CHICAGO HEIGHTS, ILL.

PUNCHES
SHEARS

Canedy-Otto Foot Vise and Bolt Header



A powerful, strongly built machine for making bolt heads, forming calks, shaping tools, and everything where a first-class quickly operated vise is needed.
Furnished with or without dies of the following sizes: ¼ 5/16, ⅜, 7/16, ½, ⅝, ¾.
The best of material and workmanship used throughout.

How to Weld Tires.

From Henry H. Beale, Maine.—There are many different ideas practised in welding tires. One smith will narrow both ends before welding, and another will cut the edges off after it is welded. This is done to prevent it from spreading or getting too wide over the weld. I hold both of these are wrong. The first one is wrong because when the ends are narrowed down it is impossible to make them stay together until the weld is taken, especially if it is narrow. I think the second idea is wrong because it cuts off the best part of the weld and weakens it. Some smiths will split the tire; others rivet them together. This is done to hold the tire in place until it has been welded. There is no need of this trouble, but for a new beginner a rivet is all right.

I wish to give my experience in welding tires, and as this experience has been in a factory where thousands of wheels are made yearly, I suppose it will be worth something to the reader. When the tire is ready to weld, draw down the ends and let them swell as much as they want to. Now let the helper take the end that is to lay on top and pull it towards the floor; the other end to rest on the anvil. This will give the end a tendency to press itself steadily against the lower end. Next place this end on top of the other end. The ends must not be hot enough to allow them to be shaped.

You will now notice that the top end is wider than the tire, so is the lower end. The tire is to be placed so that the swelled parts reach over and inside of each other a little. Now give a couple of blows right over the end of the under tire. Next tap the swelled sides down over the tire together so that it cannot slip to either side, and the swelled side of the under tire will prevent it from pulling out. If the top end has been so bent that it has a tendency to press down and out a little the tire will now be in good shape to weld.

Before you put the tire into the fire, let me remind you of what I have said before about the fire. Many blacksmiths are never able to weld a tire tight on the outside because of a poor, low and unclean fire. If the fire is too old or too fresh it will not give a good heat for welding a tire. If you have a good big fire high up from the tuyere, then you are all right. Place the tire in the fire and proceed as follows: No matter whether it is an iron or soft steel tire, sand is the best welding compound and nothing else should be used; but if you lose the first heat then borax might be used as it will prevent the tire from scaling and burning. When you have the right heat, place the tire on the anvil. Let the tire rest against the inside edge of the anvil. If the lower end of the tire is allowed to come down on the anvil it will cool off and can never be welded. Now hold the tire this way until you have the hammer ready to give the first blow.

Then let the tire down and strike the first blows directly on top and over the end of the other end. This is important and if the first blows are not directed to this very place the lower end will be too cool to weld when you get to it. Next weld down the upper end. This done, turn the tire on edge and while it is in a welding heat come down on it heavy with a sledge if a heavy wagon tire.

Hammer it down until it is considerably narrower over the weld as it will swell out when dressed down. This way the weld has all the material in the iron and the lapped lips will help hold the weld together. A very poor smith can weld tires to stay in this manner. The edges should be rounded off with the hammer and filed to make the tire look the same over the weld as in the iron. If there should be any trouble to weld a steel tire place a little steel borings over the weld and use borax.

When a light buggy tire is to be set mistakes are often made in measuring the tire. The tire is too light in itself to resist the pressure of the gauge. The smith tries to go it light, and if there is not the same pressure in measuring the tire there was in measuring the wheel, it will not give good results, and when the tire is put on it is either too tight or too loose. I worked for many years on a tool to hold the tire steady in order to overcome this trouble. The only device that I have ever seen for this purpose before is the anvil close up to the forge, one side of the tire on the forge, the other on the anvil. This arrangement would crowd the smith, roast his back and expose him to ridicule, but it will not help to ruin the tire.

The tool I invented is a tire holder made of cast iron. It consists of a standard or frame with a shank in to fit in the square hole in the anvil; in the standard is a slot hole from the bottom up. On the back of the standard are cogs on both sides of the slot hole. Through this goes a clutch hub with cogs to correspond with the cogs in the standard. On the outside of the standard is an eccentric lever. Through this lever is a tapered hole to fit over the clutch hub. This lever is tapered so that it will fit different thicknesses while the cogs and eccentric lever will adjust it to different widths. This device is so cheap that any smith can afford to have it.

Next time you buy a quart of whisky, sit down and figure out which will do you more good, my tire holder or the whisky. A blacksmith in a prohibition county in a northern Iowa town got into the habit of going over to a Minnesota town for a keg of beer every month. On one of his visits to the place he saw a crowd of men standing around a road grader in the road. As he approached he found that the grader had a serious breakdown and the men were just discussing the possibilities of getting the grader repaired in the village shops. One said no smith could do it, another thought they could if they only had the tools. "I know a man," said one of the party, "that can, if any man can, and he has tools, I am sure. I was over to his shop the other day to have my buggy tire set, and mind you, he had the slickest tool you ever saw to hold the tire in. I never saw a tool like that before."

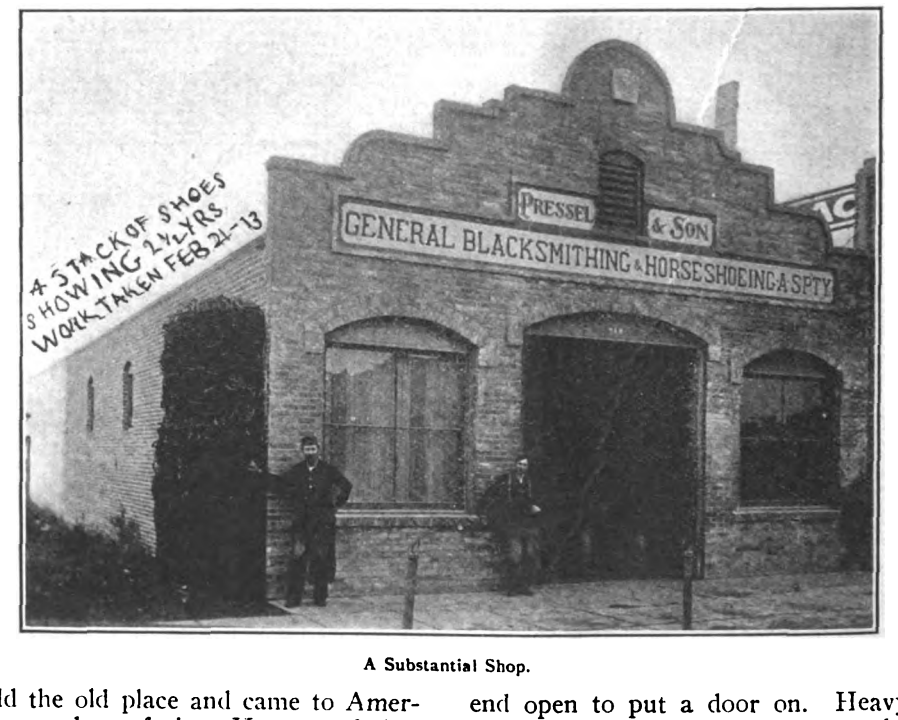
"Well," said one, "that has nothing to do with this case."

"Yes it has," said the road boss, my father always used to say, 'A mechanic is known by the tools he uses,' and when a smith has good tools in one line he has them in another, and I shall give this man a chance."

Our traveling smith had heard enough. This was a temperance and tool lecture to him. He began to think of all the trips he had made to this town. Twelve trips a year, three dollars per trip, for liquor, and the time lost must be worth two dollars per day. He figured it out and would have turned back if he had not been so close to the place. He took a glass of beer but it didn't taste as usual and he asked for a cigar. With this he returned and on the road home he swore off good. He bought a tire holder at once to start in with and by this time he is one of the best smiths in the country, always at his stand ready to do the work brought to him, and his customers now know that he is to be found in his place, with tools to do the work and a sober hand to use them with. Do thou likewise.

Long in the Business.

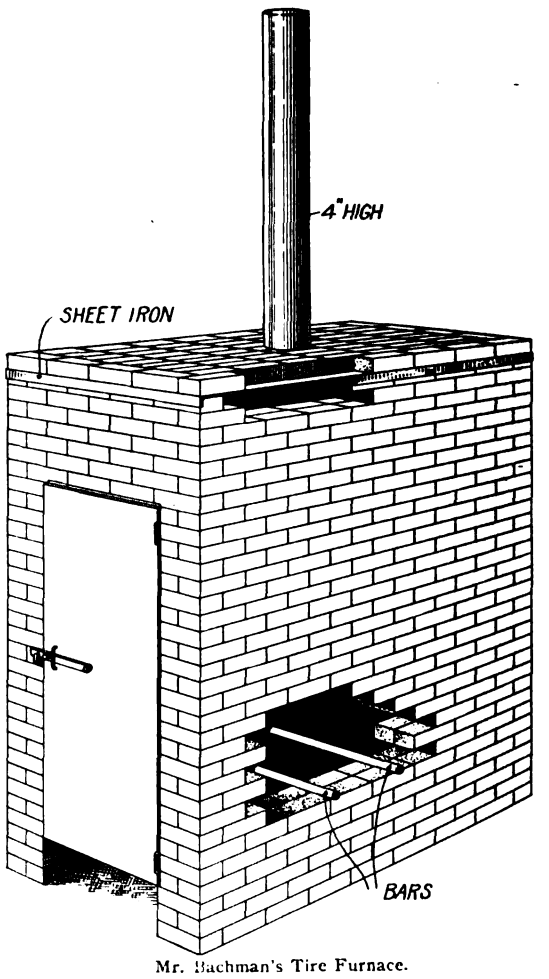
From Carl Pressel, California.—The trade has been in our family for 600 years, having been handed down from father to son. We originally came from the southern part of Germany in the province of Bavaria. My father ran a shop there for ten years, having taken the shop over from my grandfather, and after the death of his father he sold the old place and came to America when I was a boy of six. Here my father worked in a country shop a short time and then went to Portland, Oregon, where he worked in a machine shop. From there we came to southern California, where we have been since. We have a brick shop 30x75 feet on the main street. My father and I are now running the shop. We have an electric motor and two electric blowers. Father has been working at the trade since 1869, or 44 years. I am young yet but have also worked at it steadily since 1899. I took a trip to Europe eight years ago to the land of my birth and was shown some of the wagons that my grandfather made in 1849. The name and date are shown in a plate that he put on the front end of the hounds above the pole. I enclose a photograph of our shop which includes a picture of my father and myself. This shop was built in 1910, and it stands on the same place our old shop stood. The stack of shoes shown lacks a couple of hundred pounds of weighing five tons.



A Substantial Shop.

A Tire Heater.

From A. E. Bachman, Pennsylvania.—If the brother who wanted a tire furnace will make one of brick 6 feet long, 2 feet wide and 6 feet high,



Mr. Bachman's Tire Furnace.

he will have a convenient and satisfactory one. Lay a piece of sheet iron over the top; bend down on four sides to keep the wall together. Then lay brick over the top of the sheet iron and have a stove-pipe hole in the middle with a pipe to let the smoke out. It ought to be at least 4 feet high to give it good draught. Have one end open to put a door on. Heavy sheet iron will do for the door. The frame to hang the door on ought to be an old tire. Make it firm and put on two hinges and a latch to hold it closed when heating. Do not let the door come down further than about 6 inches from the bottom so that it will draw well. Have two irons crosswise in the

A Half Century of Success.—This is the record of the Rhode Island Perkins Horse Shoe Company, Valley Falls, R. I., and the attention of readers is especially called to the attractive announcement from this company in the present issue which states that experienced horseshoers who have grown old in the business stick to Perkins Shoes because they know that the Perkins was the first shoe rolled from a bar of iron and they also know ever since it has stood high in quality and satisfaction. Many horseshoers state they use the Perkins horse shoe because it is the shoe that is easy to fit. These shoes are carried in stock by all jobbers throughout the United States. They are made in over 300 different sizes and styles for every requirement and it may be interesting to our readers to know that every Perkins shoe receives three separate inspections before it is placed on the market. Readers are urged to write for interesting free booklet entitled "The Making of a Horse Shoe in an Up-to-date Plant," or the manufacturers will also be pleased to send you their catalog and samples of their shoes. Address all your inquiries to the Rhode Island Perkins Horse Shoe Company, Valley Falls, R. I., and mention this magazine.

The Milwaukee Gasoline Engine.—In this issue the Milwaukee Machinery Co., 3015 Walnut St., Milwaukee, Wisconsin, has a brief announcement of its gasoline engine for blacksmith shops. They say it is not the best in price but the best in fact. They further say that some of their engines have been in use ten hours a day for twelve years. Any readers thinking of putting in a gasoline engine should write for a circular and price list.

Absorbine for Big Knee.—W. W. Goodliff, Bolivar, N. Y., writes to W. F. Young, P. D. F., 55 Temple Street, Springfield, Mass., manufacturer of the well-known liniment, Absorbine, as follows: "I have taken a bunch off a horse's knee with Absorbine and Glycerine that a veterinary said was ruined for life. Today he is worth $2,000. I am handling a good many horses and think that Absorbine will cure most anything."

The Milwaukee Gasoline Engine.—One of the requisites for a gasoline engine is durability, and we know of a Milwaukee engine which has been in constant use ten hours per day for 12 years and is still "on the job." This engine has a built-in magneto, no gears and no commutator. Blacksmiths in many sections are acting as agents for this handy motive power. Write for dealer's price list to the Milwaukee Machinery Company, 3015 Walnut Street, Milwaukee, Wis., and mention this paper.

The Common Sense Tire Remover.—This handy device is manufactured by the Common Sense Tire Remover Company of Dowagiac, Mich. It is a convenient and inexpensive tool for removing tires, which will pay for itself many times over in any blacksmith shop. Readers should consult the illustrations in the advertisement of this company and correspond with the manufacturers, not forgetting to mention this magazine. The cost of the Common Sense Tire Remover is only $20 and those who have purchased it, say it is the very best investment possible.

wall about 1 foot above the ground to set the tires on. Then you can fire wood under. With this you can heat at least 12 light tires at once or 8 heavy ones. This furnace will last you a lifetime. Put it where it will be out of your way and still not too far away.

A Good Word for Horse Vehicles.

From Austin English, Kansas.—I take five leading monthly journals devoted to our trade and with no intention of criticising any of them, it seems to me that a good many of them have gone over to the automobile. Of course the automobile has come to stay, but like the bicycle, it will finally settle into its own channel, as many now own them who cannot afford them. The horse is going to stay along with the automobile. Several years ago carriage journals made a great feature of their smithing departments but today they cut them out entirely and devote the space to automobiles. I think a journal devoted entirely to the carriage and wagon industry would be a winner.

Friendly Words from the Green Isle.

From Rich Purser, County Waterford, Ireland.—I think it is only human that one should like well-earned praise bestowed upon him. When I get my Blacksmith and Wheelwright and turn to your editorials, I must say I am never disappointed in them, for there I find so much of interest to the blacksmith, not only as a blacksmith but as a man, words to lift him to higher and nobler thoughts and actions, which shows you have the welfare of all your readers at heart and would have us live up to our belief that there is no more honorable trade than that of blacksmith. Let me also add a word of praise to all those writers who have helped to make our paper a success.

BAND SAW SHARPENING.

The Proper File, Setting the Teeth and Use of the Saw.

From The Australasian Coachbuilder and Wheelwright.—While much has been written on saw sharpening generally the band saw has been somewhat neglected. Yet the proper sharpening of this tool is most essential to the satisfactory working of this useful machine. Theoretically, the way to sharpen all saws is to work every alternate tooth from its own side. But almost invariably in practice band saws are sharpened all from the one side, just as they are taken off the machine and without reversing. This method is found to be the most satisfactory. Two wooden wheels, about 12 in. across, with a flange on the lower side are fitted on top of a bench high enough to conveniently file the saw. One wheel is made fast to the bench at one end, but is, of course, allowed to revolve; the other wheel is fitted with a simple shifting device, such as a slot and thumb screw, so that it can be shifted to take up any slack or variation in the length of saws, because each time they are broken and brazed, they are shorter. On the side of the bench is fitted a small vise with long jaws; or a wooden saw clamp can be used. Be careful to set this so the saw passes through it as the saw revolves round the wheels; so that the saw can be held secure while it is being filed.

The proper file to use is what is known as a band saw file. It is a triangular file, with the three corners rounded off, and forms a round bottomed gullet or hollow between the teeth. The file should be held perfectly level, and worked square across the teeth filing every tooth one after the other with an equal number of strokes.

Occasionally the teeth of a band saw require ranging or stripping. This is best done by holding a flat mill saw file against the teeth while the

saw is on the machine, and running at about half the usual speed. To assist you to hold the flat file, it can be fastened to a handy block of wood with a few nails, which can be kept for the purpose of stripping saws.

When filing the saw after it has been stripped, care must be taken to see that each tooth is just brought up to a point and no more, irrespective of the number of strokes it may require. The face of band saw teeth should always be straight up, as most of the work is ripping. The hand setting of band saws is generally tedious, but with a little practice it can be quickly and evenly accomplished with an ordinary hand set. There are several ingenious devices on the market for this purpose, which can be bought at a low price, and will save their cost in a few months, and will do the work much better. Very little set is required, but it should be uniform.

A band saw should never be forced to cut when it is blunt, but as soon as it shows signs of being "tired," it should be taken off the machine and sharpened. It is the forcing the saw to cut when it is blunt that ruins the saw, because the timber is pushed so hard against the dull saw that the pressure is so severe against the friction wheel that the saw gets hot. It should also be borne in mind that the saw should not bear hard against the friction wheel, but the wheel should be set up to the back of the saw, so that it will just touch it after the saw has found its proper position on the main wheels. And if the guide wheel is set right for a narrow saw, it will have to be adjusted to suit a larger saw whenever you have to change. A little oil on the face of the friction wheel will often be an advantage to reduce the friction where the back of the saw bears against the wheel.

When using the saw if you notice it does not go through the timber freely, but there is a series of little jerks or bumps while the saw is cutting, it is a sign that the saw is most likely cracked; so stop and examine the saw carefully, and when the fault is located it can be broken and brazed again.

Wagon Hub Standards.

From F. W. Pool in The Woodworker.—I have been making yellow birch wagon hubs for the past twelve or fifteen years, and have always advocated standard sizes and shapes. During the year 1910, in the manufacture of hubs for about twenty-odd wagon manufacturers, I had about 200 sizes to work from and probably half as many different patterns.

Many of the wagon manufacturers call for hubs to be turned during the months of January, February and March, out of winter-cut timber.

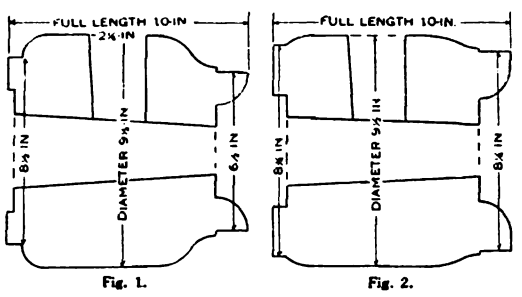


Fig. 1. Fig. 2.

In this section (northern Minnesota and Wisconsin) birch timber gets about as hard as stone at this time of the year, and some of the patterns are almost impossible to turn when the timber is frozen. You will say, most likely, that a standard hub would be as hard to turn as any other; but just a moment. Let us look at Fig. 1.

Any one at all familiar with the hub business will tell you that a hub similar to Fig. 1 is a hard hub to make in cold weather. The diameter at center of this hub is 9½ inches and the front end is 6½ inches. The center of the bearing on hub is 5½ inches from the front end of hub. The mortise is 2¼ inches long. After allowing ¾ inch for spoke band we have 2⅜ inch left to drop down from 9½ inches to 6½ inches, which shows an ogee pattern similar to Fig. 1.

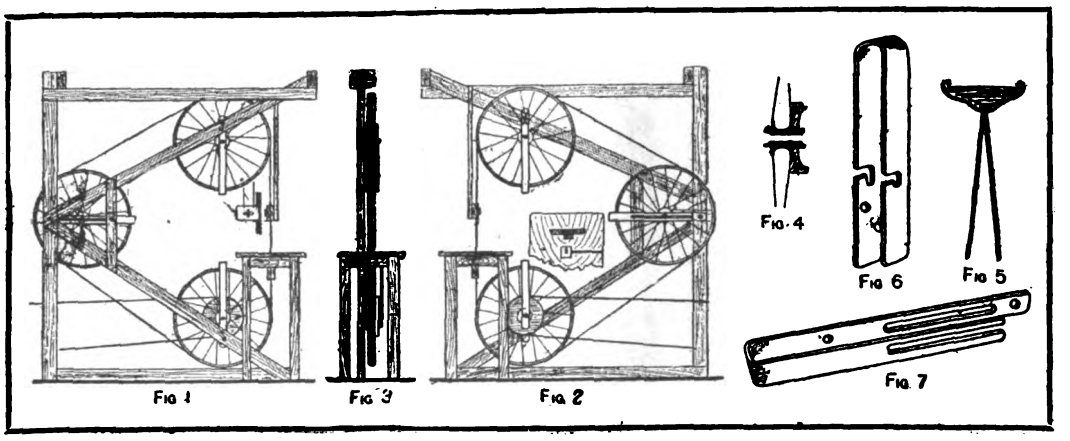
A standard hub could be established, say, similar to Fig. 2. This calls for the same dimensions as in Fig. 1, with the exception of the front end, which is 8¼ inches in diameter. This makes a very nice looking hub and one that I can safely say will stand the weather from two to three years longer than one like Fig. 1.

One of our hub manufacturers from Wisconsin, at the hub-makers' convention in Cincinnati last fall, made the remark: "You would be surprised to see how much of an expert a man will get to be if you have him do one thing all the time." He was referring to machine men at his factory, but at the same time, if we had a standard hub to make, would we not get to be eminently proficient in the turning of this one shape?

The hub mill foreman has lots to contend with, as many of the wagon manufacturers are very hard to please. Mind, I am not saying all of them, as I have some very good friends at some of the wagon factories. But when a man is called into the office and handed what looks to like him the President's message to Congress, and, after reading eight or ten pages of typewritten copy, he finds that he has placed the mortise 1/64 inch too close to the back end of the hub, he feels as though he never wanted to see a wagon hub again or that a standard hub should be established.

Band Saw with Wire Bicycle Wheel.

From Work, England.—In the accompanying illustrations, Figs. 1 to 3, show a three-wheel band-saw fitted on to a wood frame. The usefulness of this machine is known best to the woodworker, and the writer can recommend it to all who want to be able to cut light material or anything up to 3 inches thick.



Making a Band-saw with Three Cycle Wheels. Fig. 1.—Rear of Band-saw. Fig. 2.—Front of Band-saw. Fig. 3.—Side View Showing Table. Fig. 4.—Hub of Wheel with Wood Pulley Attached. Fig. 5.—Rim of Wheel Filled with Upholsterer's Webbing. Fig. 6.—Bearings for Top and Bottom Wheels. Fig. 7.—Bearings for Mid Wheel.

The frame is made from 6-inch by 2-inch white-pine battens, half-checked at the joints, which should be well screwed together. In fixing the frame, the position of the driving shaft must be taken into consideration, and also what means are to be employed to start and stop the machine.

The position of the frame having been fixed, it should be set in position and secured to the rafter in the workshop roof; or if these are not suitable, to two runners as shown at the top of Fig. 1. The lower part of the frame is fixed on to the floor with a piece of strap iron.

Having procured two front and one rear cycle wheels, proceed now to prepare those for the machine. The teethed cog should be taken out of the rear wheel, and a wood pulley built of two thicknesses fitted in its place (see Fig. 4). The diameter of the wood pulley will depend very much on the diameter and the velocity of the driver; but in all cases the circumferential velocity of the saw should not be less than 9,000 feet pe minute.

To prepare the rims of the wheels for the saw to run on, wind with narrow web, the narrower the better, until the space is filled up to within ⅛ inch of the beaded edge of the wheel (see Fig. 5), and fix the end of the web by sewing.

The wheels are now ready for the strap-hangers (Figs. 6 and 7); which should be made out of 1½ inch by 3/16 inch iron. The two required for the upper and the lower wheels are cut and bored in pairs, as in Fig. 6. Fig. 7 is made with a slot, which will allow the middle wheel to be altered in position, according to the length of the saw in use. The hangers should now be bolted on to the wood frame, and the wheels fixed in position for the saw.

Proceed now with the fixing of the saw table, which should be about 3 feet 4 inches high, with legs 2½ inches square, rails 3 inches by 1½ inches, and 1¼ inch tops. Before fixing the top put the hand-saw on the wheels, and where the saw passes through the table cut a 2 inch square hole at 30° to the surface (see Fig. 2). A 2 inch block of hard wood with a saw-cut should be fitted into the table top as inset in Fig. 2. The advantage of this is that by taking out this block the saw is easily removed; and, also, should the saw-cut in the block become too wide, the block is easier renewed than the table top.

The machine should now be carefully adjusted, and the lower and upper guide blocks fixed in position. To fix the upper block, a vertical rail should be fixed to the frame and the guide piece, which is 4 inches wide by 2 inches thick, and made with a longitudinal slot, so that it can be adjusted according to the running of the saw.

Steel Working and Interfering.

From W. D. Ralston, Indiana.—Some smiths give lots of advice and not the right kind. The following is what I want to say to the craft, in regard to the working of steel: Always keep a clean fire, free from clinkers, and take plenty of time with your work, as different steel works differently, some takes lots of heat while other steel takes but little. My experience is this: Watch your steel and when the material begins to glare over, no matter how low a heat you have, the scum that covers the steel will tell you just when you want to remove it from the fire. The same is true of iron.

A great many blacksmiths make a great fuss when shoeing a horse that interferes. All it takes is a right good paring of the foot and a proper fitting of the shoe. The way I do is to fit the shoe to the foot and let the shoe come back to the end of the foot on the back part, and not a bit longer as that makes extra exertion on the part of the horse when traveling. I have had good results shoeing that way, and hope these few remarks will help some brother craftsman.

QUESTIONS FOR OUR READERS

You are invited to ask questions freely on all points pertaining to your work. Our subscribers who have solved successfully the problems which confront you will take pleasure in imparting the results of their experience for the benefit of their fellow-craftsmen.

Wants a Tire Heating Furnace.

From George W. Holton, New Hampshire.—I would like, through the columns of THE BLACKSMITH AND WHEELWRIGHT, a suggestion about a tire-heating furnace. We have to heat these indoors here. I have a furnace five feet long and five feet high, twenty inches deep with iron doors in front to open when taking out tires. I do not like it as the heat is so intense one can hardly stand up to it when taking out tires with an iron lever. I would like to hear from some one who has a good one.

Cure for Thrush.

From R. G. Marks, Pennsylvania.—May I ask the readers of The Blacksmith and Wheelwright if some one can tell me a good cure for thrush? I have a horse that has the thrush badly.

Charging Prest-o-Lite Tanks.

From James Anderson, Canada.—I would like some reader to give a method for blacksmiths to charge Prestolite tanks for auto lighting.

Welding Compound Wanted.

From J. B. Gillespie, Ohio.—I should like to be informed, through your paper, of some kind of welding compound for welding high grade plow plate steel to bar iron. I have tried several so-called remedies, but none of them have proved satisfactory so far for either spring or any other.

Drop Forging.

From W. Peter, Ohio.—Can some brother blacksmith give me information about drop forging with an ordinary power hammer? I am particularly interested in drop forging a special blacksmith tongs.

Who Can Tell?

From E. J. Burton & Son, Arkansas.—Who is the champion horseshoer of the States, if any? How many shoes did he set up and nail on, and where was such contest held?

Corn Mill Buhrs.

From Hugh L. Lyman, Kentucky.—An article on corn mill buhrs and how to dress and keep them in order would be of service to the novice if written by a practical miller. In the South and West blacksmiths are adding corn grinding to their business so they can make use of their engines.

(Note by the editor.—Possibly some reader may be able to give the information Mr. Lyman wishes, and if so, we should feel obliged if he would send it to us for publication. It would seem to be a good idea to take on work that will keep the gasoline engine in fairly constant use.)

Carriage Top Dressing Formula.

Carriage tops that have faded and become gray can be restored by washing with a solution composed of:

Nutgalls	4 ounces
Logwood	1 ounce
Copperas	1 ounce
Clean iron filings	1 ounce
Sumach berries	1 ounce

Put all but the iron filings and copperas in 1 quart of the best white wine vinegar, and heat nearly to the boiling point; then add the copperas and iron filings. Let stand for 24 hours, and strain off the liquid; apply with a sponge. This is equally good for restoring black cloths.

2. Old, Faded and Cracked Carriage Tops.—The top should be washed with warm water and thoroughly dried; then with a sponge give one or two coats of the formula as given above, as may be required by the condition of the top. When dry, apply one coat of lampblack, using oil or varnish enough to give a gloss. Moss off when dry and give a coat of drop black mixed a little quicker than the first coat. Follow up with a little coach Japan in it.

3. Restoring Enamel Leather Carriage Tops.—First wash the top with soft water and castile or crown soap to remove dust, dirt, etc., using a sponge, and then scrub with a moderately stiff brush, cleanse with clean water and dry with chamois leather. Never apply any kind of oil or top dressing without first cleaning the leather.

Hardening Lathe Centres.

In hardening lathe centres the point of centre should be heated to a bright red, then cooled in clean, cold water. After it becomes cold it should be withdrawn and the dirt removed so that the color may be noted. One maker of machinery recommends that centres be drawn to a light straw color. Care should be taken not to heat the centre very far back, as it is liable to become sprung.

40 Years' Experience as Axle Makers.—Wood, Smith & Company, of Chicago Heights, Ills., have been manufacturing standard buggy and wagon axles for more than 40 years and this in itself should be a strong recommendation of their product to our readers. Their axles are lap-welded under hammers and the weld will not break. All corners and splices are hammered hot. W. S. & Co. steel farm-wagon axles with thimble skein bearings and semi-steel hardened interchangeable boxes are also used by this old and reliable house. Direct your inquiries to Wood, Smith & Company, Western Axle Works, Chicago Heights, Ills., and mention The Blacksmith and Wheelwright.

The Simonsen Hot Trimming Shear.—This is described by the manufacturers as the handiest tool for cutting out plow points, trimming cultivator shovels, etc. Hundreds of them are in use throughout the United States. Ask your jobber or write for circulars direct to the Simonsen Iron Works, Sioux Rapids, Iowa, and mention The Blacksmith and Wheelwright.

Level Feet Promote Speed.—The time has passed when mechanics in any line do their work by "rule of thumb" and it is generally recognized in these days that scientific methods and exact measurements are necessary in all branches of activity. These are some of the reasons which should recommend to our readers the Scientific Horse Foot Leveller, manufactured by the John Hood Company, Boston, Mass. This tool enables the horseshoer to see that the horses' feet are all at the right angle and it is recommended by many of the best drivers, veterinaries and blacksmiths through the country. It is inexpensive and will save its cost many times in the improved quality of the wofk which a horseshoer may turn out by its aid. Write for testimonials, cuts and prices to the manufacturers and mention this magazine.

Steel Sideweight Horse Shoes.—The famous Hartford Steel Sideweight Horse Shoes with undercut crease are manufactured by the Sideweight Horse Shoe Co., Hartford, Conn., and these shoes have won a deserved reputation throughout the world for shoeing race horses and for use wherever high-grade shoes are required. They are packed in wooden boxes, ten pairs in a box, and also in 100-lb. kegs, and they come in track weight, medium and heavy weight. Ask your jobber for these shoes or write for samples and particulars to the Sideweight Horse Shoe Co., Hartford, Conn., not forgetting to mention this magazine.

Falkenhainer Auxiliary Vehicle Springs.—These are manufactured by Falkenhainer & Co., for elliptic spring wagons, platform spring wagons, vans and trucks, also buggies, surries and factory automobiles. Of course, the object of these springs is to make the vehicle ride easier. Ask your supply dealer for list of sizes and prices, or write direct to Falkenhainer & Co., 313 Carr St., St. Louis, Mo.

Clip Your Horses.—The Gillette electric, steam or hand-power machines have achieved, in the years they have been on the market, a well-earned reputation for reliability and efficiency. Write for descriptive circular and prices to the Gillette Clipping Machine Co., 110-114 West 32nd Street, New York City.

WANT ADVERTISEMENTS

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

will be inserted under this head at 2 cents a word, including the address for each insertion, payable in advance; but no advertisement will be accepted for less than 50 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 FOR INVENTIONS.

H. W. T. Jenner, patent attorney and mechanical expert, 608 F. St., 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.

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.

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.

PATENTS.

C. L. PARKER, attorney-at-law, and solicitor of patents. American and foreign patents secured promptly. Handbook for inventors sent free upon request. 926 G street, Washington, D. C.

BLACKSMITH.

Here is your opportunity to be an expert blacksmith without help. As life is short, get Toy's Modern Methods of doing hard jobs easy, forging and welding all kinds of steel solid. Also tempering all tools to a standard by colored charts. This is real plain information, not theory, all for $1.00. Send for free samples first. W. M. TOY, Sidney, Ohio.

BROTHER.

Accidentally have discovered a root that will cure both tobacco habit and indigestion. Gladly send particulars. No drugs. G. S. STOKES, Mohawk, Fla.

MECHANICS.

Send for a circular describing "Mechanics' Companions," a tri-square, a centering square, a calliper, rule and protractor. Address J. O. HESS, Oran, Mo.

PATENTS

PATENTS secured. Ideas bring wealth. Prompt service. Personal attention. HARRY PATTON CO., McGill Bldg., Washington, D. C.

WANTED.

WANTED—Traveling men who visit the carriage, implement and livery trade make big commissions selling our steel and rubber tired wheels, poles and shafts as a side line. Why don't you try it? THE BOOB WHEEL CO., Cincinnati, Ohio.

Auto Cylinders rebored. Pistons and rings fitted $8.00 to $12.00 per cylinder. Gear cutting in nickel, steel, brass, fiber, etc. Crank shafts, connecting rods, cases and axles reproduced like original. Send old or broken parts to go by. McCADDEN MACHINE WORKS, St. Cloud, Minn.

POWER USERS.

We offer one fine 8 H. P. stationary Milwaukee gasoline engine for only $115.00. Have also 50 other sizes and styles. State your power requirements before you buy. We can save you money. BADGER MOTOR COMPANY, Milwaukee, Wis.

CASH FOR YOUR BUSINESS OR REAL ESTATE.

I bring buyer and seller together. No matter where located, if you want to buy or sell, address FRANK P. CLEVELAND, 975 Adams Express Building, Chicago, Ill.

FOR SALE OR EXCHANGE.

Taxi-cab, half-ton truck, two touring cars. L. C. HAUBER, St. Mary's, Pa.

Auto parts repaired, cylinders re-bored, pistons fitted; prompt shipments. HAUBER AUTOMOBILE WORKS, St. Mary's Pa.

WANTED.

Articles to manufacture in wood or metal. Parties with limited capital in their business will do well to confer with us. HAUBER MFG. CO., St. Mary's, Pa.

FOR SALE.

Blacksmith shop in good country town in good farming section, middle Texas. Address for full particulars, W. H. JONES, Box 28, Turnersville, Texas.

FOR SALE.

Blacksmith shop, stock, tools. Good location. Good reasons for selling. Address L. C. LARSEN, Carroll, Nebr.

FOR SALE.

Shop and tools. Lots of work. Also dwelling property. Good town. Good schools. Three churches. For further particulars address M. R. REEVES, Grenola, Kansas.

FOR SALE.

A modern power equipped repair shop with first class stock and tools. Good trade and location. This is a bargain for some one, as it must be sold to close an estate. Address MRS. H. H. BULLINGER, New Haven, Mo.

Carriage painter wishes to hear from carriage or horseshoeing shop that has a paint shop. Good place, rent free. Address W. A. RIGGLEMAN, Jamestown, Ohio.

FOR RENT.

In a good location, a blacksmith shop with tools. Address for full particulars and price, JNO. MARTIN, Sea Cliff, L. I.

FOR SALE.

A fine stone blacksmith and shoeing shop. Fully equipped with electric power and latest improved machinery in good R. R. town. Plenty of work and good prices. $4,000, $2,000 cash. Balance on time. A. G. BIMSON, Berthoud, Colo.

FOR SALE.

Full set of pipe cutting dies. Forge and bellows, boiler makers' forge, also some special snaps in new and second-hand automobiles, auto tires, supplies, etc. Write us your wants. Box 275, Burlington, Wis.

FOR SALE.

First-class blacksmith shop, with materials and latest improved tools and machines. For particulars apply to THOS. BALL, Sinton, Tex.

FOR SALE.

A bargain. One No. 3 West tire setter, used only short while. Address BALTIMORE HUB WHEEL & MFG. CO., Baltimore, Md.

FOR SALE.

Cheap. Blacksmith and wagon shop with all tools complete, doing A No. 1 business in a thriving brick manufacturing and coal mining town. Good location and lots of work. Owner wants to quit on account of health and other business. Address for further particulars, ARTHUR BASSETT, Bolivar, Pa.

FOR SALE.

One 5 horse gasoline engine, one Cordesman combination saw, 16 inches, one Canedy Otto Power Blower for one to four fires, one old fashioned Root's hand blower. For further particulars and prices address the WOLFE TIRE COOLER COMPANY, West Carrollton, Ohio.

FOR SALE.

McGovern and West power tire shrinker, Moyer and Defiance hub boring machine. All as good as new at one-third the price of new ones. Address, 554 Freeman Avenue, Cincinnati, Ohio.

WANTED.

One first class carriage blacksmith for pressing and punching department to take charge of room. We want a hustler and one who can handle men. Give us full particulars as to age and experience in first letter. All replies strictly confidential. Address DOUGLAS & LOMASON CO., Detroit, Mich.

FOR SALE.

Power blacksmith shop, stock and tools. Good location. Work for two men. For full particulars address Box 441, Elma, Iowa.

SALES.

Latest improved Hub Boring and Spoke Tenoning Machines, Universal Wheelwright Woodworkers, Band Saws for foot or belt power. Best in the market. Inquire CHARLES HAMMER, 260 West Broadway, New York.

DON'T PURCHASE A TRIP HAMMER

Until you have asked for a price from the COLEMAN IRON WORKS, Elmira, N. Y., U. S. A.

BARGAINS.

Steam Engines and Boilers, 5, 8, 12, 15, 20, 30, 40 and 50 H. P. Kerosene Oil Engines, 3, 6, 15, 25, 60, 75 and 80 H. P. Gas and Gasoline Engines of different sizes, all being in good operating condition. Address C. H., care Blacksmith and Wheelwright, P. O. Box 654, New York City.

WANTED.

A blacksmith and horseshoer. Must be good all around smith. We have a saloon in our town but boozers need not apply for the job. Address F. D. HAMMER, Arenzville, Ill.

FOR SALE.

Blacksmith shop with power. Work for two men year around, 8-room house. Good improvements. $4,500, terms if wanted. W. A. JACK, Evans, Colo.

WANTED.

Horseshoer and general blacksmith—one who can do woodwork and capable of running shop. Address JAMES JACKSON, Hunter, New York.

FOR SALE.

Blacksmith shop, well equipped, 24 by 60, good location. COL. ROUSE, Cleveland, Kan.

AUTOMOBILE REPAIRS.

Blacksmiths who own automobiles or repair automobiles in their shops should subscribe for the Automobile Dealer and Repairer; the big 100-page illustrated monthly devoted exclusively to automobile repairs. The only magazine of the kind in the world. The "Trouble Department," with five pages of numbered questions each month from car owners and repair men, which are answered by experts on gasoline engine repairs, is worth many times the subscription price, which is $1.00 per year or 15 cents per copy. The subscription price of this magazine in foreign countries, including Canada, is $1.50 per year. Postal cards will not be answered. CHARLES D. SHERMAN, 52 Windsor Avenue, Hartford, Conn.

WANTED.

Blacksmiths everywhere to use and sell calipers and pocket levels, liberal proposition. ERNST SMITH, Columbia, Pa.

WANTED.

Work by the job or by the day in a blacksmith shop. I am an all around man. I do not drink. Am sober and regular to my work. Am instructor in wheelwrighting and blacksmithing at the R. H. N. I. School. Address C. H. SOUTHAL, P. O. Box 86, Eatonville, Fla.

FOR SALE.

One 3 H. P. gasoline engine in first class order, ready to run. Newly equipped and painted. Price $50.00. A bargain. Address P. O. Box 25, Kent, Ind.

WANTED.

Good horseshoer or floorman to work in general repair shop. A Seventh Day Advent preferred. Address DAVID HARTLEY, Newark, Ill.

Sta-rite Power Hammer.—These hammers are manufactured for the blacksmiths' trade by the Star Foundry Company of Austin, Minn. An illustration of this hammer will be found in our advertising columns. It is said it will save muscle, time and patience, besides increasing your income and reducing the cost of production. The hammer is guaranteed to be durable and it is economical in shop space and the price charged for it. The hammer head is made of 50-lb. high carbon steel and has all steel unbreakable guide, best tool steel dies and adjustable spring links. All machines are fully guaranteed by the manufacturers. While these hammers may be purchased from nearly every jobber, interested readers are requested to write for description and price direct to the manufacturers.

VACCINATION FOR GLANDERS.

Views of a Well-Known Veterinary Surgeon As To An Obstinate Disease.

J. H. Ferster, V. S., in the New York Herald.—No subject is of more vital importance to the horse owners of New York City today than that of glanders. More than twelve hundred horses suffering from this disease were destroyed last year in this city. These horses were worth approximately $400,000.

To give the reader a correct idea of the status of the glanders question as it exists today in New York it will be necessary to call attention to a few facts. In the first place every veterinarian and every M. D. knows that in daily practice we meet some diseased conditions of which it is impossible to immediately make a positive and correct diagnosis. There are some diseases the earliest symptoms of which are so similar that all practitioners hesitate to express a diagnostic opinion. In such cases the practitioner, if he is honest to himself and to his client, waits and watches for a differentiating symptom.

It is a well known fact that if an animal's system is weakened either by overwork or poor nourishment or disease, he is more apt to succumb to any disease. It was this fact that led veterinarians twenty-five years ago to administer a physic ball to all suspected cases of glanders, of which the symptoms were not sufficiently plain to enable them to form a positive diagnosis. This method has, however, been quite generally abandoned since the introduction of mallein, which is now used quite extensively as a diagnostic agent. It was its action and the impression it made upon me when I first began its use that made me willing and anxious to experiment with the glanders vaccine furnished me some five years ago by Dr. Aaron Silkman, of the Board of Health, of this city. Together with my associate, Dr. R. S. MacKellar, I have been using it ever since, with results that indicate its usefulness when properly handled.

At the conference of veterinarians called on January 17, 1913, by Calvin J. Huson, Commissioner of Agriculture, to discuss the subject of glanders and how best to handle it, I made the statement that I believed "glanders in certain stages is curable," and took issue with the State inspectors and other veterinarians who held that all animals responding to the present tests should be destroyed.

I believe if you want to handle this matter with justice to the horse owners and with any promise of success you must take into consideration the curative and preventive elements of the subject. And I wish to emphasize "with justice to the horse owner," because without the element of justice no problem is rightly solved, and to my mind nothing can be more unjust than to destroy horses that show no external signs of glanders, even if they do respond to the blood or mallein tests. My reason for this position is demonstrated quite forcefully by scores of horses that responded to the mallein test more than six months ago and have been working every day since.

All horses in a stable of fifty-seven head were given the mallein test, because every little while previously we had found a glandered horse there. Thirty-seven responded and four broke down and were destroyed. The thirty-three others were treated with the vaccines. Each horse has taken on flesh since beginning the treatment, and not one has been sick since, although they all responded to the mallein and blood tests, and according to the theory advanced in the recent conference called by the Commission of Agriculture to consider glanders, they should have been destroyed. Their value is about $12,600—quite a neat little sum to sacrifice to a theory.

Those opposing the use of vaccine claim that by its use we are simply covering up the disease and that it will break out anew and be a source of danger to other animals, but a veterinarian who is wise enough to tell by examining these horses that they are affected with "covered up glanders" ought to be wise enough to tell us how long it will remain "covered." But I have not yet found the veterinarian that cared to hazard such a prophecy.

In another stable of thirty-six horses that were given the blood and mallein tests about a year ago seventeen responded to the test, but instead of destroying them they were given the vaccine treatment, and not one of them has shown any signs of glanders since.

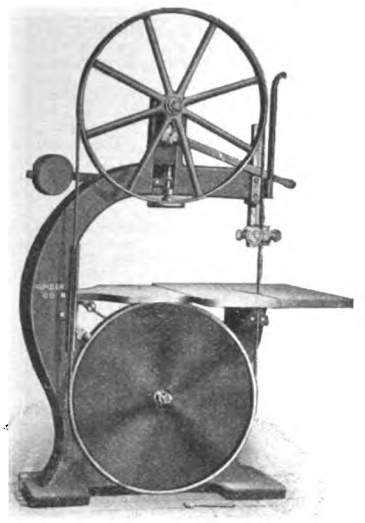
I could fill this entire page with photographs and accounts of horses that have responded to the blood and mallein tests, that have been given the serum treatment during the past three or four years, and are now working, apparently as healthy as any horses can be.

It is on account of these facts that I am thoroughly opposed to the proposed compulsory inspection measure and the destruction of all animals responding to the test,

While mallein is probably the most reliable diagnostic agent we have, yet it is hardly infallible. The blood test which some consider positive is not shown to be so in actual practice, because it is on record where two specimens of blood taken from the same animal and examined by two chemists have been returned with a conflicting report.

A Medium Priced Band Saw for Small Shops.

A medium priced band saw for use in wood-working establishments of all kinds where the amount of work to be done does not warrant the use of a large capacity saw has been brought out by J. A. Fay & Egan Co. That the Fay-Egan "Lightning" No. 345 is a medium priced machine does not mean that it has not been carefully designed and made. In fact, it has incorporated in its construction the principle which makes this company's high duty band saws capable of standing up under hard work and lots of it; i. e., the solid lower wheel



Medium Priced Band Saw. Made by J. A. Fay & Egan Co, Cincinnati, Ohio.

controlling the light-spoked upper, which arrangement has proved the most satisfactory for preventing over-running or choking in heavy cuts. The wheels are taper fitted to shafts running in babbitted bearings. The upper wheel has vertical adjustment and device for tracking the blade. All adjustments are made from the front where operator stands and without stopping the machine. Their weighted straining device is fitted to the upper wheel and keeps the blade properly tensioned at all times. This saw can also be fitted with resawing and radius attachments and special tilting table for pattern-shop work which may be had at a slight additional cost.

Further information may be had from the makers, J. A. Fay & Egan Co., 175-195 W. Front St., Cincinnati, Ohio.

The Improved Starite Power Hammer.

In this connection we illustrate the Improved Starite Power Hammer manufactured by the Star Foundry Company, Austin, Minn. This hammer is intended especially for the use of blacksmiths, machinists, or all those requiring a ham-

A Good Power Hammer.

mer of moderate capacity. It was designed by a practical blacksmith who had 18 years' experience building power hammers. Its strength and simplicity is shown in the accompanying engraving, but write for a full descriptive circular, giving many other interesting features, and price list. Every blacksmith shop having power should have a power hammer. It will save a great deal of hard work.

Auxiliary Seats for Automobiles.—The Hill Manufacturing Company, 25-27 Fuller St., Buffalo, N. Y., makes a specialty of the manufacture of auxiliary seats of high quality for automobiles, and this is a side line which might interest many of our readers. Description and price will be sent to any one who will write to this concern, mentioning The Blacksmith and Wheelwright.

"Pioneer" Shaft Ends.—These shaft ends, the manufacturers say, stand out pre-eminent as the leading repair socket on the market. They also state that this shaft end may be attached to the broken shaft in less time than any other repair socket and that it produces the strongest possible joint. Your jobber will furnish you with this article or you can write direct to the manufacturer, Crandal Stone and Company, Binghamton, N. Y., not forgetting to mention this paper.

The Little Giant Tire Setter.—This is described by the manufacturers as "the machine that makes tire setting a pleasure." Write to-day for catalogue giving complete information regarding this machine to the Keokuk Hydraulic Tire Setter Co., 29 Johnston St., Keokuk, Iowa, not forgetting to mention this paper.

Money-Making Lawn Mower Grinder.—C. R. Zacharias, Asbury Park, N. J., manufactures a power-driven lawn mower grinder, which is said to possess unusual merits. It is sold under a positive guarantee on easy payments. Write to him for his catalogue.

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Spliced Joint Shaft and Pole Ends.—The original spliced shaft ends for repair work are manufactured by the Steel Socket Shaft End Co. of Cleveland, Ohio. The spliced joint where the woods meet adds great strength and guarantees the device against breaking where repaired, and prevents them from working loose and rattling. This article is handled by all leading jobbers, but if your dealer does not have them you should write direct to the Steel Socket Shaft End Co. and mention this magazine.

Cat-Foot Shoes at the Inaugural.—The four black horses that drew the President's carriage in the inaugural parade in Washington and the four black horses that drew the Vice-President's carriage were equipped with Cat-Foot shoes. The shoes had been well tried out and gave perfect satisfaction, and the owners of the horses were glad and satisfied to equip them for this important function with these cushion and non-slipping shoes. They gave perfect service on the slippery asphalt of Pennsylvania Avenue and what is good enough for our President and Vice-President in Washington ought to be good enough for the rest of the horse-owners throughout the country.

THE MODERN GASOLINE AUTOMOBILE; its construction, operation, maintenance and repair. By Victor W. Page, M.E. The Norman W. Henley Publishing Co., 132 Nassau St., New York. Price, $2.50.

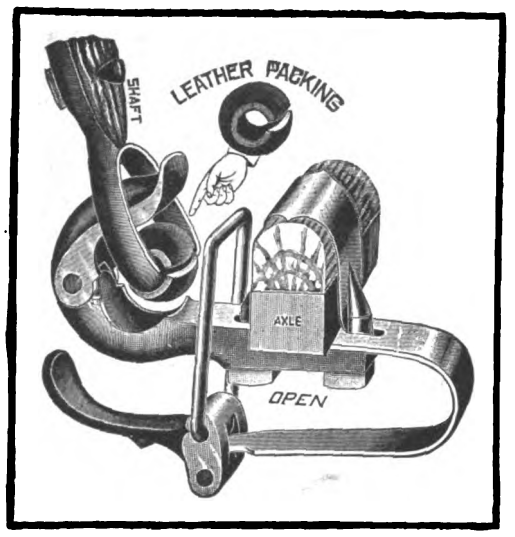
An up-to-date and most complete treatise on the gasoline automobile. Written in simple language by a recognized authority, familiar with every branch of the automobile industry. Free from technical terms. Everything is explained so simply that anyone of average intelligence may gain a comprehensive knowledge of the gasoline automobile. The information is up to date and includes, in addition to an exposition of principles of construction and description of all types of automobiles and their components, hints on the care and operation of motor cars propelled by internal combustion engines. By a careful study of the pages of this book one can gain practical knowledge of automobile construction that will save time, money and worry. The book tells you just what to do, how and when to do it. Every part of the automobile, its equipment, accessories, tools, supplies, spare parts necessary, etc., have been discussed comprehensively. If you are or intend to become a motorist, or are in any way interested in the modern gasoline automobile, this is a book you cannot afford to be without.

AUDEL'S ANSWERS ON AUTOMOBILES. Theodore Audel & Company, New York, publishers. Price, $1.50.

Of the many books recently issued in relation to this subject, this seems one of the most compact and comprehensive. It is well illustrated and the subjects are fairly well classified and indexed. The subject is pursued in the question and answer form, and automobile owners and repair men will find it useful whenever they are confronted with troubles concerning the care and repair of a car. The automobile is a machine which involves a consideration of a wide range of facts, and the study of its construction and operation is quite a liberal education. After one has studied this work for a time he ought to be able to run an automobile and to repair and care for it. The work contains 466 pages, and is well illustrated with line cuts. Some space is occupied in giving information about motor cycles, and there are special chapters in relation to dynamos and storage batteries. The book will be sent on receipt of price by addressing the publishers, or the Motor Vehicle Publishing Company, 71 Murray Street, New York.

Calipers.—Read the announcement in this issue of Ernst G. Smith of Columbia, Pa., manufacturer of calipers of unusual efficiency and accuracy. Write for his catalogue and special discounts mentioning The Blacksmith and Wheelwright.

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



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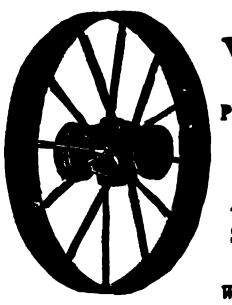

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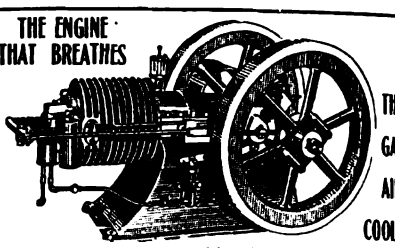

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Get our special proposition to BLACKSMITH & WHEELWRIGHT readers at once. Write tonight.

GADE BROS. MFG. CO., 200 Main St., Iowa Falls, Ia.

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.

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

will clean them off without laying the horse up. **No blister, no hair gone.** $2.00 per bottle, delivered. Describe your case for special instructions and **Book 8 E free.**

ABSORBINE, Jr., liniment for mankind. Removes Painful Swellings, Enlarged Glands, Goitre, Wens, Bruises, Varicose Veins, Varicosities, Old Sores. Allays Pain. Price $1 and $2 a bottle at druggists or delivered. Manufactured only by

W. F. YOUNG, P. D. F., 55 Temple St., Springfield, Mass.

PATENTS

C. L. PARKER
Ex-Member Examining Corps, U. S. Patent Office.
Attorney-at-Law and Solicitor of Patents.

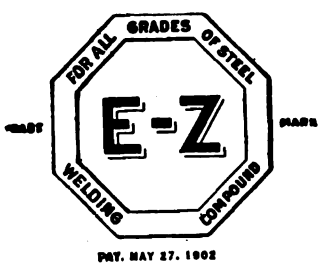
American and foreign Patents secured. Trade-marks registered. Searches made to determine patentability, validity and infringement. Patent suits conducted. Pamphlet of instructions sent upon request.
26 McGill Building. WASHINGTON, D. C.

ESTABLISHED 1873.

$60 Lathe. Gap Lathes, Turret Engine Lathes and Shapers, Screw Cutting, Foot and Power Lathes, Hand and Power Planers, Hand and Power Drills, Chucks, Emery Wheels, Outfits. Tools especially for Blacksmiths, Electricians and Bicycle work. Catalogue Free.

SHEPARD LATHE CO.,
141 West 2d Street, Cincinnati, Ohio.

"E-Z" Welding Compound "E-Z"



Will make perfect welds at 250 degrees lower heat than any other flux known.

"E-Z" Will Stick to the metal **when the metal is at a low heat.** No other so good for **Spring Steel, Tool Steel, Tire** or **Axle Welding.** Try once and you will always want it.

Send to us for *FREE PREPAID SAMPLE.*

Manufactured only by the

ANTI-BORAX COMPOUND CO., Manufacturers of

WELDING, BRAZING AND TEMPERING COMPOUNDS,

For sale by all leading jobbers. **FORT WAYNE, INDIANA.**

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**

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 head of the "Want" Department on another page.

ONLY SELF-SETTING PLANE SENT ON TRIAL

Our $1.00 CERTIFICATE and carpenter's pencil FREE if you mention the Blacksmith and Wheelwright.

FREE—another pencil if you send addresses of ten plane users.

This paper guarantees we will do as we advertise, so send now, don't wait, write tonight.

GAGE TOOL CO., Vineland, N. J.

"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.

250 page catalog free.

THE AKRON-SELLE CO. Akron, Ohio

DO YOU KEEP UP WITH THE PROCESSION?

If you do not, you are neglecting your business. The blacksmith and wheelwright business must progress just as much as any other if it would keep up with the times. And you cannot keep up with the times unless you know what is going on in the great world of manufacture—the great world of production—wherein the new and improved things that make for betterment in your work are produced.

Please take a little time—this evening, if possible—to read the advertisements in this issue It will not be found a dull or a difficult or an uninteresting bit of reading.

If you see anything that you don't understand, or if you need more information than is given in these advertisements, write the advertisers and ask for further facts.

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.

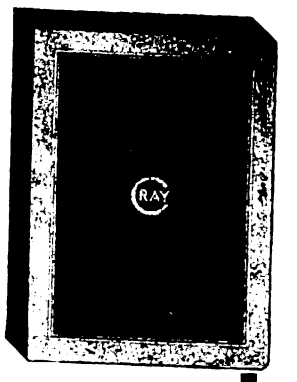
Made in two sizes:

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

Write any jobber for prices, or

Macgowan & Finigan Foundry and Machine Co.,
204 North Third St., ST. LOUIS, MO.

Will You Read This 480 Page Book If We Send It Free?



This **Repairers' Guide & Price Maker** is issued in the interest of Automobile repairers, dealers and garage men, blacksmiths, carriage men, etc. **It's free to the trade** and sent to them only.

Think of it, **480 pages of bargains**—about 3000 illustrations—a complete auto repairers' guide and price maker—quotes **lowest wholesale prices** on first quality carriage and wagon hardware, automobile supplies, auto repairers' tools, tool kits, spark plugs, horns, lamps, pumps, springs, forgings, brass fittings, batteries, coils, switches, auto-tops and in fact **everything used on an auto or carriage.**

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.

MERCHANT BAR IRON

Rolled Accurate to Size—Easy to Weld—First-class Iron for Railroads and all Shop purposes.
Let us quote you our Prices.

THE MILTON MFG. CO.
MILTON, PENNSYLVANIA

"FAVORITE" CLIPPER GRINDER

The "Favorite" Clipper Grinder gri the knives of Horse Clipping and Sh Shearing Machines in a few seconds cut as good as new.

We now furnish a new Adjustable Holde for holding Barber, Fetlock and Han d Clipper Knives.

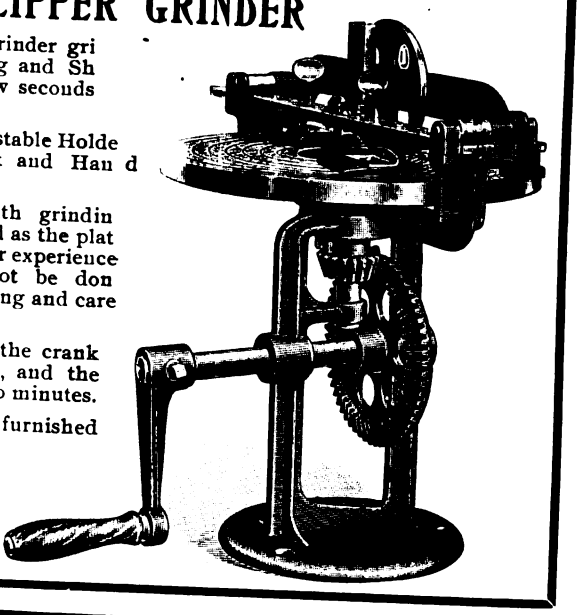
The plate is charged with grindin paste and the blades oscillated as the plat revolves. It requires no skill or experience and being automatic, cannot be don wrong. Bearings are extra long and care fully fitted.

About twenty-five turns of the crank will sharpen a set of Knives, and the Holders can be changed in two minutes.

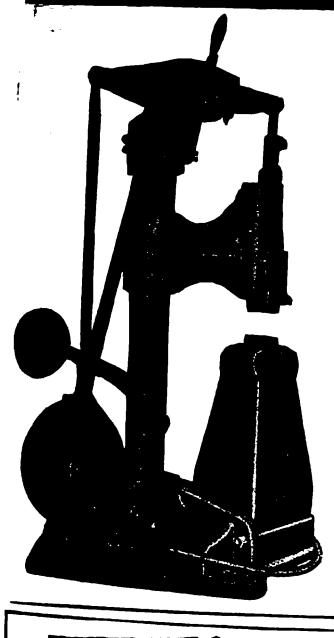
Tube of Grinding Paste furnished free with each machine.

Write for Price.

THE HEATH FDY. & MFG. CO
Plymouth, Ohio



THE MODERN HAMMER



Try It Before You Buy It

We are willing to take all the risk and expense of sending you this hammer on a

10-Day Free Trial

as we feel this is better advertising than placing a long list of claims and arguments on paper.

We have never had a Modern returned as unsatisfactory.

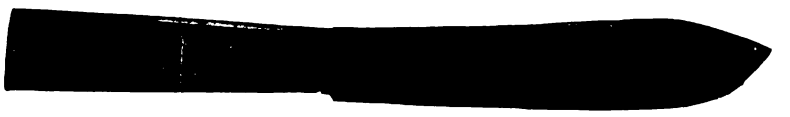
When accepting our free offer kindly write us on your business stationery.

Agents for U. S. A.: ALL JOBBERS.
Agents for Canada:
D. ACKLAND & SON, Ltd., Winnipeg, Canada.
Agents for Australia:
GIBSON, BATTLE CO., Ltd., Melbourne and Sydney.
Agent for Montevidio-Uruguay, Caso en Pando:
AMBROSIA BERTOLOTTI.

MODERN SALES CO., HAMPTON, IOWA, U. S. A.

Butcher Knives Made For Blacksmiths.

Stamped with YOUR own name.



Blacksmith Forged Warranted

We sell to only one smith in each town. By mail only.

Two given for each unsatisfactory Knife.

You can make good money furnishing your customers and friends with genuine **BLACKSMITH FORGED BUTCHER KNIVES** of all kinds. Made from the best crucible steel, tempered by a special oil drawn process. Every one warranted, (we replace each knife not satisfactory with two new ones,) to be the very best knives to hold an edge that it is possible to make. All knives ground, polished and finished with hard wood riveted handles.

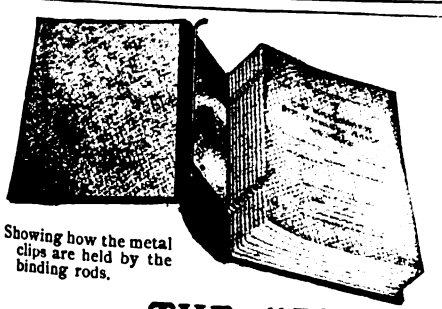
$5.00 TRIAL ASSORTMENT NO. 1.

Consisting of 42 Assorted Knives that you can easily sell for $15.00 to $18.00. Contains 6 6-inch Butcher; 6 7-inch; 3 8-inch; 1 10-inch Steak; 2 6-inch Sticking; 2 6-inch Skinning; 2 7½-inch Bread; 2 7½-inch House; 6 4 inch Poultry; 12 assorted Kitchen.

FREE—One knife blade just as forged. One in the rough partly finished.

YOUR money refunded without a word if you are not perfectly satisfied. Write to-day for trial assortment No. 1, enclosing money order for $5.00 and secure the exclusive sale in your vicinity and the knives will be stamped with **your name** and sent to you by express at once. We refer you to the Banks of Nunda as to our reliability. F. E. WOODWORTH, Prop.

WOODWORTH KNIFE WORKS, NUNDA, N. Y.



Showing how the metal clips are held by the binding rods.

BIND YOUR MAGAZINES In PERMANENT BOOK FORM

We have succeeded at last in securing a really practical binder

"It's as simple as filing papers"

Our magazine contains many articles and a great deal of valuable information and data worth saving for future reference. There is only one way of keeping them.

THE "BIG BEN" BINDER

preserves them in permanent BOOK FORM. This binder is handsome, durable and convenient. It opens flat like a regularly bound book, Cloth Covered, with the name of the magazine stamped in gold. For persons who desire to

SAVE THESE VALUABLE ARTICLES

this binder is just the thing, as it can be used year after year, by simply taking out the oldest numbers and inserting the new ones as they come to you, or you can keep each volume in a binder as a permanently bound book which will be a valuable addition to your library.

By making special arrangement with the manufacturers of this best binder that has ever been put on the market; we are able to furnish them to you for

ONLY $1.00 EACH

Merely send us your name and address and enclose this amount and we will send the binder promptly, all charges prepaid.

Send in your order now and begin making the magazine doubly valuable to you, at once.

Address all orders to

THE BLACKSMITH AND WHEELWRIGHT. :: 71-73 Murray St., New York City

UNCLE SAM Will Deliver This Tool by Parcel Post for $1.00

Remit by Postal Money Order

THE IMPROVED EASY HOOF TRIMMER

THIS TOOL has a detachable knife that can be removed or replaced in a moment. The knife jaw is adjustable by means of screws. When the knife becomes shorter by sharpening, give the screw a turn or so and the reins will go back to the proper distance apart. When knife wears out it can be replaced for a few pence.

DIMENSIONS—Weight, 2 lbs., Length, 12 ins.; Opens 2 ins. Cuts 1 in.

OUR GUARANTEE—If you don't like it you can return it and get your money.

DIRECTIONS FOR USING—

IRST—Hold the foot in the ordinary manner and remove soft parts from bottom with your toe knife; then with the trimmer begin at the heel and cut down and around the toe and back on the other side, removing the part at one cut and in one piece.

SECOND—Avoid all wrenching or prying. Hold the tool as near upright as you can. Cut straight through to the blank jaw regardless of NAILS OR OTHER OBSTRUCTIONS and with very little leveling with the knife or rasp your job is complete.

CAUTION—Don't make the mistake that a great many do by grinding bevel on one side of blade, but keep the bevel equal on both sides, so that it will pass through the hoof straight and not in a strain.

Send us $1.00 and it will be delivered by Parcel Post.

Patented Jan. 2d, 1894.

MADE BY

MUNCIE WHEEL CO., Ohio Ave. and Big 4 Ry., Muncie, Ind.

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

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 principles 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
Pittsburg, 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

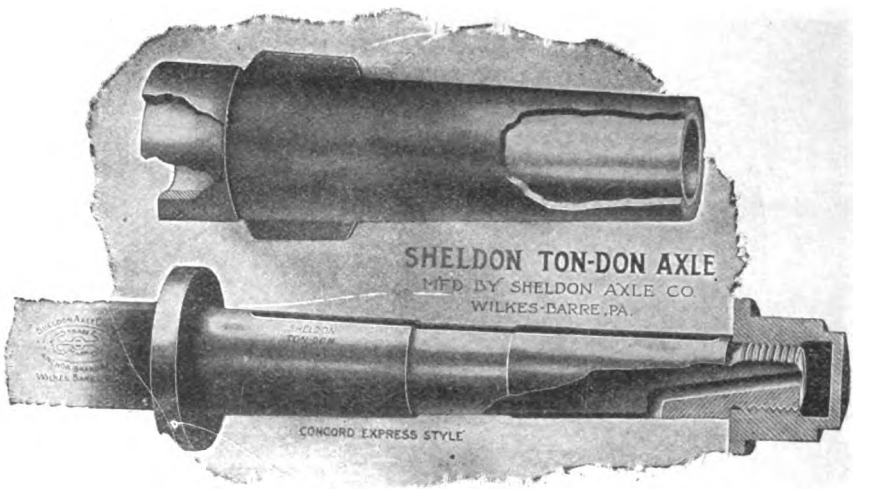
"TON-DON"

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 CO.
WILKES-BARRE, PA

LARGEST AXLE FACTORY IN THE WORLD.

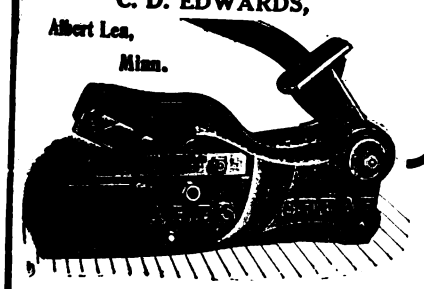
dwards Shears

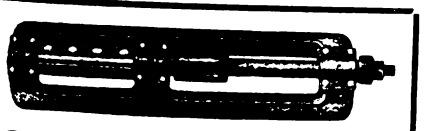
twenty years the Two Leading Low Shears in the U. S., representing the Best Value for the Least Money.

5, weighs 200 lbs., cuts 4x½ inch soft steel.
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.





COMBINED OUTFIT

12 in. Jointer and Saw Arbor

with 4 in., 4 sided Rounding Head, Boring Bits, Disk Sander, Dado Head, Spoke Auger, etc.

A heavy, substantial machine made especially for the wagon maker.

Send for illustrated circular and prices of our full line of specialties for the woodworker.

Sold by leading jobbers or direct.

W. L. SHERWOOD, KIRKSVILLE, MO.

Most Powerful Brazing Forges in the World.

4 Sizes

Welding Compound.
Brazing Compound.
Brazing Spelter.

Send for catalogue and prices.

THE NATIONAL CEMENT & RUBBER CO.

Dept. B. Toledo, Ohio, U. S. A.

YES, THIS IS JUST WHAT I WANT.

Don't start in to calk your summer shoes by hand. It is a big waste of time and money calking shoes by hand. The work of the L. S. P. Calking Machine is much more satisfactory to yourself and customers.

The machine is used every day in the year, on either sharp or blunt work. Used on every shoe you calk. And you are wasting money every day until you have one, whether you are alone or have five men working for you.

The machine that is in use by the U. S. Government.

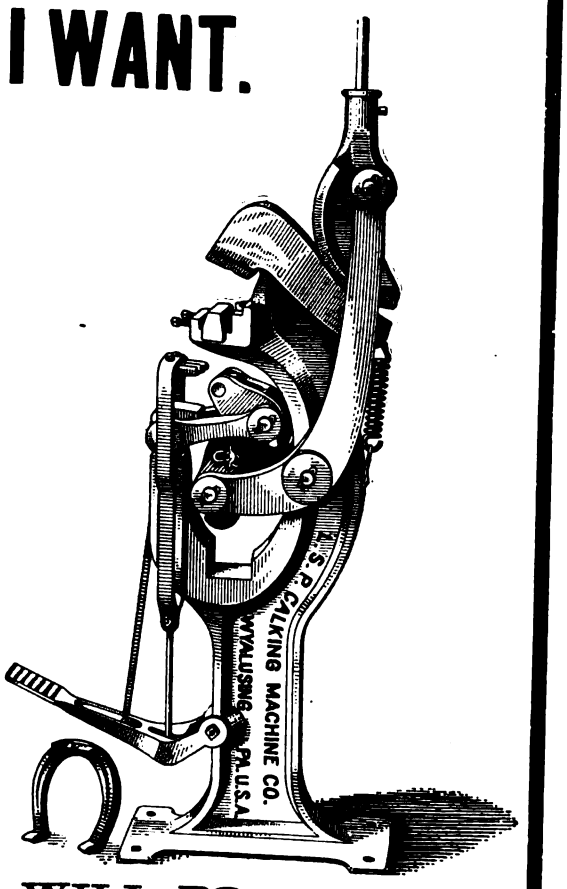
The machine that is in use in the best shops.

The machine that pleases Bosses, Journeyman and Customers.

The machine that the users claim more for, than the manufacturers.

The machine you will eventually use.

The machine that was on exhibition at the Master Horseshoers' National Convention at Denver.



WHAT THE MACHINE WILL DO.

With one pull of the lever it will completely make either a sharp or blunt heel calk of any desired length, on any size shoe, with the stock where it is needed, and no galls or cold shuts, producing a perfect calk. One pull of the lever welds either a sharp or blunt toe calk, and forms clip or not, as you may desire. No weld like the pressure weld, no losing of toe calks.

It has a shear to cut off the end of shoe for shoeing flat or with pads. It works finely on old shoes and resharpening. It makes the Single or Double Block Heel, or the "Phila. Kink," without the use of hammer or change of dies. And in Changing Dies you have no bolts or screws to bother with; all dies pick right out with the fingers.

The machine is made of the very best material and by the best mechanics, and is fully warranted and guaranteed. Write today for testimonials and prices.

"THE EXTREME OF HAND LABOR IS THE EXTREME OF EXTRAVAGANCE."

THE L. S. P. CALKING MACHINE CO.
Wyalusing, Pa., U. S. A.

NATIONAL MACHINE COMPANY
Brighton, Ont., Canada.

THE 400 CHAMPION

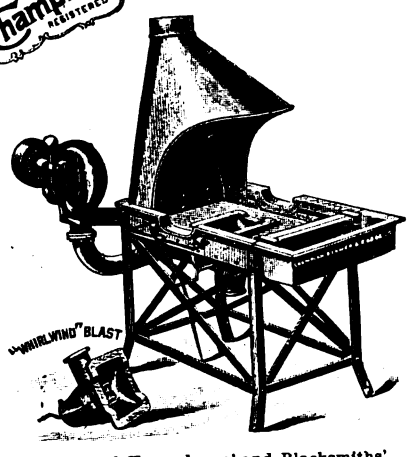
"The Incomparable Blackmith Blower"

With over ONE-HALF MILLION USERS anxious to testify to its wonderful value. ASK WHAT THE OWNERS SAY, especially those that have used the 400 daily for ten years or longer. It is the ONLY BLOWER ever built that remains as perfect after ten years' daily use as the day it is built. It is the one great tool that will be handed down from father to son for generations.

THE 400, THE BLOWER FOR QUALITY, first, last and always.

No. 400 Champion Patented "Whirlwind" Blast Anti-Clinker Heavy Nest Tuyere Iron goes with the 400 Blower, WITHOUT EXTRA COST.

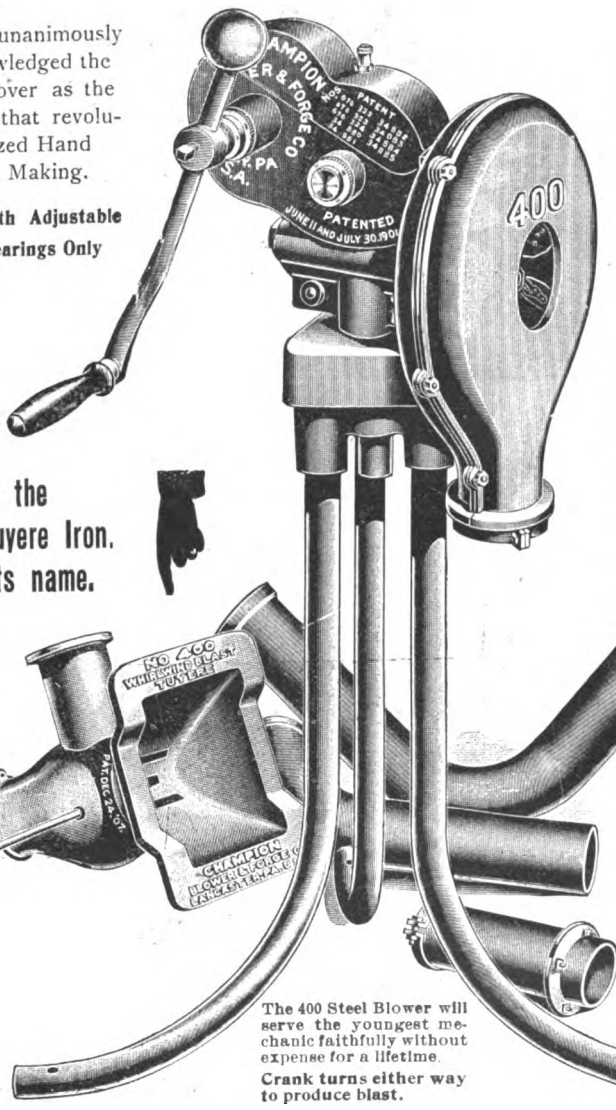
With the circular rotary feature of the "Whirlwind" Blast the hot blast from the coal is not wasted by being blown up through the fire and out of the chimney, like all other blacksmith fires. With the "Whirlwind" blast circulating between the heavy walls of the nest the hot air is forced to the center of the fire, thus giving the iron in the fire practically all the heating elements of the coal, which save in time and coal consumed, the first cost of a 400 Blower and "Whirlwind" Tuyere Iron many times over every year it is used.



No. 408 Steel Horseshoers' and Blacksmiths' Forge with Half Hood.
Hearth 30x36 in. Fan 12 in. in diameter.

The 400 unanimously acknowledged the world over as the Blower that revolutionized Hand Blast Making.

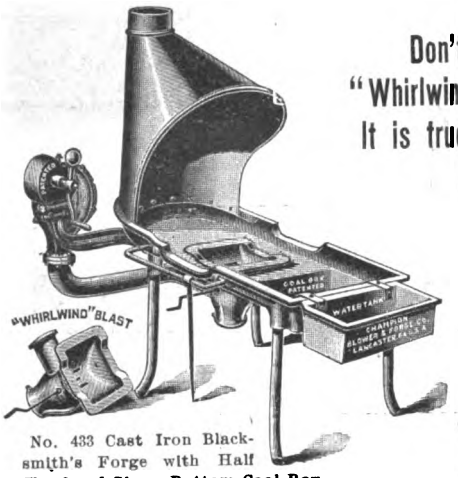
Made with Adjustable Ball Bearings Only



The 400 Steel Blower will serve the youngest mechanic faithfully without expense for a lifetime.

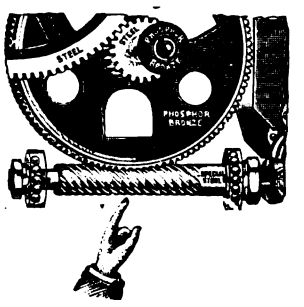
Crank turns either way to produce blast.

Don't miss the "Whirlwind" Tuyere Iron. It is true to its name.

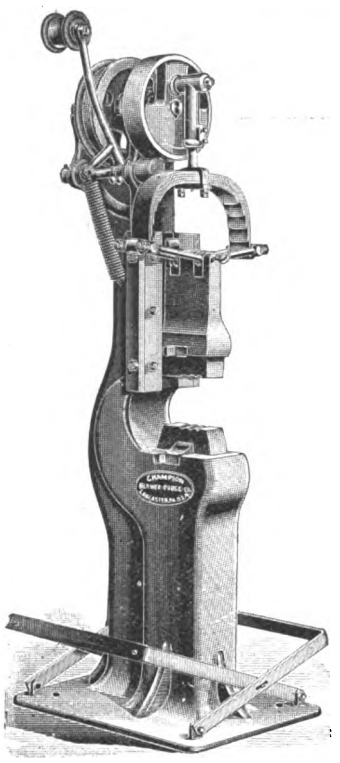


No. 433 Cast Iron Blacksmith's Forge with Half Hood and Sloop Bottom Coal Box.
Hearth 32x45 in. Fan 12 in. in diameter.

THE FAMOUS 400



It's all in the Spiral



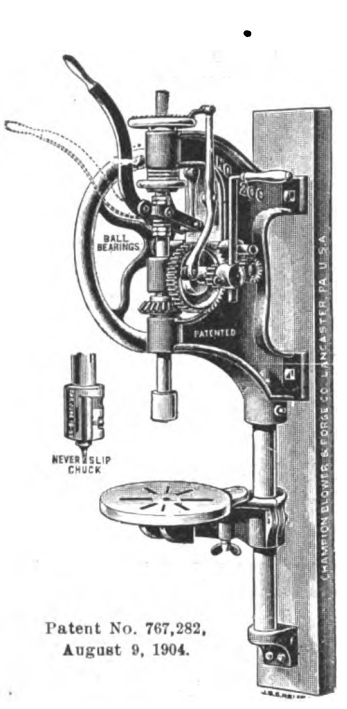
The Champion "Patented" Power Hammer.
Made in Two Sizes.

No. 0 Champion "Patented" Power Hammer, with one regular set of dies for plow work, upper die 3x1½ inches, lower die 3x2 inches. Size of base of Hammer 18x25 inches. Height over all 5 feet 4 inches. Weight of ram 30 pounds. Pulley 9x2⅝ inches. Speed 400 RPM. Capacity 2 inches, square or round. ¼ HP required to operate same. Weight 900 pounds.

No. 1 Champion "Patented" Power Hammer, with one set of dies 2½x6½ inches, with plain surface 2½x3 inches, and two plain grooves and one tapering groove across one end for forging round iron, straight and tapering. Size of base of Hammer 20x27 inches. Height over all 5 feet 8 inches. Weight of ram 65 pounds. Pulley 10x2½ inches. Speed 300 RPM. Capacity 2¼ inches round or square. 1 HP required to operate same. Weight 1,250 pounds.

Our New Catalogue can be had free upon application, showing the very latest and greatest inventions in the blacksmith line in the world on Blowers, Forges, Drilling Machines, Tire Benders and Shrinkers, Power Hammers, Punches, Shears, Screw Plates, Power Blowers, etc. It will pay you to see our catalogue. Write for it.

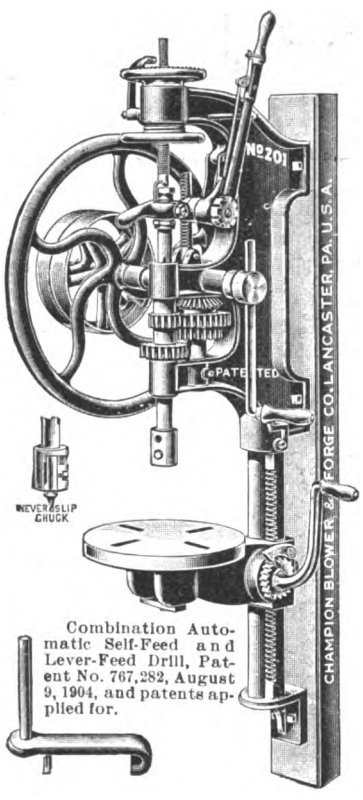
The Champion "Patented" Automatic Self-Feed and DOUBLE COMPOUND LEVER-FEED UPRIGHT POST DRILLS. Made with Cut Gears and Ball Bearings.



Patent No. 767,282, August 9, 1904.

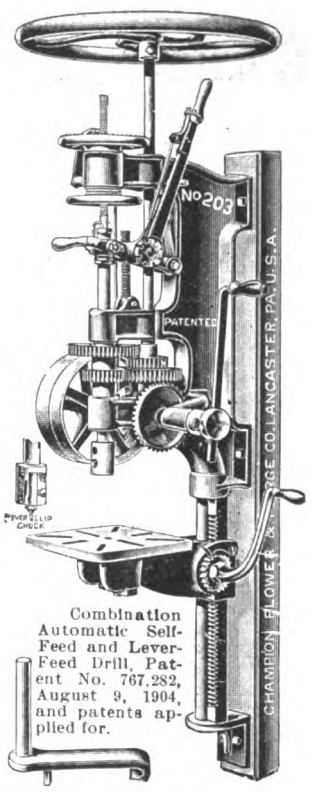
No. 200 DRILL

Combination Automatic Self-Feed and Lever-Feed Drill.



Combination Automatic Self-Feed and Lever-Feed Drill, Patent No. 767,282, August 9, 1904, and patents applied for.

No. 201 DRILL



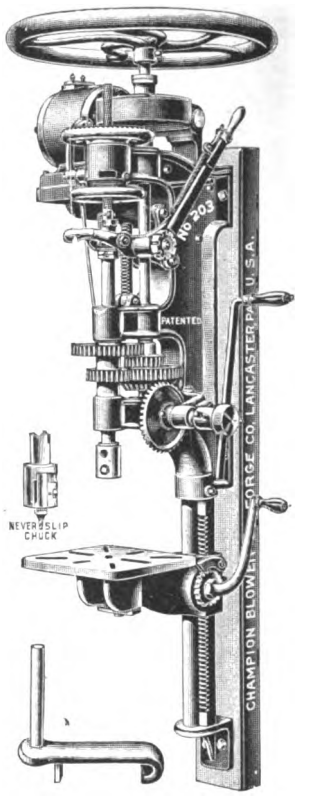
Combination Automatic Self-Feed and Lever-Feed Drill, Patent No. 767,282, August 9, 1904, and patents applied for.

No. 203 DRILL.

The Double Compound Lever-Feed produces 80% more pressure or drills holes 80% larger, with the same labor, than any Lever-Feed Drill

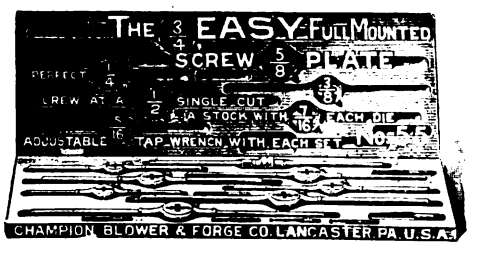
REMEMBER

There is no TURNING BACK of the FEED Screw NUT WITH EITHER FEED.



No. 203 Champion Combination Automatic Self-Feed and Double Compound Lever-Feed ELECTRICALLY DRIVEN Upright Post Drill.

This Drill has the motor direct connected to the upright back gear shaft, which represents what we consider a perfect up-to-date Electric Drill and one that is worthy of most careful consideration from the up-to-date mechanic. It represents simplicity, durability and no loss of power.



Screw Plates in four styles cutting up to 1½ inches.

The DOUBLE COMPOUND LEVER-FEED Saves 200 Per Cent

IN TIME AND LABOR in drilling holes, reaming, countersinking, etc., and makes the drill a first-class Wood Boring Machine.

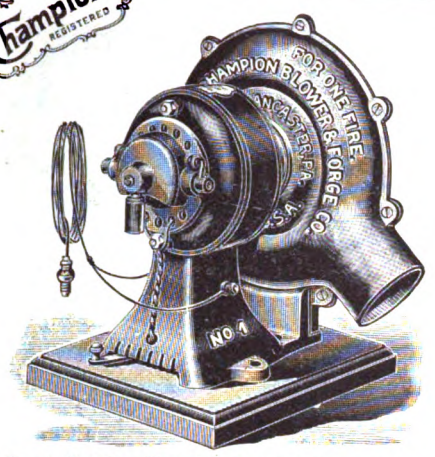
THE CHAMPION BLOWER & FORGE COMPANY, LANCASTER, PA., U. S. A.

THE CHAMPION ONE-FIRE, VARIABLE SPEED ELECTRIC BLACKSMITH BLOWERS

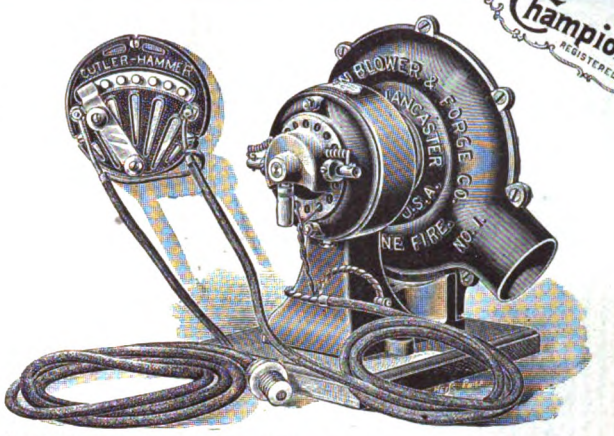
THE ELECTRIC SUCCESS

Motor Capacity 40% above requirements

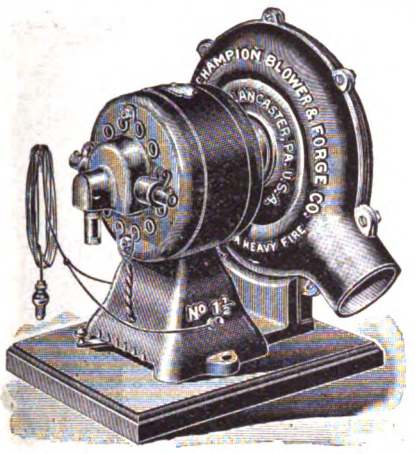
The illustrations show a very complete line of Electric Blowers, running up to nine fires. We recommend, in every instance, each fire to be equipped with its own individual Electric Blower, so it gives each operator full and complete control of his own individual fire and a large saving in the consumption of electric current. The material, workmanship, etc., used on these Blowers are of the very best.



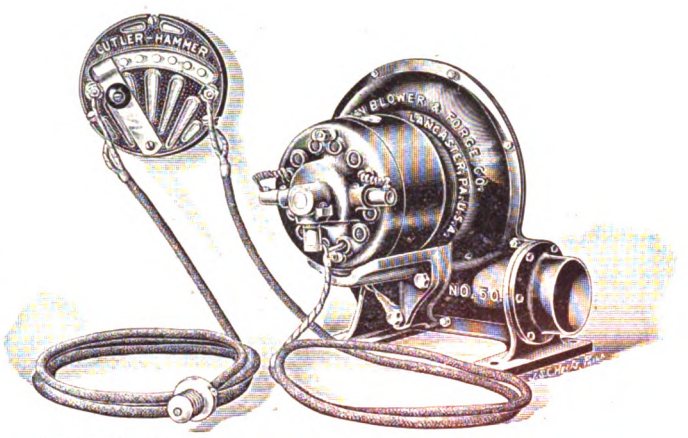
No. 1 One-fire Variable Speed Electric Blacksmith's Blower with six speeds, for light and medium fires.



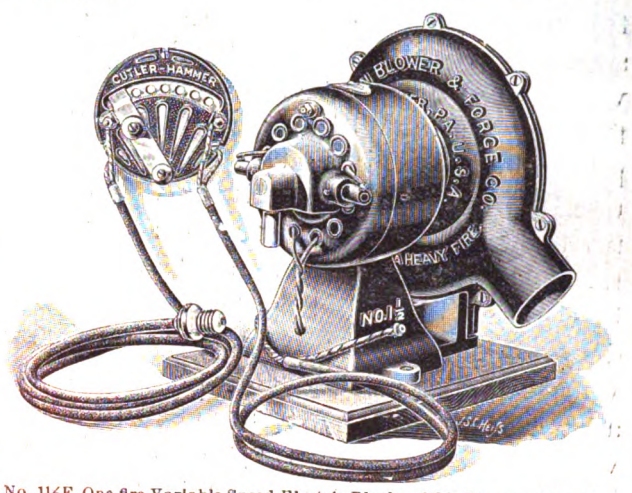
No. 1E One-fire Variable Speed Electric Blacksmith's Blower with universal motor and detached rheostat, with six speeds, for light, medium and heavy fires.



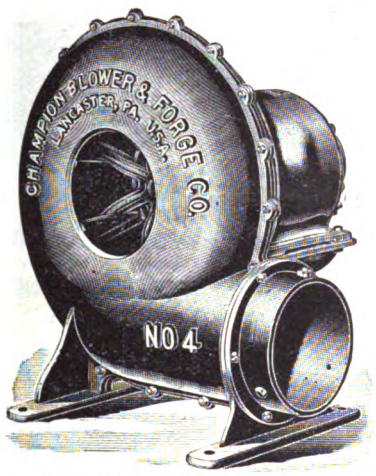
No. 1½ One-fire Variable Speed Electric Blacksmith's Blower, with six speeds, for extra heavy fires.



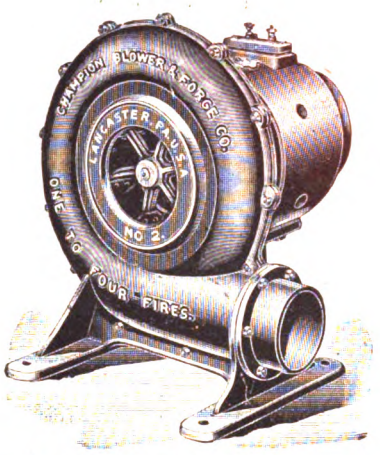
No. 50 For Regular Blacksmith Fire with Universal Motor, Detached Rheostat and Steel Pressure Case.



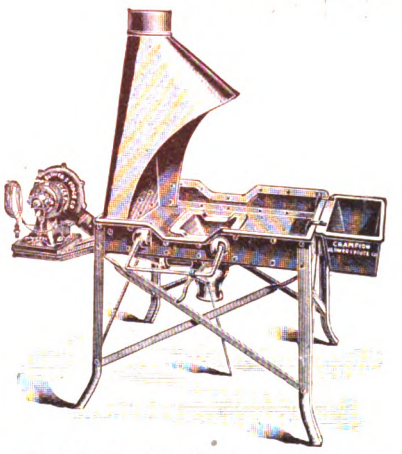
No. 1½E One-fire Variable Speed Electric Blacksmith's Blower with universal motor and detached rheostat, with six speeds, for extra heavy fires.



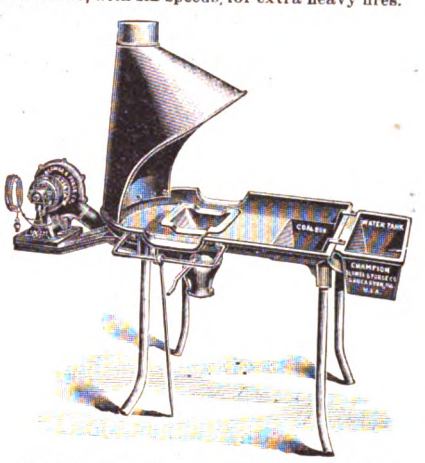
No. 4 Electric Blacksmith's Blower will blow from one to nine fires.



No. 2 Electric Blacksmith's Blower will blow from one to four fires.

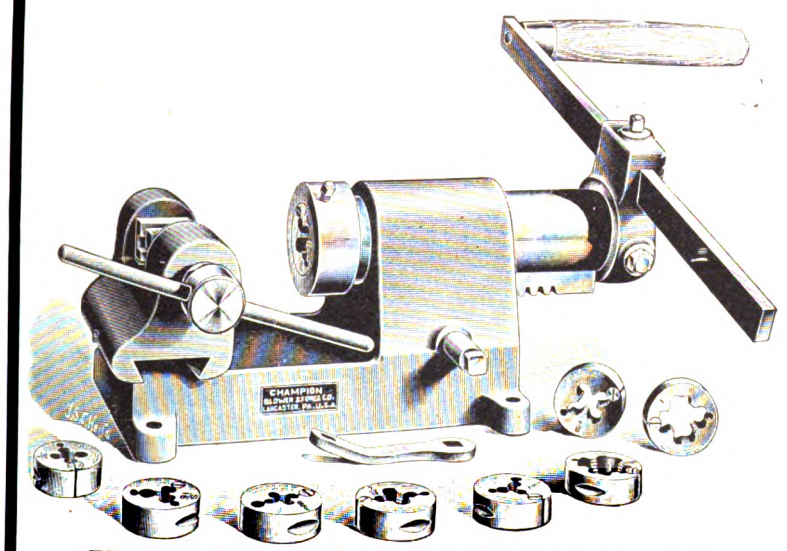


No. 440 Champion Electric Driven Blacksmith's Steel Forge.



No. 441 Champion Electric Driven Blacksmith's Cast Iron Forge.

THREE NEW CHAMPION TOOLS



THE CHAMPION THREAD CUTTING MACHINE

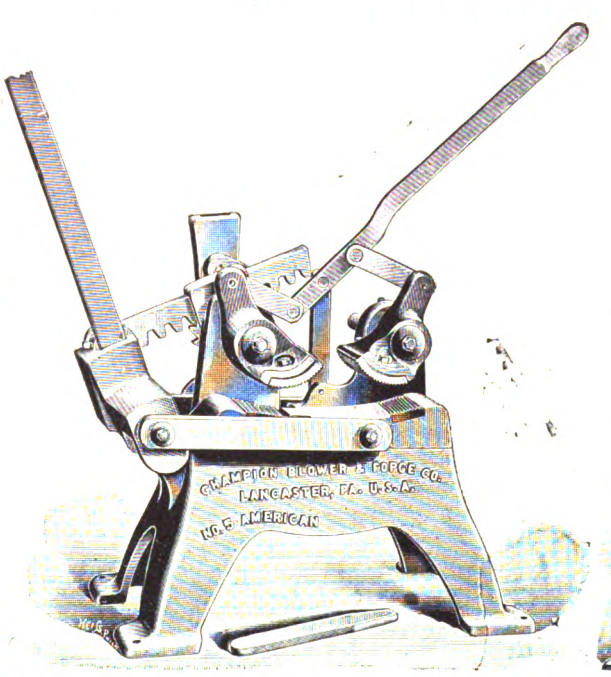
Thread Cutter to do Quantity Jobs Equal to Machines Costing Ten Times the Price.

No. 1 Champion Thread-Cutting Machine with Dies Only cutting ¼, 5/16, ⅜, 7/16, ½, ⅝ and ¾ inch. Weight 40 pounds.

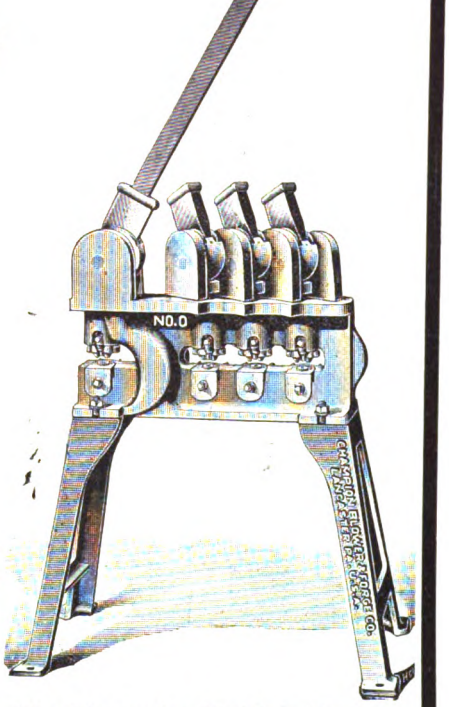
No. 2 Champion Thread-Cutting Machine with Dies Only cutting ¼, 5/16, ⅜, 7/16, ½, ⅝, ¾, ⅞ and 1 inch. Weight 45 pounds.

No. 3 Champion Thread-Cutting Machine with Dies, Taps and Tap Chuck, complete-cutting ¼, 5/16, ⅜, 7/16, ½, ⅝ and ¾ inch. Weight 45 pounds.

No. 4 Champion Thread-Cutting Machine with Dies, Taps and with two Tap Chucks, complete, cutting ¼, 5/16, ⅜, 7/16, ½, ⅝, ¾, ⅞ and 1 inch. Weight 55 pounds.



No. 5. Champion American Tire and Axle Shrinker.
HAS TWO SHRINKING LEVERS.
1st Lever for Light Tires, 2nd Lever DOUBLE COMPOUND.



The Champion Multiple Punch.
Regularly furnished with ¼, 5/16, ⅜, and ½ inch Dies and Punch. Maximum capacity 5/8x⅜ inch.

Our 1913 catalogue can be had upon application, showing the very latest and greatest inventions in the Blacksmith Line in the world on Blowers, Forges, Drilling Machines, Tire Benders, Tire Shrinkers, Screw Plates, Power Blowers, Power Hammers, Punches and Shears, etc. It will pay you to see our new catalogue.

THE CHAMPION BLOWER & FORGE COMPANY, LANCASTER, PA., U. S. A.

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

THE

BLACKSMITH AND WHEELWRIGHT

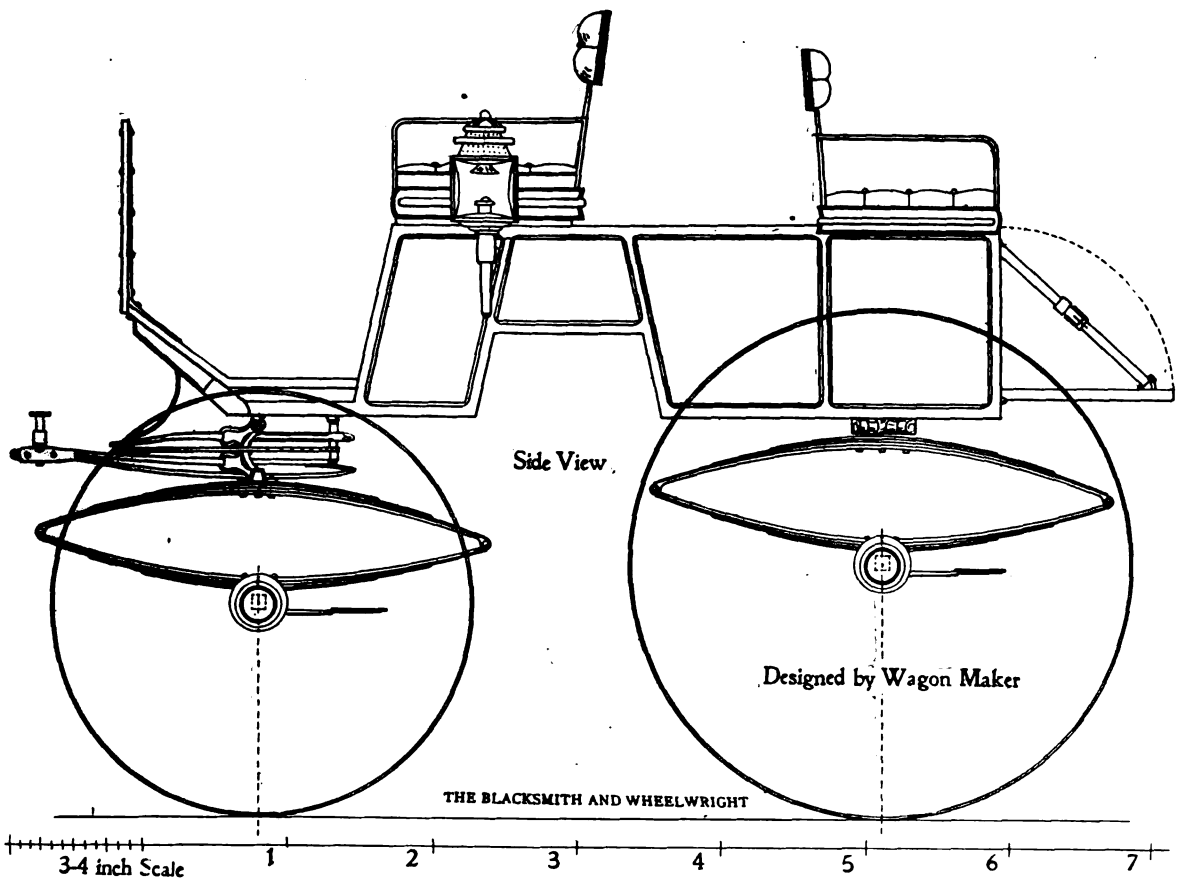
Vol. LXVII. No. 5. NEW YORK, MAY, 1913. TERMS: One Dollar a Year

FOUR PASSENGER SURREYS.

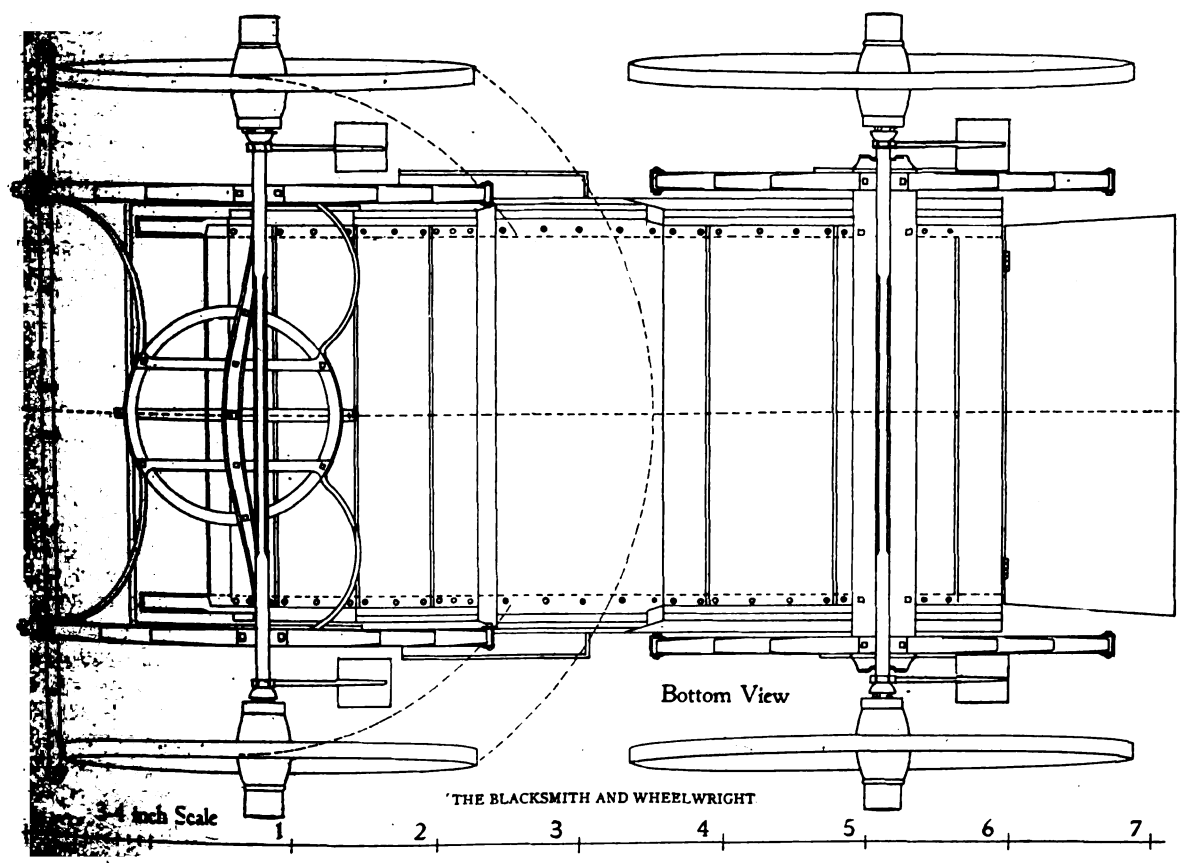
Something Different and Better Than Those Made for the Wholesale Trade.

BY WAGON MAKER.

To accommodate four passengers, surreys are generally used because they are light-built and



are sold cheap. But a great many carriage users want something better and different from styles made by the wholesale manufacturers. Of course specially designed and built styles cost more, but the difference is worth the cost to the buyer and user of carriages. In the first place the purchaser has a style different from others, and second, the carriage is far superior in construction and finish and therefore lasts a great



deal longer if built by a good carriage or wagon builder.

The front wheels turn generally under the body, which is a great convenience; they are also suspended on four elliptic springs which assures good riding qualities, and the width of track is always 56 inches, out to out. The front gear has either two straight wood beds or 2½ to 3 inch bend beds, as shown on the bottom view. But the futchels are of iron in suitable curves, also shown on the bottom view. On this draft the upper and lower futchels are of wood, while the side and front braces are of iron and curved, with the straight crossbar resting on the braces. This draw bar can be removed and coupe shafts substituted when driven with one horse only. The straight crossbar is fastened to the braces with one bolt on each side, through the wood blocks between the braces.

Construction of the Body.

Two entirely different methods are used in practice, and the first is as follows: The foundation of the body is the rockers and rocker plates. The size of rockers is 1⅜ inches across bottom surface and 2 inches deep on the rear end, 2¼ inches deep on the three sides of the wheelhouse and 2⅞ inches for the front bracket. These rockers are dressed square and beveled on the outside surface, because the body is wider on top than at the bottom and are framed together with tenons.

The rocker plates are ⅜ inch thick throughout, 1½ inches deep on the rear end, up to the wheelhouse and from there it is 1¾ inches deep except on the bracket where it is tapered toward the dash. Into this rocker the framework is lapped and over the framework and rockers a ⅜ inch thick popular panel is glued. These panels are leveled and finished and moldings are glued over it. This finish varies according to the individual taste. Some prefer plain panels without moldings, others want 5/16 by ⅝ inch half rounded moldings, but as this style looks flat when finished the style as shown on the side view is preferred. These moldings are ½ inch thick by ⅝ inch and are chamfered. These moldings when well finished look exceedingly well on this kind of work.

Another way to construct such bodies is as follows: Take an ash or other suitable board, ¾ by 16 inches, and cut from it two sides the shape of the body, as shown on the side view. Glue and screw along the bottom edges of the boards 1 by 2 inch pieces to strengthen it, at the same time creating a support for the bottom boards, to which they are glued and screwed.

The toe pieces are made sufficiently thick to be level on the inside and outside, including the moldings, and the board lapped into it. On the front end of the inside surface of the boards are glued and screwed 1 by 1¾ inch pieces, to keep the board straight strengthen it, and at the same time create a support for the front panel, into which a lid is cut as usual on all such work.

On this structure plates are fitted, as the front part up to the wheelhouse is not strong enough to support the weight. These plates are ⅜ by 1½ inches and screwed, but care must be taken that the screws are not over 1½ inches long so that they do not come out on the outside surface nor split the boards as they are liable to do if the screws are not the right length and the holes bored to fit the length of the screws. The length of the plates on the rear end should reach up to the spring crossbar.

This method of framing is commendable because it is stronger than the first explained method, it takes less time to do it and creates a smooth surface on the inside of the side boards. To strengthen the rear end of the side board a corner iron is fitted the whole length of the crossbar and up the boards on each side to prevent side motion. The size of the rear crossbar is generally 1½ by 2½ inches but as there is only a very light rocker to frame the crossbar into it this iron corner stay is a necessity on this account. The trap door on the rear end should be framed, because, being 14½ by 33 inches, it is liable to warp, besides is not strong enough to support the weight except when ironed with iron strips on the inside surface.

The practice has been to use 1¼ by 1¾ inch hinges, but as the gate is not over 1 inch thick these hinges are too weak to support the weight. The best way is to make the hinges to suit the thickness of the gate, and let it run the whole height of the gate; with a short end about 2 inches let in on the top surface of the crossbar, or make the gate 1½ inches thick and use 1¾ by 1¾ inch hinges.

The rear seat is framed and is 14¾ by 39 inches, ⅞ inch thick. The front seat is 15½ inches and the rest same as on the rear seat. The front seat is stationary, is raised 1⅜ inches above the main line of the body with the aid of risers, which are set inward 3/16 inch from the outside surface of the moldings. These risers are glued and screwed to the body rail. The rear seat is made to turn either forward or rearward with one stationary slot fastening only, but when turned either way it is always in the right position. These carriages are built with and without a dash. The toe front is built similar to a coach front, which is built without and for park and for suburban driving the dash can be dispensed with; for this reason we have drawn the front view without it and only indicated it by dotted lines.

The trimming material should be either corduroy or whipcord, which is generally preferred for vehicles of this style. There is a rug in the rear and a rubber mat in front.

The body is generally painted black, or black with a shade of green striped a fine line of medium green. Or the body panels can be a

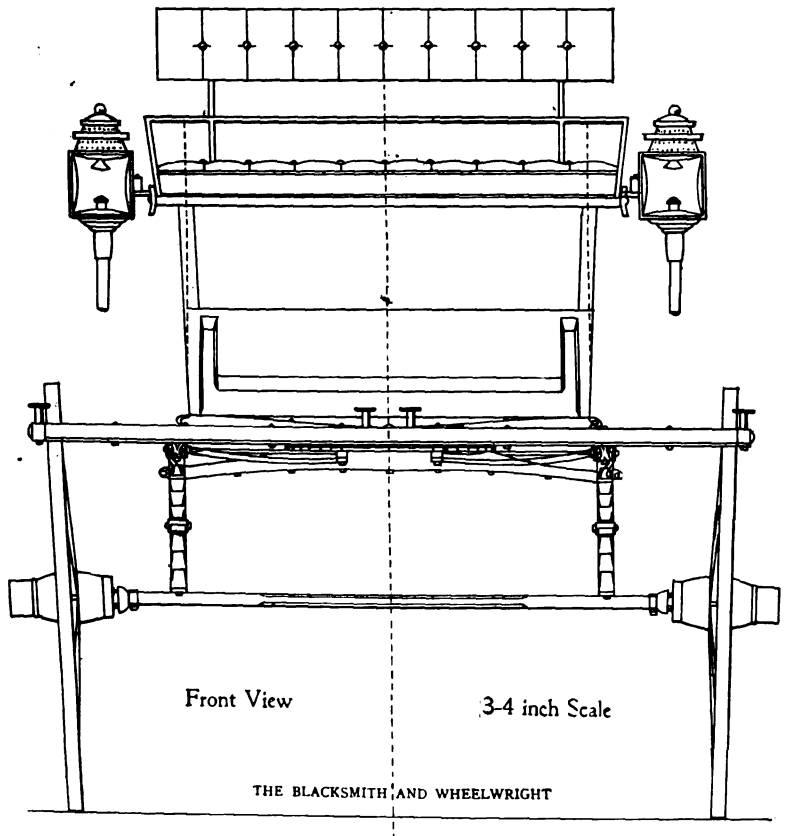
medium green, moldings black, striped a fine line of the same color as the panels.

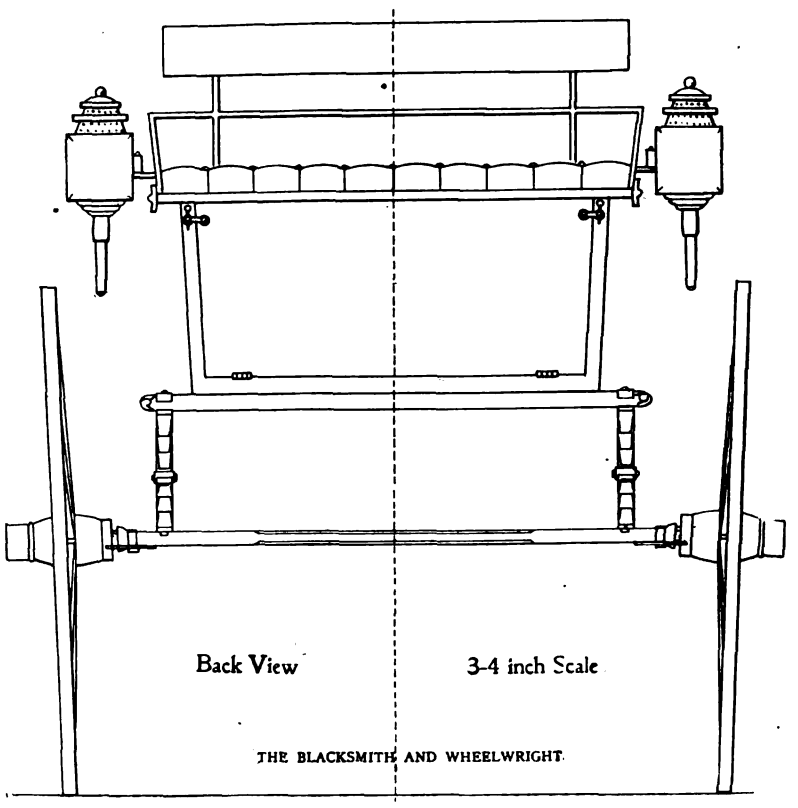
The gears have a further variation of colors: Canary or lemon color striped black, deep blue striped yellow cream or light blue. Carmine striped black are the colors generally adopted.

The lamps are all black japanned except the brass heads in which the glass is enclosed, and the dash is either an iron frame covered with enameled leather or a built-up dash.

Dimensions for plain hub wheels:

Diameter of wheels without tires, 35 by 42 in.
Diameter and length of hubs, 5 by 7 in.
Diameter of hub panels, 3⅜ by 4¼ in.
Thickness and width of spokes at base, 11/16 by 15/16 in.





Number of spokes front and rear, 12 by 12.
Thickness and depth of rims, 1 3/16 by 1⅜ in.
Width of tread, 1⅛ in.
Amount of stagger front and back, 5/16 by ⅜ in.
Thickness and width of tires, ¼ by 1⅛ in.
Depth of rims for rubber tires, 1 in.

Elliptic springs front:

Length from centers of bolts, 37 in.
Open out to out, 9 in.
Width of plates, 1⅜ in.
Number of plates, 4.
Thickness of main plates, No. 3.
Thickness of other plates, No. 3.
Size of holes and distance apart, 5/16 by 3½ in.

Elliptic springs rear:

Length from centers of bolts, 37 in.
Open out to out, 9½ in.
Width of plates, 1⅜ in.
Number of plates, 4.
Thickness of main plates, No. 2.
Thickness of other plates, No. 3.
Size of holes and distance apart, 5/16 by 3¾ in.

Coach style half patent axles:

Size at square ends and arms, 1¼ in.
Size at center, 1 5/16 in.
Length of axle arms for 7 in. long hub.
Width of body and seats:
Width across bottom of body, 34 in.
Width across top of body, 36 in.
Depth and width of front seat, 15½ by 39 in.
Depth and width of rear seat, 14¾ by 39 in.
Width of track, 56 in.

Horses in Hot Weather.

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 moderate quantities will not hurt him. But let him drink only a few swallows if he is going to stand still.
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 wet sponge. Use vinegar water if possible. Do not turn the hose on him.
6. Saturday night, give a bran mash, cold; and add a tablespoonful 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 harness and bridle, wash out his mouth, sponge him all over, shower his legs and give him four 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 sideways, 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. Unless he cools off during the night, he cannot well stand the next day's heat.

AUTOMOBILE PAINTING.

Doing It Durably and Economically Requires the Best Methods.

From M. C. Hillick, Pennsylvania.—To paint and finish the automobile in the manner suggested by the caption to this article means some radical changes in the system of work as now carried on by a large number of manufacturing concerns and by not a few painters and possibly by some car owners.

It is impossible to crowd coats of paint or varnish upon a surface at too rapid a pace and not suffer the consequences in numerous ways.

If the coats are not thoroughly dry, one coat being blanketed over a previous one only partially dry, the ultimate result is certain to be disastrous to the finish. The undried pigment, or varnish, or whatever it may be, goes on with its changing process during which time it must have access to air and the upheaval caused by the readjustment of the chemical parts usually shatters the finish to a sorry condition. This is entirely unnatural to paint or varnish when these materials are given proper usage. It matters little whether the car is home painted, or professionally painted, right drying conditions must prevail, and adequate time must be given each coat to dry quite out of harm's way, if the car is to be painted in a durable and profitable manner.

An over amount of hurry is responsible for most of the painting and varnishing that is going wrong and disappointing the car owner. Even the chemists who are supposed to know everything about paints and varnishes fail to specify to what extent this hurrying method can be practiced without endangering the work from top to bottom. All this department of knowledge, seemingly, is turned over to the painter to invade and pass judgment upon, but in this matter he is handicapped by the urgent appeal of the car owner to hurry the work along as fast as possible. More than likely a date is set when the car simply must be done. Fearing, of course, to disappoint the customer, the painter works with an eye single to the date when the car must go into service, regardless of certain fundamental chemical laws, not to mention other governing factors equally important, which, first of all, are entitled to consideration.

Either more time must be given for the drying processes in the shops and apartments given over to the business of painting and finishing of automobiles, or resort should be had to means by which the drying of the paints and varnishes may be very much accelerated.

An increase of artificial heat and better ventilation will quicken the drying process to an important extent, but even this method has its drawbacks for the tendency is, as a rule, to crowd this artificial drying to the utmost, and when this practice is indulged in the results are fully as bad as when coats of pigment are piled too quickly upon one another.

Apparently it all resolves into a matter of discretion, experience and good judgment, with all parties to the contract brought to a fair understanding of their actual obligations in the case.

There is no reason why the automobile cannot be painted as durably, and, in proportionate measure, as economically, as the horse-drawn carriage formerly was, but to do this class of work enough time must be granted to insure sound and good drying of each applied coat of material.

A thorough examination of the surface of the car before commencing any painting operations is the first order of business. This examination should, of course, be made by an experienced painter or by some one experienced in general paint surface conditions, as a means of outlining the actual work necessary to be done in order to restore the surface to its original condition. It is not necessary to often burn the old paint from the car. If the surface is solid and intact, for the most part, except perhaps some surface cracks which do not extend down into the primary coats, but are simply of a shallow depth, burning off is not needed, and will mean only an extra expense with no compensating returns.

The first step in the proceedings under such circumstances is to clean grease smears, oily accumulations, etc., from the car, both body and chassis, and make everything clean and neat. Then cut out any defects existing in the surface and touch up the scars with an oil pigment, and the following day, with hard putty proceed to stop up all these defects. Mix up some lead pigment using only enough raw linseed oil to give

the paint good binding properties, and reducing the mass to a rather stiff consistency with turpentine, apply with a broad, elastic scraping knife to the parts of the surface cracked and fissured in the worst shape. Now with scars and gouges filled up, and the badly checked parts choked up with the putty glaze, you have the surface in good solid shape, as soon as it is sandpapered and rubbed down, to coat up with color. Put on two coats of color, two coats of varnish color, rubbing each coat of the varnish color lightly with water and pumice stone flour; stripe, if necessary, on the last coat, then apply one coat of clear rubbing varnish, which in due time rub firmly with water and pumice stone flour; wash up thoroughly and finish with one coat of elastic body finishing varnish. Fetch the chassis along in like manner and you have a finish on the old paint foundation that with fair usage will wear like the eternal truth.

WOOD FILLING.

Various Kinds of Wood Require Different Ingredients as Fillers.

The woods employed in furniture making and house finishing may be placed in three groups, as regards their filling, as follows, according to A. Ashmun Kelly in the "National Builder."

Open-Grained Woods.—These require paste filling, being "hard woods." Ash, beech, butternut, baywood, black walnut, chestnut, elm, mahogany, oak and rosewood.

Close-Grained Woods.—These are filled with liquid fillers, being soft woods. Bass, cedar, California redwood, gum, Oregon pine, poplar, spruce, tamarack, white pine, Washington fir, whitewood and yellow pine.

There is another group of woods that occupy an intermediate place though they might properly be classed with the close-grained woods, namely, birch, cherry, circassian walnut and maple. They are sometimes filled with paste filler, sometimes with liquid filler.

Chestnut and some oaks are very open-pored and not only require paste filling but often two fillings and a stiff paste. The purpose of the paste filler is to fill up the openings in the tissue of the wood, the liquid part of the filler saturating the tissue and so to some extent preventing the wood robbing the varnish coat and occasioning pin-holing, etc. For this purpose it is sometimes best to apply a coat of liquid filler over the paste filling, and in some instances another coat of paste filler over the liquid is best. In any case the idea is to form a hard and impermeable foundation for the varnish coats that are to follow. Where staining and wax finishing are to be effected there is no need for filling the pores of the wood.

A filler should be colored to match the wood; but should be made a shade or so darker, whether the wood is stained or not. The following is a very good formula for making a paste filler: Mix 2 parts of best coach japan and 3 parts of raw linseed oil, both by weight. To this liquid add enough finely pulverized silica to form a stiff paste. If this can be run through a hand mill all the better. The thorough mixing of the mass should be accomplished in some manner and the mill does it better than the stirrer or paddle. Then add such pigment as desired for color.

There are several substances used for fillers, such as terra alba or China clay, talc, asbestos, barytes and carbonate of magnesia. The fault with these is their fading out or whitening in the wood, showing pale or white in the pores of the wood. A liquid filler made of magnesia, and indeed of the other substances named, has the merit of holding up the color well, but there is nothing to excel or even to equal pulverized silica. Cooked starch makes a good transparent filler, and some prefer it because with it the work may be rushed; such a filler is soft and easily applied, and that is about the most that can be said for it. It does not hold up the varnish well. One of its advantages is that it will hold up well in the pot, silica settling badly unless kept constantly stirred. Silica also dries out too rapidly; but this fault may be corrected by the addition of a little raw linseed oil, which will also cause it to work much easier.

Corn-starch filler seems to fill wood perfectly, but as it dries and hardens it shrinks badly and leaves the wood only partly filled. The natural result of this is seen in the varnishing, in pinholes, checks, etc. Also it should be noted that corn-starch filler requires more time for drying than it usually gets, and hence the varnish is apt to crack over it.

A good transparent filler, where cooked starch is not desirable, may be made by mixing together 8 ounces of corn-starch and 8 ounces of very fine pumice stone powder, to which add ¼ gill of white shellac varnish and the same quantity of boiled linseed oil. Mix thoroughly and thin up to proper consistency for use.

A white liquid filler is sometimes desirable, and the following is a good one: In 1 gallon of raw linseed oil put 2 pounds of pale powdered resin, and place in a suitable vessel on the stove until the resin has melted, stirring meanwhile. Then remove from the fire and add 1 pint of white japan dried and 2 quarts of turpentine; stir well, then set aside to cool; when cold, stir in 8 ounces of corn-starch. After which thin it with turpentine and pass it through a strainer or hand mill.

Cooked starch filler is made in this manner: Mix together 1 quart each of raw and boiled oil, gold-size japan and turpentine. Boil some corn-starch and add to it some magnesia, say one-fourth as much as there is corn-starch, or somewhat less. Boil the mixture, the starch and magnesia, for fifteen minutes at least, then add it to the liquids, and add any coloring desired. Of course a transparent filler needs no color. Silica may be used in place of corn-starch if so desired.

Ordinary corn-starch paste filler may be made from this old formula: To 1 pound of corn-starch add ½ pint of boiled oil, the same of shellac varnish and 8 ounces of fine pumice flour. Mix well together and add any coloring necessary. It is found best to color all paste fillers to suit the natural color of the wood.

WHEELWRIGHT WORK.

Tenoning Spokes—Hand and Power Spoke Driving—Turning and Sanding Spokes.

BY JAMES F. HOBART, M. E.

The wheelwright who has been accustomed to fitting spokes by hand will certainly appreciate the work of a good tenoning machine, once he has become accustomed to handling that machine, and the quantity and quality of the work turned out by a good tenoning machine cannot be compared with the limited, size-varying work turned out by the best hand worker available.

When the wheelwright has decided to put in

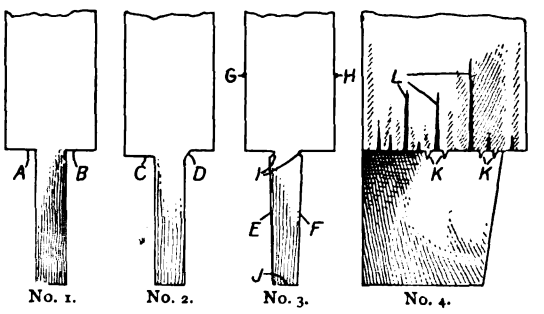


Fig. 1.—Good and Bad Spoke Turning.

a tenoning machine, let him cast about a bit before making a selection. Don't take up with an old-time, wooden frame machine, but select a strong, well built one with a stiff iron frame which is well supported by a heavy iron base. With a machine of this description good work can be done—and lots of it. The wooden frame machine requires far too much tinkering to suit the writer, but the iron frame machine can be depended upon to stay in adjustment, irrespective of hot or cold weather, wet days or dry ones.

But there are iron frame tenoners and iron frame tenoners also. Select a kind which has both ends of the sliding table supported directly from the frame, with a good end frame underneath each end of the table. There is another variety of the iron frame tenoner, in which the frame supports the mandrel end of the machine only, the sliding table being supported upon a swinging arm which in turn is pivoted like a crane to the frame of the tenoner. While machines of this class do excellent work the writer very much prefers the double supported table mentioned above, and he will, under all conditions, select the directly supported table in preference to the swinging arm form of construction.

When selecting a tenoner, be sure to choose one in which the adjustment of the upper and lower cutting heads is easily made, and which have means for fastening these heads securely, once the necessary adjustments have been made. The writer has no use for a tenoning machine in which one or more of the adjustments "go back" after a bit of hard work or continued use. That is, where the adjustments work out of place and the tenons increase or diminish in thickness a little by failure of the several adjusting parts to hold properly. The writer has run tenoning machines in which one could never be certain, after half an hour's run, that the upper and lower shoulders of the tenon were exactly in line and the constant testing and watching required by a machine of this class makes tenon work a guess, with nerve-racking requirements which are

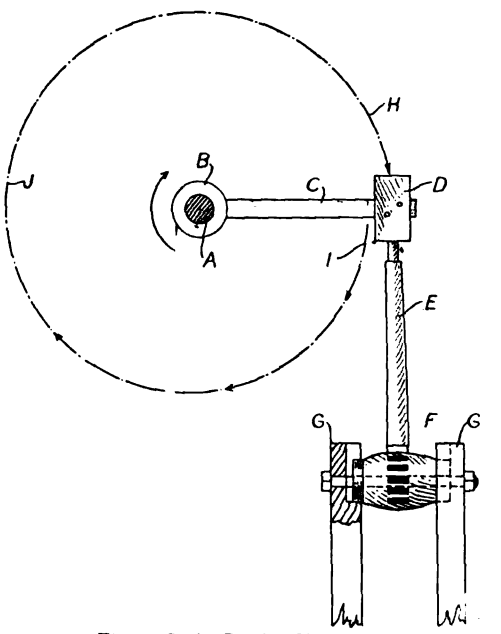


Fig. 2.—Spoke Driving Mechanism.

not desirable, and which should be abated once for all by selling the defective tenoner and procuring one which will stay in adjustment.

A whole lot of spokes are spoiled by the improper setting up of a tenoning machine, and more spokes are spoiled by improper handling of the machine when properly set up, but when a man runs up against a combination of the two —bad setting and poor running—then it is a wonder that good spokes are gotten out at all.

Fig. 1 shows a few things to do and not to do when making spokes on a power tenoner. Sketch 1 shows an edge view of a perfect spoke—one which it will be noted that the corners A and B are all full, square and sharp, that the shoulders are in line with each other and the tenon is of even thickness throughout its entire length, and that the tenon is also placed exactly in the middle of the spoke thickness. It is the combination of all these things which makes the good spoke.

In sketch 2 trouble is shown. The shoulder is not in line with the lower shoulder, showing that the upper head needs adjustment. The corner D is defective, showing that either the cutter has worn dull or that a corner has been broken off the knife so as to leave the fillet shown at D. Spokes made with this sort of shoulder cause felloe-bound wheels in a very short time, owing to the small corner at D, preventing the tenon from fitting as snugly against the hub as it should when the spoke is driven. Then, when the wheel has worn a little, the shoulder D, sketch 2, flattens down and lets the spoke into the hub a trifle. This causes the spokes to fall away from the rim a trifle, leaving the wheel "rim-bound" or "felloe-bound," a condition which must be attended to at once or the wheels will be quickly ruined.

Another fault sometimes found is shown by sketch 3. In fact, there are several faults shown by this sketch. The first is that the tenon is tapering, as shown at E F, being thinner at J than at I I. Next, the tenon is closer to side G than it is to side H instead of being placed evenly between the two sides. But the worst thing about this job is the cut at I on either side of the spoke tenon. This defect, and a bad one it is, too, was caused by poor setting of the spur or saw segment which cuts the shoulder of the tenon. The spur or cutter was allowed to project beyond the face of the cutters the result being the very weak tenon shown at C.

Another bad defect is shown by sketch 4. This sketch shows the side of a spoke instead of an edge in the former illustrations. By looking closely at this engraving it will be seen that there are two kinds of trouble on tap in Fig. 1, sketch 4. First, the little projecting slivers K K, will spoil any job to which they may be attached. The other defects are the split-out places I. L L, which were caused by slivers left protruding

from the shoulder of the tenon and then broken off by further action of the cutters.

A tenon marked in this manner can never be of much use to the carriage builder and the workman should take immediate steps to prevent any further action in that direction. The sole and only cause of the slivers K K, and the splits L L L, is that the spurs and the cutters have been allowed to get dull. Keep them sharp all the time and you will never be troubled with slivers or splits, as shown by sketch D.

Driving Spokes by Hand or by Machine.

The matter of driving the spokes in a wheel or two is not a matter of much consequence, but when it comes to driving spokes all day long, week in and week out, then it becomes necessary to cast about for some machine which will do the work and relieve human muscles of the severe labor thus called for. There are several machines on the market and one machine in particular comes very close indeed, in its action, to that of a man swinging a sledge-hammer. There is, however, one considerable difference: The man gets tired but the machine don't, and can drive all day long, either with heavy blows or light ones at the touch of the toe upon a treadle!

Fig. 2 illustrates the principal mechanism of the spoke-driving machine noted in the preceding paragraph. It consists of a shaft A, to which is attached the hub B, arm C and hammer D. These parts are solidly fitted to the shaft which is revolved either by means of a loose belt and a tightener or by a friction clutch. In either case the starting device is under control of the operator through a treadle at the side of the machine.

The spoke being driven is shown at E, the hub F being supported by standards G G, to which the hub is attached by means of a bolt through the center thereof. The force of the blow is carried upon the shoulders of standards G G, which are hollowed out to fit under the ends of the hub as well as to pass by both ends thereof and support them, as shown, both endwise and from below.

The path of the hammer, as shown by the arrow line H I J, is not a true circle, but there is a lateral movement of the hammer at I, whereby the hammer is drawn inward the instant after the blow has been delivered upon the spoke E. The inward movement is automatically effected by means of a cam, not shown in the engraving, which is fixed to hub B and draws the hammer inward as described enough that it may pass downward inside the spoke in order to make a new stroke and deliver another blow.

The manner in which the hammer is made to strike a very heavy blow or to deliver an exceedingly light one, at will of the operator, will be readily understood and acquired by him in a very short time, and it is not with that part of the work that the writer wishes to deal in this story but to point out a source of considerable danger to the operator and to others in the shop when a spoke-driving machine of this kind is operated.

The danger lies in the hammer-head D, which is attached to the end of helve C. Should the smith be mathematically inclined, he may figure out the stress or pull exerted radially upon the hammer helve at the instant the blow is struck —this stress being caused by centrifugal force. A pretty good idea of the immense force thus exerted upon the hammer helve may be obtained by tying a one-pound weight to a string, then using a length of string just equal to length of hammer helve C, whirl the one-pound weight around the head as nearly as possible at the speed made by hammer F, in swing around its circle. It will be found that the one-pound weight requires a very severe counter stress applied to it by the hand and arm to prevent its leaving its circle and flying off on a tangent, just like an apple from one end of a limber stick when there is a small boy at the other end.

There are two matters of precaution which must be carefully looked after by the operator of a spoke-driving machine, and one of them is to be sure that hammer D is securely attached to helve C. In some machines of this class which the writer has seen in operation the only fastening of the hammer-head was two one-quarter-inch pins driven through the head and through the helve, the latter being made of wood and not more than ¾ inch thick where it passes through the hammer head.

The workman will easily see that such a method of fastening is not safe and should never be used. All there is to hold the head against the shock of delivered blows and against centrifugal force is the strength, splitwise, of a little piece of hardwood, perhaps ¾ inch thick, ⅜ inch wide and 2 inches long. These two pieces, as shown by Fig. 3, are what would be split out of the hammer helve when the pins pull through the end of the helve.

The handle is shown split in two places where the pull on the pins has simply pulled the wood apart along the grain, the two pieces, A and B, being torn off and forced out by the pins. This is no fancy sketch but is what actually happens, sooner or later—usually sooner—when a hammer is used attached to a helve as shown by Fig. 3. The writer will not attempt to say what form of fastening should be used between hammer head and helve as different makers of spoke-driving machines use different methods of attaching the head to the helve. But no matter what fastening method may be employed see to it, by close and constant watching, that the hammer-head is at all times firmly attached to the helve. This may be easily determined by noting that the head always bears snugly against the shoulders of the helve at C and D. Any loosening up at this point calls for instant examination to find the reason therefor and to take steps to safeguard the operator and the other workmen in the shop.

Then there is another thing which causes the breakage of many a helve, and that thing is the failure of the spoke to take its blow fair from the middle of the hammer head. When a blow is delivered by any side, edge or corner of the hammer head, there must be a correspondingly sudden shock to the helve at the point where it joins the head. The hammer should be made to deliver its blow from a point in the middle of its face, exactly below the center of gravity of the hammer head. When this is done, and the fastening is ample, there will be no trouble from loose hammer heads, but when the hammer strikes on one side, edge or end, then there is sure trouble in a very short time. The blows, delivered away from the center of gravity of the hammer, cause heavy and severe stresses in the helve, as much of the force of the blow, instead of being imparted directly to the spoke, is diverted into causing a twist in the helve or is diverted in some other direction, which causes a heavy strain in the machine as well as a loss of capacity in the work, because the spokes will not be driven as fast when the hammer strikes unfair upon them so that a portion of the blow-force is lost or absorbed in bending the hammer helve. Therefore, to do fast work and to make the machine last as long as possible see to it that the center of the hammer always strikes fair in its center upon each and every spoke driven.

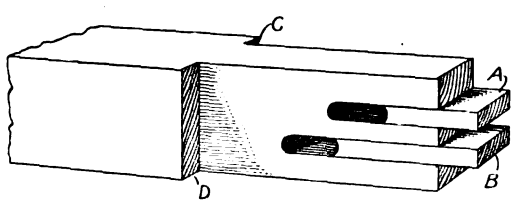


Fig. 3.—Hammer Head Fastening.

A simple experiment will give the operator a better idea of the importance of this matter than can be given by pages of talk. Just cut out of a hardwood board, at least 1¼ inches thick, a piece the exact size and shape of the hammer and helve as they appear when looking directly downward upon them. If the hammer is 5 inches square then make the bit of plank 5 inches square also, and if the helve is 1½ inches thick and 3 feet long make the wooden plank-helve the same.

Next drive a spike in a block, the spike projecting vertically upward and representing the end of a spoke which is being driven. Next strike the spike with the imitation hammer, taking care to hit the spike with the center of the hammer. Note that there is very little vibration of the hammer which lies dead in the hands. Next strike the spike a smart blow with one corner of the wooden hammer-pattern, and note what an amount of vibration is transmitted to the fingers and how slightly the spike can be affected by a blow of this character. Trying this experiment several times and hitting the spike with various portions of the hammer-pattern will show the workman just what happens when the spoke is struck by a portion of the real hammer other than the center of the face thereof. And after a few experiments of this kind I am sure your workman will drive very many more spokes with much less wear and tear of the spoke-driving machine.

Turning and Sanding Spokes.

In sections of the country where good spoke timber is plentiful, the smith or the wheelwright may add a good bit to the yearly income by putting in a spoke lathe by means of which they may not only make their own spokes but also send a good many to market from time to time. A spoke lathe is not a very expensive machine. A few hundred dollars will purchase and install one together with the other necessary machinery for making both spokes and handles.

But should this be attempted and a spoke lathe installed do not make the mistake made by several persons of the writer's acquaintance, who got the idea that a lathe was only a machine necessary for making spokes and handles and who supposed that a smoothly finished spoke came right from the lathe. But these persons found something far different. They found that sand-belts were necessary for dressing and finishing the spokes and handles after they came from the lathe, and they also found that with large axe handles a machine called a "throater" was necessary to cut away the wood left in the curve of the handle near the end of handle farthest from the eye of the hatchet handles, but it is a necessity when making axe handles for chopping wood or cutting down trees—the straight Georgia axe handle excepted, of course.

Three sand belts of varying degrees of fineness—or coarseness—give the best results, although many handle manufacturers use only two sand belts, one for roughing, covered with No. 3 sand, while the other, or finishing belt, is covered with No. 1½ sand, well glued in place. Both these sand-numbers correspond to the numbers used on common sandpaper, but I find that even these numbers vary considerably among different makers of sandpaper.

A SHOEING CONTEST.

Held on the Stage of a Theatre Resulted in a Draw.

Not long ago in Batavia, N. Y., there was a contest in making horseshoes on the stage of the local theatre and it was reported as follows in the local paper:

"If 'Little Otty' didn't win, nobody could beat him, and that satisfied the big crowd that saw the championship contest in making horseshoes on the stage of the Dellinger Theatre last evening. Thomas Heaman of Le Roy and Frank A. Ott of Batavia each made 30½ shoes within the hour and every shoe was declared so perfect by the judges that it might be worn by a horse. The contest was announced as a draw.

"Probably no event of less importance than the coming of a political candidate at the time of a national election could bring out the crowd of men that completely filled the theatre, and not even a silver-tongued campaigner could start the enthusiasm that 'Little Otty' and Tom Heaman provoked. Smithies came from Le Roy in large numbers and from Buffalo, Rochester and many places in Genesee County. They brought bells and whistles and rattles and, as the championship contest was nip-and-tuck all the way, the din was appalling. About a dozen women were in the audience.

"When the theatre curtain went up the scene was a blacksmith shop beyond doubt. There was no scenery and the big fireproof doors in the rear of the stage, together with the brick side walls, made an appropriate background. There were two forges, two bellows and anvils, with other necessary equipment, set in the centre of the stage.

"Everybody was waiting for the 'final bout,' as Mayor Wiard styled it. In announcing the contest the mayor said that already a challenge had been received from A. H. Jones of Chicago, who wanted to meet the winner for a side bet of $10,000. Everybody seemed to be yelling 'Otty' when former Alderman Ott, in blue undershirt, leather apron and skull cap stood beside his forge and grinned his sympathy at the audience. Le Royans made some noise, too, their cry being chiefly 'At-a-boy, Tom,' and 'Le Roy.' The boxes seemed to have the Le Roy audience chiefly.

"Little Otty, on the flip of the coin, chose his own bellows and anvil. He had A. S. Pratt of Batavia as helper, while Tom Heaman had A. J. Davy of Le Roy. The helpers came in for their share of applause and a running comment was

kept up between those on the stage and men in the orchestra, boxes and balcony.

"Almost simultaneously the smithies each leaned over and dropped the first red-hot and fully made shoe on the floor. These shoes had been made from straight iron bars and were ready to be put on the hoofs of horses. From that time on the anvils made a din, sparks flew, and all four men worked as though preparing to shoe a cavalry regiment in wartime. They didn't work too fast, however, for the smithies and others in the audience.

" 'That's good enough, Otty, throw it away;' 'Let it alone, Tom;' 'Batavia's doing it now;' 'Le Roy;' 'Batavia,' were some of the calls while the din continued. The musicians used their drums and other instruments to add to the uproar.

"Officers of the Genesee County Blacksmiths' Association and some guests from out of town sat on the right and rear of the stage. George Kerbler of Buffalo was judge, Anthony Schimley of Le Roy timekeeper and Mayor Wiard the official announcer.

"Mayor Wiard in a dress suit and the orchestra down in front of the stage were kept busy dodging big sparks the moment the first preliminary—the heel turning match between John Dietschler of Batavia and Anthony W. Knapp of Corfu—was started. John Tumalty of Alabama, who was scheduled for the contest, was unable to be present, so Mr. Knapp took his place at the bellows in the last moment. He was defeated by Mr. Dietschler in heeling eight shoes.

"A. S. Pratt of Batavia defeated Jerome F. Ott of Batavia in the toeing match which followed, it being announced that his work was superior in quantity and quality. At the close of the match the smithies exchanged anvils and hammers and each tried to knock off the newly placed toes of his opponent. There was plenty of vim in these efforts.

"Patrick S. Ward and his son Jack sang 'Marguerite' and 'Come Back to Erin,' the second number being an encore. Mr. Ward is a Batavia blacksmith and two decades ago was a leading baritone in Batavia. He and his son displayed fine singing qualities and a great deal of the old richness of melody that delighted audiences years ago came back to the senior singer last evening. At any rate the blacksmiths applauded long and loud.

" 'It was some contest, believe me,' said Mayor Wiard, as he straightened down the ends of his spike-tailed coat and wiped his brow in announcing the result.

"Miss Katheryn Conway on the piano accompanied the anvil chorus by Mr. Ward and A. S. Pratt. It was rendered while the judges were counting and inspecting the shoes. The number was entitled 'Keeping Time on the Anvil' and was altogether instrumental.

"Mr. Kerbler, the master blacksmith from Buffalo, long experienced in judging such contests, said that as each smithy had made 30½ shoes and as each completed shoe might be worn by a finely shod horse, he had no choice but to declare the contest a draw, and the announcement was so made by Mayor Wiard. The number of shoes made was declared a fine showing, as 24 shoes are considered a record to boast about among expert blacksmiths.

"Financial returns from the contest will be gratifying, the blacksmiths announce. The shoes made by Ott and Heaman are now on exhibition at James Lenahan's blacksmith shop on State street."

School for Carriage Draftsmen.

The day and evening classes of the Technical School for Carriage Draftsmen and Mechanics at 20 West 44th street, New York, closed for the season April 9th. The annual exhibition of students' work took place on April 14th. Every bit of available space was covered by drawings made during the past season and only a fraction of the work done could be shown. There were fourteen full-size working drawings of carriage and automobile bodies, the latter sort in the majority. There were 152 small drawings, about half of which were scale working drawings of carriages and automobiles, and the rest consisted of problems nicely worked out. There were numerous small drawings showing the vehicle in perspective and quite a number were beautifully colored.

The names of the graduates follow: J. L. Hardy, E. G. Griese, Geo. H. Dunkley, E. J. Luce, J. Chordas, A. P. Fletcher, Geo. Barron, Wm. Whitby, Chas. Gerry, Joseph Stolfi, Louis Herzog.

A pleasant event was the dinner given by the graduating class to Instructor Johnson April 4th. The dinner was held in Shanley's restaurant on 42d street and was a most enjoyable affair. The surprise of the evening for the instructor was the presentation to him of a beautiful silver loving cup suitably engraved and with the names of the graduates marked upon it.

The school conducts a correspondence department which is open the year round and men are admitted at any time.

COLOR HARMONY.

Something that Requires Taste and Judgment in Automobile Painting.

From M. C. Hillick, Pennsylvania.—The time will probably come when automobiles will be painted in as quiet colors as horse-drawn carriages have been for so many years. But these somewhat bright colors for automobiles and the fact that to-day they are in many localities the chief work of the carriage painter, have given the painting business new features and added importance. As much as possible the loud and sensational colors should be out of sight or on parts of the automobile surface where they show the least. In a former issue reference has been made to some of the more prominent colors which for the present year and possibly—even let us hope—for succeeding years will reign as favorites in our decorative effects.

In choosing a combination of colors for the car it is a mistake to attempt to introduce too many colors. Two or three are about as far as one should go for the body of the car, while one color, supplemented, of course, by the striping color, should invariably suffice for the chassis.

In making effective combinations of colors for the automobile it will at times be necessary to ignore the strict letter of the law governing harmony and contrast, and prove a law unto yourself. That is to say, use common sense methods and good judgment, avoiding, to be sure, any combination that approaches an offense to the color instinct possessed by every man who is not color blind. Grays are usually neutral colors, but any one of the popular grays if employed in connection with a combination of colors in which a prominent blue reigns conspicuously should have a bluish tone, or what is perhaps more correctly termed, a cold hue. If a bright red were the conspicuous color in the combination the gray should have a warm, reddish tone.

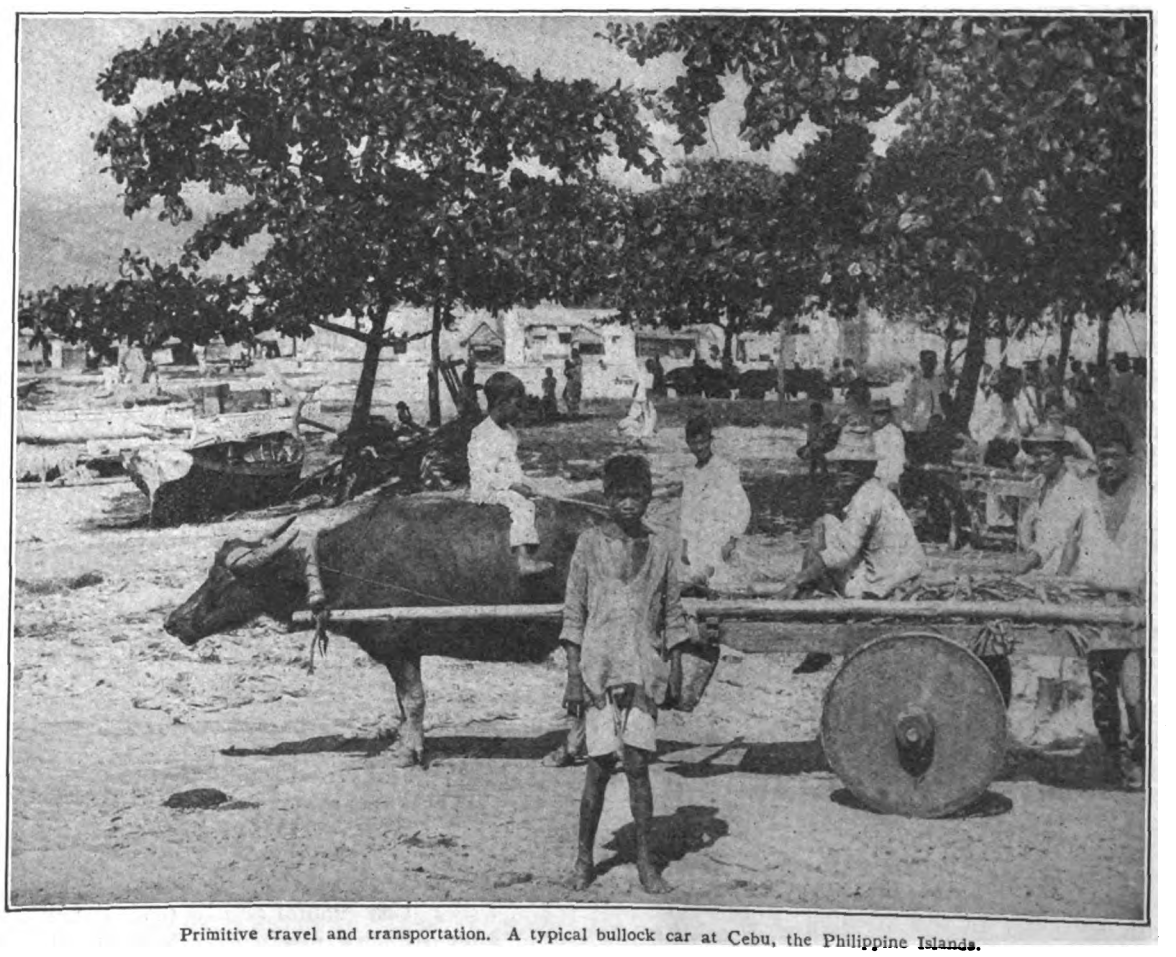
A neutral gray, or in other words, a gray made out of white and black will harmonize with any color. Black will do quite the same thing. It is a mistake to suppose that a color that always harmonizes with any color, or any set of colors, will with such colors produce combinations pleasing to the eye. Such is not the case.

Harmony of color, if nothing more is wanted, may be more accurately obtained by varying a certain color to divers shades and tints. Green, for example, if shaded to a darker hue or cast to a lighter tone, will develop harmony through either change. So likewise the blues. In the preparation of gray pigments the most thorough mixing is necessary, otherwise there will be streaking out of the various pigments employed. Especially is this true of a gray in which more or less black is used. Black is an assertive color when used in connection with white to make up some one of the various shades of gray. The best practice in making up a soft, neutral gray is to beat the white to a creamy paste, and the black to a like consistency, and then add the black to the white gradually, meanwhile beating the mass vigorously. A very intimate mixture of the two pigments being obtained, proceed to add turpentine until the proper consistency is secured.

Not infrequently a very harmonious combination of colors may be had without getting enough brilliancy into the effect to please the average person. This difficulty is often overcome by the choice of bright striping effects, or by changing some one of the field colors either to a bright or a more subdued shade. Small spaces of green or blue or maroon or brown in contrast to large spaces of black are not pleasing.

In fact, they are in bad taste, and even the novice while perhaps not able to explain the sensation is not indifferent to the offensive color situation. Change the ratio of color, making black play a very small part in contrast to a very large part played by the green and blue, and the combination will pass on as an altogether pleasing and effective one. Blue and green panels on the car body are greatly intensified and rendered more beautiful when the moldings are colored black. Dark green panels are given a contrasting effect by striping with lines of deep red. Finer lines of deep red, like No. 40 carmine, for example, may be used on fields of blue for a contrasting effect, although as a rule either lighter or deeper blue than that employed as the field color, used to line the surface will give more pleasing, and, on the whole, more beautiful color effects. Lines of black on the medium deep blue field give a very handsome and genteel effect.

In making choice of a color for the car or a combination of colors, the owner thereof will find it a wise practice to study the outlines of the surface and the actual conditions of the surface, whether smooth or only moderately so. All dark, elegant colors require a very smooth, finely conditioned surface to hold them forth to the best advantage. Light colors, including the light browns, show surface defects very much less than the dark colors, and for this reason such colors may well be selected for use upon surfaces



Primitive travel and transportation. A typical bullock car at Cebu, the Philippine Islands.

that cannot for various reasons be worked down to the desired degree of fineness.

Automobiles that have been used for two or three seasons are certain to show surface conditions which require leveling down fine and good in order to display the dark, rich, beautiful toned colors everywhere in such pronounced favor today, and unless the owner feels warranted in going to the expense of putting the car in this condition preparatory to giving it the color, it will be more satisfactory to all concerned to choose a lighter tone color. For this purpose almost any one of the grays, or the browns, and medium shade of maroon—the latter a very attractive color, let us say in passing—will answer the purpose nicely without making the car look out of date in any particular. Moreover, the grays and browns and maroons are rightfully classed as exceedingly durable colors.

OXY-ACETYLENE WELDING.

Mr. Bagley Gives Further Information Relating to the Range of Work.

From J. N. Bagley, Nebraska.—From the numerous inquiries I have had since the first issue containing matter relating to the oxy-acetylene welding machine, I judge that many of the brother mechanics have made machines. In fact a few quite close to me are having unusually good success. The welder will prove the most valuable tool that can be placed in the shop as it leads up to a line of work that will do more than that which would otherwise come to the shop. At the time I installed my welder two of us were taking care of the business very nicely. At the present time there are five in the shop and we all have plenty to do.

One might wonder how this comes and it is an easy matter to explain. In the first place, many of the broken parts can be repaired by the man that looks after the welding, and some of them must necessarily go to the shaper or to the lathe, to be finished. This requires a man for the welding machine and one for the lathe and

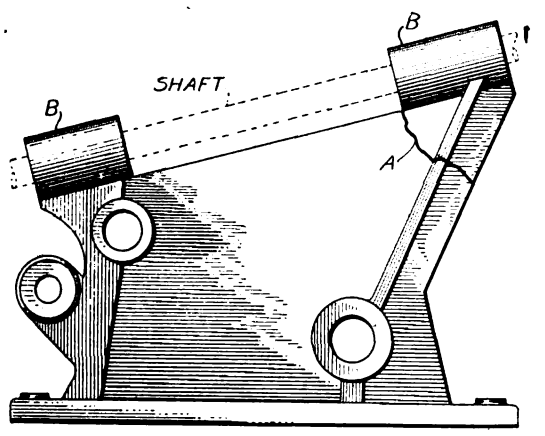


Fig. 1.

shaper work. Then the extra amount of business that you will draw which does not belong directly to your territory will take another man. Now considering your own territory, aside from the regular line of work that comes to the garage, there is the farm machinery, such as castings and parts belonging to plows, harvesters, mowers, thrashing machines, cream separators, etc. This will require an extra man. Aside from the already mentioned increase, the automobile repair business will still further increase because of the promptness you can handle the work. People driving cars like to get them out of the shop just as soon as possible and many times sending for repairs causes a delay of from one to three weeks. We are able to get the car off the floor two to three times as quickly as we did when we sent to the factory for parts and this allows us to double the amount of business in a building with the same amount of space.

We will take up in this article a line of simple as well as important work, and something that will come to the shop most every day after the welding machine is well advertised. There seems to be an enormous amount of small castings of various shapes to be welded, and it is next to impossible to give a rule for handling them all, but one must get the idea and figure out the best, quickest and cheapest way to do the job. This will only come as the operator has had the experience. We in this issue will only consider the iron castings, as we will have to handle the different materials in different ways to meet with success. In the drawing, Fig. 1, we will take up the irregular casting to be welded and this one is similar to many other castings that come to the shop to be welded.

In the first place we have at points, B B, Fig. 1, a bearing in which works a slide bar, the casting being broken at A. It will be necessary to keep the points B B, in line while being welded. In order to do a job of this kind I proceed as follows: Make a bed of molding sand or potters clay and press the casting into it, holding the parts closely to place, with a shaft just fitting the bearings B B. As soon as the impression is made and all is ready, remove the casting from the sand, being careful not to disturb the print and grind the V shape notch as referred to in a previous issue. Now take the casting and very carefully place it back in the sand just as it was before grinding the V notch.

We are now ready to weld, and in order to save a little gas it will be necessary to heat the casting red with the torch. Now with the flame properly adjusted at the torch, turn the flame along the V and at the same time keep the weld rod in the flame until it becomes red, after which stick it into the can of flux, leaving it until a quantity adheres. When the casting passes the red stage, melt into it the weld rod, being careful not to pass over the V without melting under the rod.

Continue this until the iron is built up a trifle higher than it is to be when finished and ground down on the emery wheel. Let the casting cool in some place other than in a draft. When it is nearly cool it can be taken out and ground.

I find it a very good plan to paint all the cast-

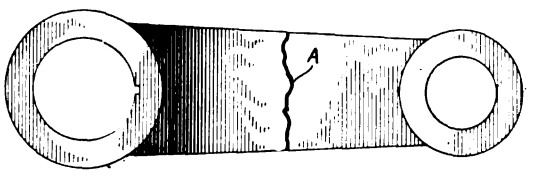


Fig. 2.

ings after welding. Of course this does not make the job any better, but the average customer will be willing to pay the cost of painting rather than have the job turned over in a rough burned state. All castings should be tested before being turned out of the shop for one cannot be too particular as to the way the work leaves the shop, especially when trying to build up a trade on a new line of work. Of course this applies to all time but after one has been in business for some time and a mistake is made it is overlooked and will not attract one-half the attention it will in the beginning.

We have in Fig. 2 a type of casting much in use and one that quite often needs repair. We will suppose that it is broken at point as shown at A. Now we must take the impression in the sand or clay first of all, paying particular attention to keeping it true in the mold.

After it has been taken from the mold it will be necessary to grind the V notch as already explained. Where the casting is quite thick I find it a very good plan to grind both sides of

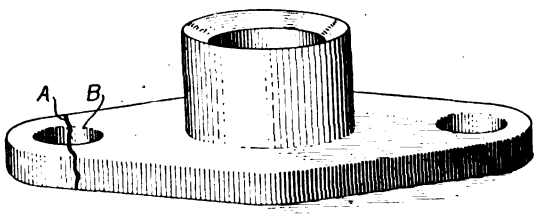


Fig 3.

the casting, as it will be easier and quicker done. Castings of this sort should be built up all the way around, quite a little larger than the finished casting will be, so that after the grinding it will be the same size and shape as before being welded. Many times one will be bothered with small air holes in work of this kind. In such instances the metal was run in too cold, or the flux used was not sufficient to cause the molten metal to flow about as it should. In case the metal is too hard to file, it indicates that the flame was not properly regulated, that is, too much oxygen and not enough acetylene. The flame should be so adjusted that it is burning just all the acetylene gas it will burn without having a tail to the flame.

In Fig. 3 we have a connection to an exhaust pipe or carburetor manifold, which is a very common break. We have the casting broken at A, destroying the eye. In this case it is necessary to lay the casting on a flat surface and a plug of clay made to fit the hole B, after which the V notch should be ground and be placed back with the plug of clay inserted. Proceed with the welding as already described. When welded punch out the clay and the hole is made. Grind up smooth and the job is complete. This little job for an experienced operator will take from three to five minutes after it has been removed from the machine.

In Fig. 4 we have another very common class of casting, a cap to a box. In this case we will proceed a little different, as I find it to work well and keeps the casting true and straight. Point A being the break, we have a half circle at B. This should be filled with potter's clay and

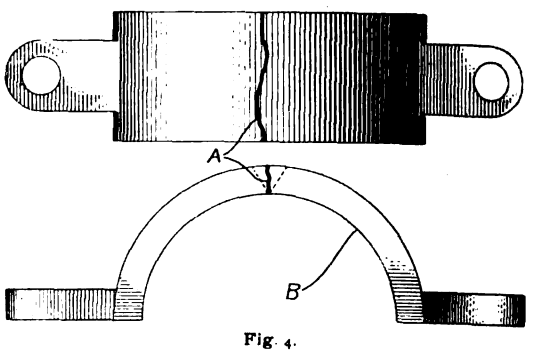


Fig. 4.

pressed in solid and scraped until a straight-edge will line the clay with points C C. Now remove the casting from the clay print and grind the V notch as already described and it is ready to weld. After welding it should be ground and painted and the job is complete. There is none of the small castings but what can be welded as cheap as they can be purchased from the maker to say nothing of the time and expense that it takes to get them from the factory. In almost every instance arrangements can be made with the implement dealer to send the broken machine castings to you for repair, and after competing with factory prices and giving the dealer his commission the casting can be repaired just as cheap as it can be bought new.

MORE SOLDERING NOTES.

The Various Fluxes and Something About Soldering Irons.

From The Carpenter and Builder.—Solders are known as "hard solders" and "soft solders." Since "soft" soldering is the more common form, we will devote our attention to this process. Soft solders, also called tin solders or white solders, consist of readily fusible metals or alloys and do not possess much strength. They are easy to handle on account of the ease with which they are melted. Soft solders are composed of tin, lead-tin and alloys of tin, lead and bismuth. Plumbers' solder, also called "half-and-half," is made of one part tin and one part lead. This solder melts at 370 degrees Fahr., and is used for wiped joints, etc. Ordinary solder for general use with a soldering-bit is made of 5 parts tin and 3 parts lead, and melts at 350 degrees Fahr. Other variations of these mixtures are used with the addition of bismuth for blow-pipe work.

No one flux can be assigned to any one metal as being peculiarly adapted to that metal for all purposes. The nature of the solder used often determines the flux. The fluxes generally used in the soft soldering of metals are powdered resin, or a solution of chloride of zinc, alone or combined with sal ammoniac. A common method of applying resin in soldering is to powder the resin and apply it to the work by means of a swab consisting of a small tin or wooden handle to which a tuft of cotton or a few folds of cloth have been fastened. If a liquid resin solution is desired, the resin may be dissolved in alcohol, thus making a sort of varnish. This preparation when applied to the surface to be soldered, dries out, leaving a thin coat of resin just where it is desired.

Ordinary acid solution may be made by placing three parts of hydrochloric acid and one part of water in a lead, glass or wooden vessel, then slowly adding small pieces of zinc as long as any action of the acid on the zinc can be observed. Always put in more zinc than the acid will dissolve and allow the solution to stand several hours. A test should then be made to see that there is sufficient water in the solution. To make this test, a small quantity of the solution is removed to a clean dish and a bit of clean new zinc is dropped in. Now add a few drops of water and see if any chemical action upon the zinc follows the addition of the water. If there is any action, the original solution should

be diluted with water until further addition does not have effect upon the zinc. Pour off the clear part of the liquid for use. Care should be taken in this process since considerable heat is present.

A variation on the ordinary acid solution is obtained by dissolving the zinc in three quarts of common muriatic or hydrochloric acid without the water mentioned in the previous solution. After the acid has dissolved all the zinc possible, pour off the clear liquid as before and add a solution by dissolving six ounces of sal ammoniac in a pint of warm water. Also, add four ounces of chloride of tin which has been dissolved in another pint of water. These quantities will make one gallon of solution, but may be cut down proportionately for smaller quantities. The combination of solutions will be a little cloudy, but may be cleared by the addition of a few drops of the hydrochloric acid. Be careful not to add any more acid than is necessary to clear the solution. The advantage of this solution is that it will not spatter when the bit is applied to it, and also will allow the use of a poorer grade of solder.

See that all surfaces to be soldered are clean and free from any material which will prevent the solder from sticking. Old work should be brightened by scraping, filing or rubbing with emery cloth. For small work the solder is applied to the bit instead of to the work. A small amount of solder may be picked up on the tinned part of the hot soldering bit to the place which is to be soldered. If the surfaces are clean and properly fluxed, the solder from the bit will readily flow over them and adhere solidly.

When large work is to be soldered, as in the case of seams in a tin roof, it is necessary to feed the solder onto the seam by melting the bar of solder on the top of the hot bit as it is moved along the seam.

Soldering bits are usually made of copper and are "tinned" on the point. To "tin" a bit, the tool should be heated hot enough to melt solder easily; the point of the tool quickly filed bright, and then rubbed through a mixture of solder and sal ammoniac spread on a piece of tin. This action will provide a thin coating of solder over the point of the bit.

Bits should not be heated too hot, nor should they be used too cold to produce smooth work. The bit should be just hot enough to melt the solder readily. Bits should be kept well tinned at all times for good work.

A gasoline blow torch or a charcoal furnace is best for heating the bit. Heating in a soft coal fire causes the tinning to vanish very quickly.

Legal Department

All legal questions answered free of charge. Address Communications to Editor "Legal Department," THE BLACKSMITH AND WHEELWRIGHT, P. O. Box 654, New York City.

Property But No Will.

Question.—"A" dies owning a farm with debts on, leaving a widow and a number of children. The widow and children pay off the debts, the children now being all grown up and all yet living. How about leasing this farm to parties for oil? The farm still remains in "A's" name.

1. Would all the children have to sign the lease together with the widow to make it valid?

2. Suppose the terms of the lease do not suit the children, or some of the children, and they refuse to sign the lease, could the widow and the other children whom lease suits still give a good lease on the land?

3. What would be the result is part of the children only and the widow sign the lease, and oil being then found on the farm? What recourse and claim would those have that did not sign the lease?

4. Could the widow alone lease her interest in the farm disregarding what the children do? And if she can, just where would her interest in the farm be? Which part of the farm could she claim and consequently lease?

5. Would the husbands and wives of the children have to sign the lease to make it good?—A. S., Ohio.

Answer.—It is assumed in this answer that "A" died without willing the property to anybody, or in other words the property descended to his heirs at law subject to the dower right of the wife. The land is therefore owned by the children as tenants in common, subject, however, to the dower of the widow during her life. Dower is the right of the widow to possess and enjoy during her natural life one-third of the lands of her deceased husband.

1. Undoubtedly the lessee would insist on all the children and the widow signing the lease, otherwise the children not joining in the lease could claim their share of the property, it being utterly impossible in law for one tenant in common to lease his co-tenant's interest in the property without the latter's consent.

2. By a "good lease" of the land I suppose you mean a lease which would be good against the children who did not sign. If such is your meaning I would say that the lease would be bad.

3. If only part of the children and the widow sign the lease, if oil is found on the farm undoubtedly those who did not sign the lease would be entitled to enter upon the land and take their share of the oil.

4. The widow could undoubtedly lease her interest in the farm disregarding what the children may do, but her interest is rather precarious, depending on her actually living during the period of the lease and I doubt very much whether such a lease would be salable.

5. The husbands and wives of the children would not have to sign the lease to make it good, but in the event of the sale of the land by all the children and the widow they would have to sign so as to release their courtesy and dower rights.

In conclusion I might suggest that if there is a disagreement between some of the children and the widow, the wisest course to be followed would be to start a partition action and have the land partitioned. In that event if the land was incapable of being divided into as many parts as there are children and the widow, the court would undoubtedly order a sale of the property. When the sale took place the children who could agree as to the leasing of the property might join forces and buy the land and in that way get rid of the dissenting children. If the breach between the children and the widow cannot be amicably adjusted the sooner you consult a competent lawyer in your vicinity the sooner you will realize upon the property.

Collecting a Bill.

Question.—Will you, through your paper, explain how I can collect a bill I have against a telephone company. I presented the bill to the board when they had a meeting, but they sent me the bill back, claiming that I had overcharged them. As I have the same price as any blacksmith would charge them, how can I do; can I charge interest from the time I presented the bill?—A. Anderson, N. Dakota.

Answer.—If you are not willing to compromise your claim the only thing for you to do is to consult a competent local attorney and employ him to collect the amount of your bill. If, at the time of doing the work for the telephone company you told them what your charges would be and they made no objection, you can then sue the telephone company for the price so stated to them. If on the other hand no price was mentioned by you or the telephone company at the time the work was ordered, you can only recover the reasonable value of your services. In either of the above cases you are entitled to interest on the amount of work done.

If the amount of your bill and the amount which the telephone company is willing to pay are not very far apart, I would strongly advise you to compromise your claim without consulting a lawyer, as this course would probably be cheaper for you in the end. However, if the claim cannot be compromised at a reasonable figure you had better consult a lawyer at once.

A Horse Aid Society.

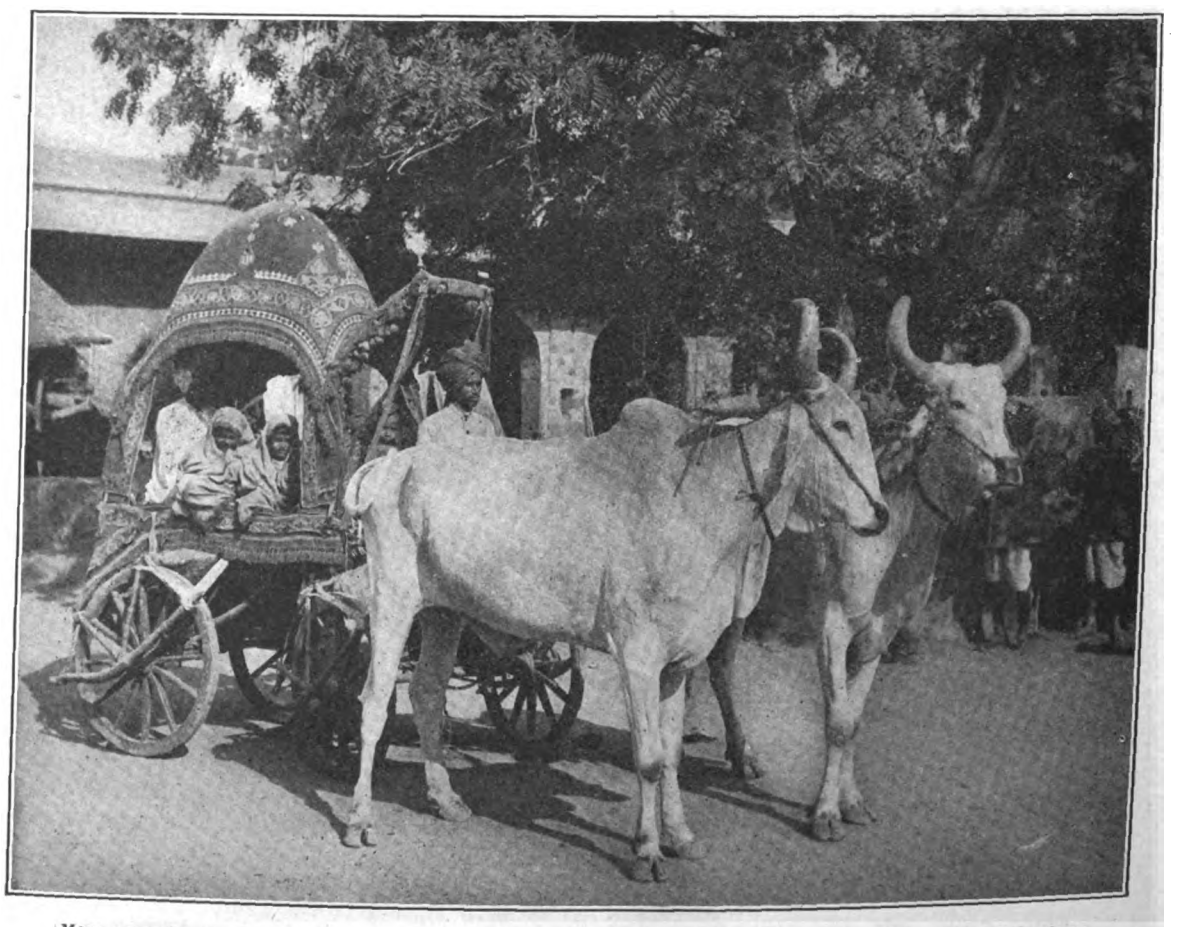
In New York City the Horse Aid Society has been established. It is a sort of a shoeing hospital for horses which suffer from defective shoeing. Its president is Mrs. Stella Ehlrich and it has just opened a scientific horseshoeing shop at 164 West 18th street. Here horses suffering from bad shoeing are not only shod but their drivers are given some sound and plain advice.

This society does not believe in having drivers arrested. It tells them about the clinic, which is free, and invites them politely, and they usually come. If the driver refuses and the horse is really hopeless it takes but two veterinary surgeons to condemn him. Then he is given a few tidbits of food and sent to Horse Heaven.

And it is an organization worth while. It has a big two-story building, and in a short time expects to treat cats and dogs as well as horses. On its staff are many of the most prominent veterinarians of the country. Every Thursday evening there are free lectures given by specialists on locomotion and mastication.

Kerosene Is Useful.

Kerosene is of great value as a softener of rust—but in four cases out of five it is not given sufficient time to do this work. Kerosene splashed on and immediately rubbed off will do practically no good; it must be given time to penetrate, the longer the better. Several hours at least ought to be allowed, and if the rust is heavy, all day or all night, or both, will be found necessary to give the oil an opportunity to do what it is capable of doing. The same principle applies, of course, in cases where kerosene is applied to a nut rusted on a bolt or stud, only in this case the oil has to penetrate between the metal faces in addition to permeating the film of rust.



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

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MAY, 1913.

PARTIAL CONTENTS.

SPECIAL NOTICE TO READERS.

For more than a year, as a result of the niggardly policy pursued by the Post Office Department, our subscribers have been making complaints about the delay and loss of papers in the mails. The blame for this has naturally been placed upon the publishers, although The Blacksmith and Wheelwright is mailed carefully and regularly to all its subscribers each month.

The trouble, however, is solely due to the Post Office Department. In the attempt of the late Postmaster-General to run the department at a profit he subordinated efficiency to economy, and the result has been most disastrous and exasperating to publishers as well as to readers.

In pursuance of this plan of parsimony—for it is incorrect to call it economy—the Postmaster-General inaugurated the astounding plan of sending monthly periodicals by freight, and this is the reason why our paper reaches its readers so late in the month and at such irregular periods. This freight transportation idea has resulted in the concentration of second-class mail at various points until enough has accumulated to fill a car and then it is forwarded at the convenience of the railroad company. This has been done in order that the government might make a profit from the transportation of second-class mail matter.

Neither the post office nor any other of the departments of the United States government were established for money making, nor even with the idea that they were to be self-sustaining. They were established to promote the public welfare.

But when this craze for profit-making is carried to such an extent that the service is impaired by delays and errors of delivery, it becomes a public duty to protest against it and insist upon a reform. The present rate of postage for second-class matter is sufficient to insure prompt delivery and the same care and attention that are given all other classes of mail or to any other well conducted business.

As has been stated before, our northern neighbor, Canada, transports its second-class publications at a quarter of a cent a pound, whereas it is claimed that our government loses money in transporting second-class publications at one cent a pound. But whether it loses or gains is not the question. The vital point is that the people of this country are entitled to periodical literature at as low rates as they have been getting it and that it be promptly and accurately delivered.

Every opportunity should be taken by our readers to communicate with representatives in Congress and Senators so that they may get the feeling of the people on this question.

It is reported that the new Postmaster-General Burleson proposes to improve the service and to make efficiency the leading idea of his administration and it is to be hoped that he will be successful, although he has found the department in such a chaotic condition so far as efficiency is concerned that he has a stupendous task before him.

IN NINE YEARS, $20,000.

Recently a Nevada blacksmith sent to this office an advertisement offering his shop for sale, and he says he has made in this shop, during the past nine years, $20,000 clear profits, and is now going to retire.

We have no reason whatever to doubt his statement. The blacksmith business is and always has been profitable except in cases of ruinous competition or where no effort has been made to keep up with the times in the use of power and up-to-date machines and tools.

It is a common tendency, and a natural one, to imagine that the business we ourselves are engaged in is the worst that exists. The sigh for "the green hills far away" is a common human feeling. It must be admitted that discontent is one of the strongest spurs to progress, but in many cases it is better to "bear the ills we have than fly to others we know not of."

What this Nevada blacksmith has done others are doing and still other can do, provided they have the right spirit of enterprise and industry.

We do not say it is easy. In fact, nothing in a business way with which we have any knowledge is easy. Business methods and the elements of success are changing rapidly. James Gordon Bennett started the New York Herald in a Broadway cellar and sold his papers on a barrel. To-day it would require at least a million dollars to secure the slightest show of success in an enterprise of that kind and to this would have to be added the utmost well directed effort and all the ability of the elder Bennett.

No business can succeed by pursuing to-day the methods that were common and successful even fifty years ago, and this applies as well to the blacksmith business as to any other.

But for the amount of capital invested and the amount of industry and effort employed, we know of no business that is likely to produce better returns than the blacksmith business.

And we want to say right here that we commend the purpose of this Nevada blacksmith to retire. He has probably worked hard and applied himself constantly to his business. He has earned a little rest and he does well to try to secure it. Twenty thousand dollars well invested will bring in a return of $1,000 a year, and this sum will comfortably support a family in many localities in this country.

TWO WAYS OF DOING IT.

From the Australian Coachbuilder we learn that at a court in Melbourne a case was recently ventilated of a quarrel between two employes in a machine shop. The plaintiff, Harry Hamlin, applied for sureties of the peace against John Teague. It appears that the defendant, Teague, told the plaintiff he was doing too much work on a machine, and if he did not take things more comfortably "there would be trouble and God help him." Witness was putting two pieces of timber through the machine, and Teague thought he should have put only one through. Finally the defendant hit him on the jaw, knocking his teeth out of his head and again on the back of the head. As defendant went away he called out all sorts of names to witness and threatened him. Witness did not leave work by the front way because Teague was waiting there to pummel him. During the dinner-hour Teague threatened witness with his fists. The defendant had also insulted witness in the street. It would be another month before witness could use his teeth. The witness stated that the defendant was discharged immediately after the assault. Witness picked up a lump of wood to defend himself when he had been hit on the nose, but put it down again without hitting the defendant.

Although there is but one course for a court of law to take in a matter of this kind, and that is to punish the guilty party, yet there is something to consider beyond this. The defendant considered the opportunity to work so valuable that he was willing to injure a fellow-workman rather than to have that opportunity jeopardized. Where there is plenty of work for all there is never an attempt made by one workman to prevent another from working as hard and effectively as he chooses.

The old hackneyed saying about the "right to work" is of course true, but how about the right to work when exercising that right takes from some one else the right or the opportunity—which is practically the same thing—to work? Of course even then the injured one has no right to take the law into his own hands, but to expect that he will not do so on occasions is to expect too much from imperfect human beings.

In the case of two railroads, or two manufacturers, or two steamship lines, when one takes away what the other considers more than its share of the business, it is seldom that there is any violation of the laws of the land, but the moral law is often violated with impunity. The competition is often sharp and unscrupulous and is pursued until one or the other competitor is either ruined or driven from business or until the competition is turned into a combination where each work together for prosperity instead of for ruin. And dastardly as was the act of the Australian workman, he only sought to accomplish in his own feeble way what the larger competitors in business accomplish in another way.

CENSURE AND PRAISE.

Washington Irving, that courtly scholar and traveler, and one of those who first gave to the world an American literature, once made a remark that is not easily forgotten nor should it be.

"I have at all times almost as strong a repugnance to tell a painful or humiliating truth, unnecessarily, as I have to tell an untruth, under any circumstances. To speak the truth on all occasions is the indispensable attribute of man;

to refrain from uttering disagreeable truths, unnecessarily, belongs, I think, to the character of a gentleman."

But the foregoing not only applies to social life. It is likewise applicable to business, and it is specially pertinent in its application to the relations of publications with their advertisers and readers. We are always justified in bestowing praise, but not in uttering censure.

If an editor could be sure when some reader condemns a certain tool or machine that such condemnation is justified, he might feel he had a warrant for publishing it, but the fact is, there is almost invariably contrary testimony, and in such instances the only fair way is to keep silent. This is specially the case when the complainant can easily write directly to the party who is responsible for the fault or defect. The Scriptural injunction is a good one: "Go tell him his fault between thee and him alone." It is not, "Go tell his fault to some one else," much less to a multitude of others. So when a reader knows of a fault of a machine or tool, why not write the manufacturer, "between thee and him alone?" But we hear some reader now remarking, "Don't you publish your magazine for the benefit of your readers?" And we reply most decidedly in the affirmative. Yet it is not in their interest to take the word of a reader whom we have never seen and do not know as against another reader whom we have never seen and also do not know. And the fact that a tool or machine is being sold and that some of the purchasers are satisfied with it, is pretty good evidence that our only wise course is to say nothing.

On the other hand, although we have no right and no intention of doing either advertisers or non-advertisers an injury, we have a reason and a right, when it comes to a favor, to do one to an advertiser when we would not do one to a non-advertiser.

The clergyman spends far more effort trying to save the souls of his parishioners than of those who do not go to his church, although others are just as much in need of it and he would be delighted to feel sure of their salvation. The doctor seeks to cure his own patients, but while he does not cast stones at others who are ill, he does not go out of his way to prescribe for them. The lawyer works hard to get his client out of trouble, but though others who may be caught in the meshes of trouble may have his sympathy, and he would under no consideration wish them ill, yet he gives the benefit of his legal knowledge and the force of his logic to only those who come to him as clients and perhaps have handed over the retainer.

It is hoped it may somewhat clear up the measure of responsibility the publisher bears to his advertisers as well as to the rest of the wide world.

THE LAW OF LIFE.

We can get out of life only what we put into it. Although a superficial consideration may lead to a different conclusion this is absolutely true.

One man may make wealth-getting his object, and if he thinks enough of the dollar he will succeed. That is to say if he thinks more of a dollar than of the more or less expensive comforts of life, more than he does of the little social amenities that so sweeten and illumine existence, more than he does of the things that make friends because they deserve friends, more than he does of exact justice. In short, if he weds himself to the dollar he is practically sure to attain the goal of wealth, and it will not require a vast amount of talent, either.

But after this goal has been reached, and in this way, what is it worth? "What profiteth a man if he gain the whole world and lose his own soul?" Let it be understood that the writer of this is not specially concerned with either religion or church, but the experiences of life correspond so closely to the teachings of the New Testament that their truths are often impressed upon one with startling impressiveness.

Or let one set out for the goal of fame. This, of course, is a higher purpose than mere wealth-getting and it is harder to reach, but the ambition that covets it is usually accompanied by the intellectual qualities that make for it; consequently when this is sought to the exclusion of all else it is usually reached. But ask those who have gained the goal by this route and they will invariably tell you that it is like the Dead Sea fruit and has withered to the touch.

Thus we hazard nothing in affirming that those who have sought happiness by either of these means—either by wealth or by fame—have found it an *ignis fatuus,* a glowing light, ever alluring but never reached.

In short, happiness can never be won by seeking it. Paradoxical as it may seem it comes when it is not sought and when least expected. It comes by self-sacrifice, by renunciation. It comes by making the same effort for the word "thine" as for the word "mine." And the individual who thinks he can conquer the law of life by getting more than he gives is the most mistaken one under the sun.

Using more concrete examples, in many instances about all the blacksmith gets out of his business is toil and a mere living. But one thing more he gets with these, and this is something that the highest material success often longs for and cannot attain. He gets sweet and restful sleep and good digestion.

The late J. P. Morgan, who was the envy or the admiration of the whole civilized world—according to individual point of view—in his last days found most enjoyment in what? Why, in having people keep away from him while he looked out upon the ocean from his yacht and patted a Pekinese spaniel which he held in his lap. John D. Rockefeller finds most happiness traveling up hill and down dale over golf links. The late E. H. Harriman died of a worn out brain, a worn out nervous system and a palsied digestion. Was "the game worth the candle?"

These men got absolutely no more out of life than they put into it, and if it really be true that "he who would save his life shall lose it, and he would lose it shall save it"—and we believe it is absolutely true—what is often termed success is dire failure and that which is considered dire failure is glorious success.

HOW TO GET APPRENTICES.

Sometimes we hear the question asked: "Why do not more young men learn to become horseshoers?" The answer is often made that it is because the work is too hard. We are inclined to think that a better reply would be that it is because the pay is too small.

It is true that the average young man of today is adverse to doing hard manual labor, but as a rule not unless the manual work is accompanied by small pay, and no one likes both hard work and small pay. Either considered by itself is not attractive, but when they both go together, as is often the case in the industrial world, there is no reason why either young men or old should be attracted to them.

The fact that the pay is poor deters more young men from becoming horseshoers than the fact that the work is hard. It is true that manual labor has not the same standing it had 50 years ago, but this is largely owing to the fact that the returns are quite as small in comparison as they were at the earlier period, while the returns for mental work are now far more remunerative.

Disguise it as we may, the hardest work is usually the worst paid. Take blacksmithing, for illustration; or horseshoeing. They are among the hardest of all kinds of employment, and they are about the poorest paid. And who is to blame for it?

Let us put the blame right where it belongs—upon those engaged in it. In all other kinds of business competition has been succeeded by cooperation. It has been learned in the hard school of experience that price cutting is ruinous; that it injures the public as well as those who practice it. For no community is benefited by an industry that does not pay.

Let blacksmiths and wheelwrights and horseshoers as well raise their prices to a good profit basis, and they will find no difficulty in getting all the apprentices they need.

For Cleaning Upholstery and Tops.

The recipe for cleaning and renewing leather upholstery is good enough to bear repeating. Raw linseed oil and turpentine mixed in proportion of two of the former to one of the latter is the time-honored formula. For cleansing cloth upholstery use clear water and a mixture of three-fourths of an ounce of common salt and two ounces of either grain or wood alcohol, simply rubbing the cloth with a sponge dampened in the above mixture.

Correspondence

Some Shoeing Hints.

From N. C. Rowland, North Carolina.—The accompanying sketches show a bent over horse's or mule's foot. Fig. 1 shows the left foot. Fig. 2 shows a clubbed foot. I sometimes get them both bent over and clubbed. Fig. 3 shows the

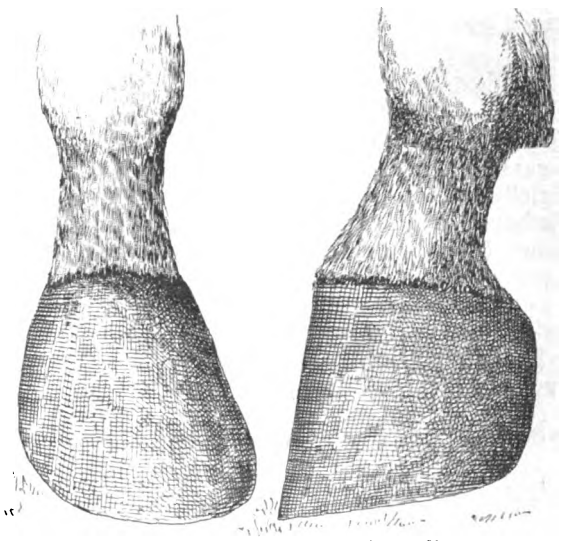


Fig. 1.—Front. Fig 2.—Side.

shoe I fix for both bent and clubbed. If it is a bad club I turn up the front end of the shoe from ⅛ to ⅜ inches. I do not bend it the whole way but only bend from 1 to 1½ inches from the front of shoe. I pick out a regular horse or mule shoe of

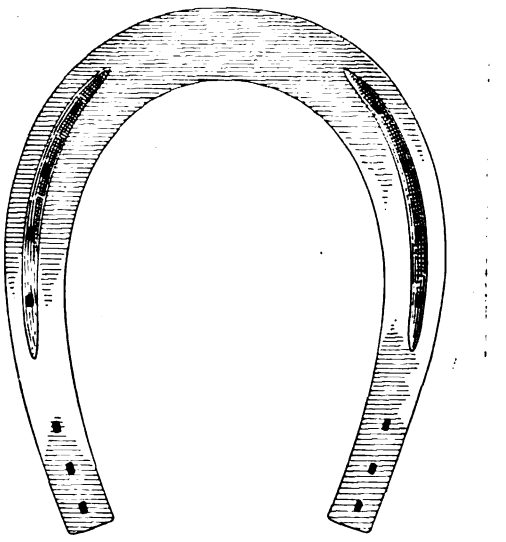


Fig. 3.

a size nearest to the size of the foot, and then I punch holes at the back of the shoe so I can get a hold at the heel, and I punch three or four holes but never on the inside. See Fig. 3. If I

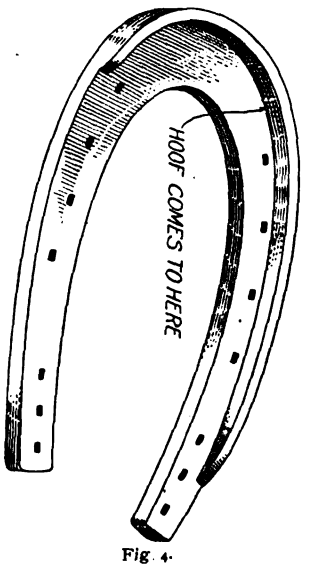


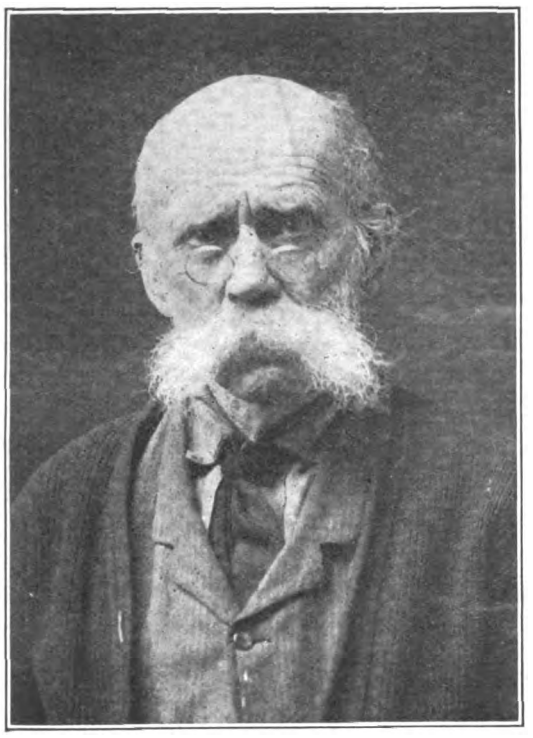
Fig. 4.

don't put any nails in front it doesn't make any difference as the back nails will hold the shoe on all right. After shoeing with this kind of shoes for six months I can get a good hold of the inside of hoof. See Fig. 4 for putting a shoe on a club foot. The inner line shows where the rim of the hoof should come to. The more the club the more shoe you let go in front of the hoof, never over 1¼ inches. Sometimes ¼ to ⅜ inch is plenty, and for a bent over club the shoes may extend ⅛ to ⅜ inches on side. In paring the

hoof pare all you can from the longest side. In lots of cases you don't need to cut any from the short side at all. I take these shoes off and trim the hoof for about three weeks and get the hoof as nearly level as it can be gotten every time. The shoe should never stay on more than four weeks. Put the same shoe back just as long as it lasts. If you want a shoe to last longer, after you have fitted the shoe to the foot ready to nail, lay it on the forge fire, holding the back end with the tongs bottom side up, and put a piece of cast iron on the toe of the shoe and blow the fire good until it melts good but do not melt all the rim off, and cool off in water at once. If the cast iron breaks off while cooling in water, it is not fixed good. Try it again.

Sixty Years a Blacksmith.

From J. B. Gillaspie, Ohio.—As you wish to know something concerning my history of sixty years in the blacksmith trade I will state it briefly. I was born in the early thirties. As my father was a blacksmith and my mother died when I was seven weeks old I was hustled around from pillar to post among aunts and grandmother until my father remarried. I was early taken to work in the shop part of the time and when old enough had to blow the bellows and next split the flat iron to make horse shoes and



J. B. Gillaspie.

to cut small strips to make horse nails. In that way I spent my early days alternating from shop to farm, with three months each year going to school. When I was about the age of sixteen father moved into a town, and I worked six months in a distillery, filling barrels of whisky. I got disgusted at the thought of so much evil, and I returned to father's shop for a year or two. About the time I was 21 I was told by my stepmother to "Pay my board by the week or leave the place," so I left and got a position as striker and helper in a carriage shop at two dollars a week and board. I remained with this man until I got up to $9 a week. In 1857 the same man went into the plow business and we made from two to three hundred plows. In November we floated down the Ohio and Mississippi rivers to the coast, and sold plows to the planters, and repaired their old ones, until the first of March. Then we returned home to repeat the same the next year, but on our last trip he lost all, and I had to hunt up another place. About that time a young lady said she was willing to share the future with me, and a storekeeper twelve miles away offered me a dollar a day and house rent (log cabin). I stayed six months, then bought them out, built a new house and shop and stayed six years. In the meantime I helped my neighbor, General Grant, put down the rebellion. I recollect the time the General was appointed to West Point as I saw him at home in Bethel in vacation days. After the war I sold out and moved back to within 500 yards of where I was born and I have been there ever since. I went into the business of ironing buggies for several years, then I began making platform wagons and general country job work. About 1882, my oldest boy being of age, induced me to buy an elephant in the shape of a farm to raise tobacco on. I had three other boys so I got about sixty acres and worked them until I paid for all the land at $60 to $80 an acre. I built a new house, a new barn, corn cribs and buggy shed, also a new blacksmith shop. To-day I don't owe a cent to any one. Now I have three of my boys in a machine shop doing business for themselves, and one has been a partner with me for eighteen years, since he was twenty-one. Yet, if there comes a hard job in the shop he says, "Pa, you do this." This is about all I can say. My general health is pretty good. I never smoked a cigar but once, when I was about 16 years old, and never drank a pint of whisky in my life. I am a teetotalist and prohibitionist. In my younger days I was a great lover of good music, especially good singing. I don't belong to any church but often go to hear a good preacher and singer, or a good speaker on any subject, but have been deaf for twenty years. About all I know is what I read in the newspapers.

Good Ideas of Business.

From O. A. Millner, New Hampshire.—I have taken the paper for a long time and am always glad to hear ideas from my fellow craftsmen and compare them with my own experiences. For forty years I have owned a shop, doing all kinds of blacksmithing and wagon-repair work. I have studied new ideas for improvement during that time which have helped me out many times, yet there is a chance for me to learn more. I find the best way to advertise our business is by the quality of the work done, using best material and good workmanship and warranting the work to be as represented, doing it promptly and according to contract, specifications as ordered and also collect your pay before the work leaves the shop by having that included in the trade at the time. By so doing you can well afford to make prices satisfactory and hold your cash customers every time. They are the ones you want to keep. Always pay your own bills promptly also and by so doing get the benefit of the discount which helps out every time.

It is best to run your business, if possible, so that you can make it an object to have on hand all kinds of material needed to do most any job you may have a call for and do it promptly which will bring in the cash customers and keep them from looking elsewhere.

Always be ready to accommodate, if possible, all that will come except those that are running from place to place trying to beat by not paying their bills and looking for credit. Those I shun and don't have any use for.

Holds Picks Securely.

From Curtis L. Smith, Virginia.—In piecing picks with steel when they have become too short and are worn down, a common pair of tongs will not hold them securely and they will slip back from the taper on the pick while it is being ham-

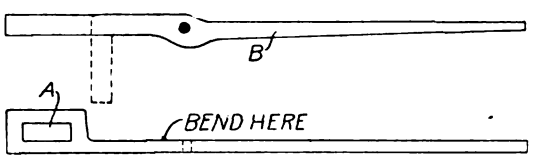


Fig. 1.

mered. A pair made like those shown in the sketch will give satisfaction, as they will hold the pick firmly and securely, no matter how much hammering is done on the metal. The lower part of the tongs in the jaw part is first made in a ring, as at A, Fig. 1. This should be large enough when closed together to form a rectangu-

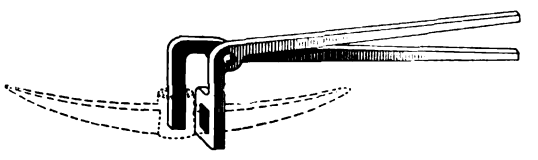


Fig. 2.

lar opening through which the end of the pick will pass all the way up to the eye. This is bent down at right angles and the other part, B, Fig. 1, is forged as in the ordinary pair of tongs, after which it is bent down to go inside of the eye of the pick, as shown by the dotted lines. The manner of holding a pick is shown in Fig. 2. The smith who has much of this kind of work to do will be much pleased with a pair of these tongs.

For Well Digging.

From Thomas Kirk, Washington.—I will show you how I make a sand bucket to sink a 4, 5 or 6 inch pipe in a well or in sand from the surface. A, Fig. 1, is a pole 5 feet long, so when you dig the sand lower than the pipe it will not catch under the end of the pipe. The bucket, B, is a

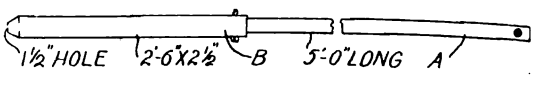


Fig. 1.

piece of iron pipe 2 feet 6 inches long by 2½ inches, and is bent in at the bottom. By working it up and down with a rope it fills with damp sand. Now drill a ½ inch hole one inch from the top of the pipe right through the pipe and make a half inch bolt with a thin head, making it a little longer than the thickness of the pipe so

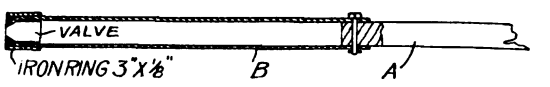


Fig. 2.

you can make a small hole in the end to run a wire through to keep the bolt from slipping out. This is to connect the pole and bucket together, as when the bucket is full of sand we can empty it by taking out the bolt. Fig. 1. When we reach the water and quicksand we place a valve in the bucket. This may be a round iron ball, 1¾ inches, or a piece of round iron, 1¾ inches and 2½ inches long, tapered to fit the hole in the bottom of the bucket, as shown in Fig. 2. I then shrink a ferrule or iron ring ⅛ inch thick by 3 inches wide over the bottom of the bucket.

To Make S Wrenches.

From L. H. Locke, Illinois.—Enclosed a sketch, showing the way I make S wrenches, which you may publish in The Blacksmith and Wheelwright. I use worn-out files or buggy

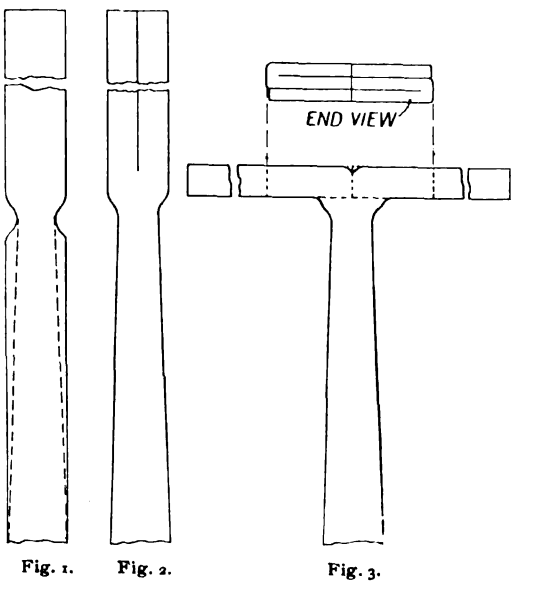


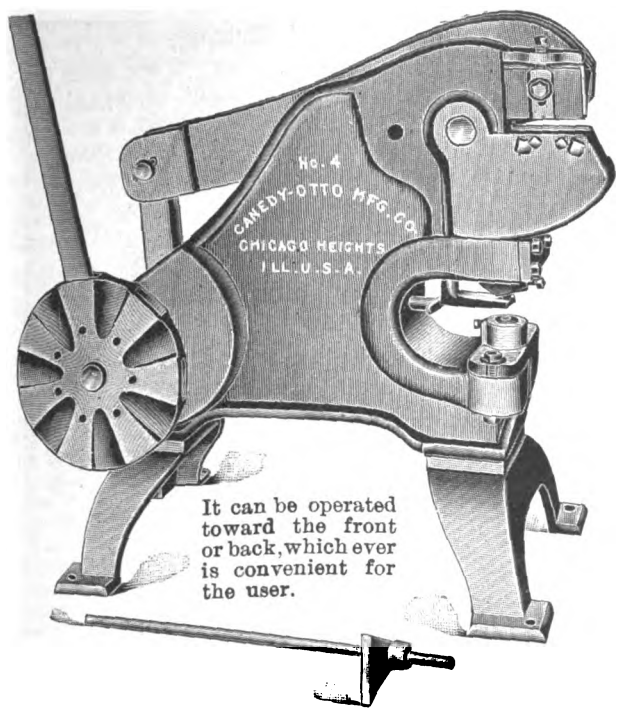
Fig. 1. Fig. 2. Fig. 3.

springs which make good serviceable wrenches. First I use the fuller and cut it down on each side; then draw the handle back as in Fig. 1. Next I split the outer end, or head, as in Fig. 2. Then spread in the shape of a T, Fig. 3, and double each prong, one up and one down, making also a T, but the T is three thicknesses. The handle then being heated I weld the T solid, turn the points together in the shape of a U, and square up the inside edges on the sides of the

Fig. 4.

hardie. After making one or two the smith can readily estimate how much he should split in order to make the wrench he desires. I have sometimes burnt a flaw in pointing, but with no harm to speak of. In order to polish it and not show the burn, I take a small bar of cast iron and melt it on the flaw, a great deal like a tinner runs on solder. This will cover up the cracks and low places and will also case harden and wear longer than steel. We get 25 and 30 cents for sharpening plows and one dollar for pointing. I trust you will understand this diagram and that it will help some brother of the craft.

No. 4 Combination Punch and Shear



Will shear ½x4-in. flat bars.
Will shear 1-in. round bars.
Will punch ½-in. hole in ½-in. plate.
Depth of throat 6 inches.

This machine is furnished with ¼-in., ⅜-in. and ½-in. punches and dies, also a lever bar.

When choosing your blacksmith shop equipment why not get the best—

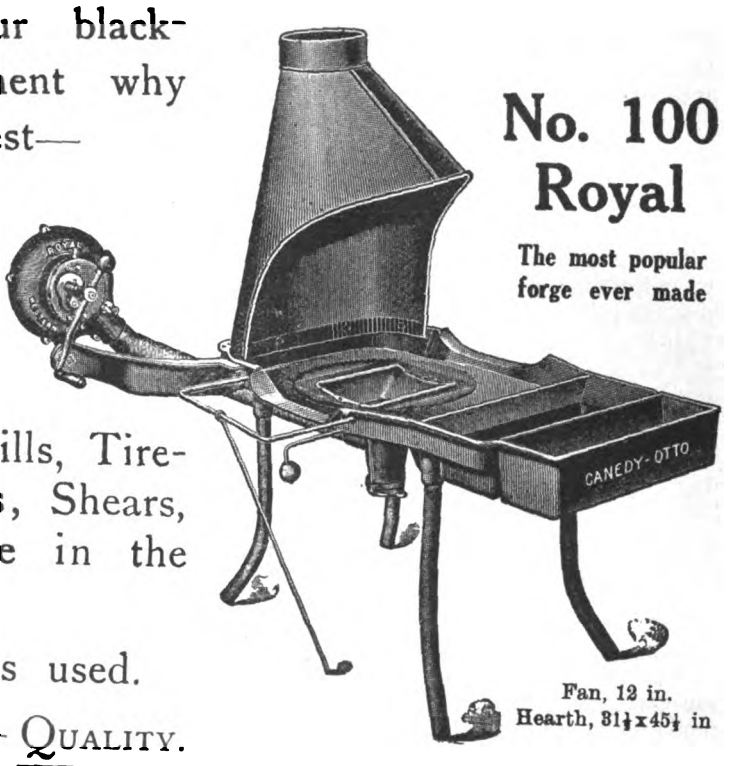
CANEDY-OTTO

It costs no more.

Manufacturers of the finest line of Forges, Blowers, Drills, Tire-Shrinkers, Punches, Shears, produced anywhere in the WORLD.

Once tried, always used.

There's a reason — QUALITY.



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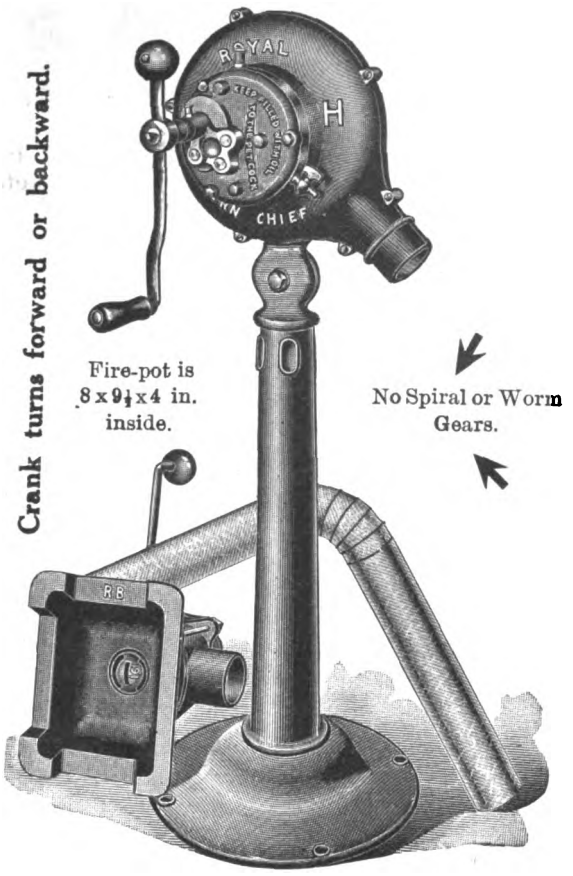
The most popular forge ever made

Fan, 12 in.
Hearth, 31½x45½ in

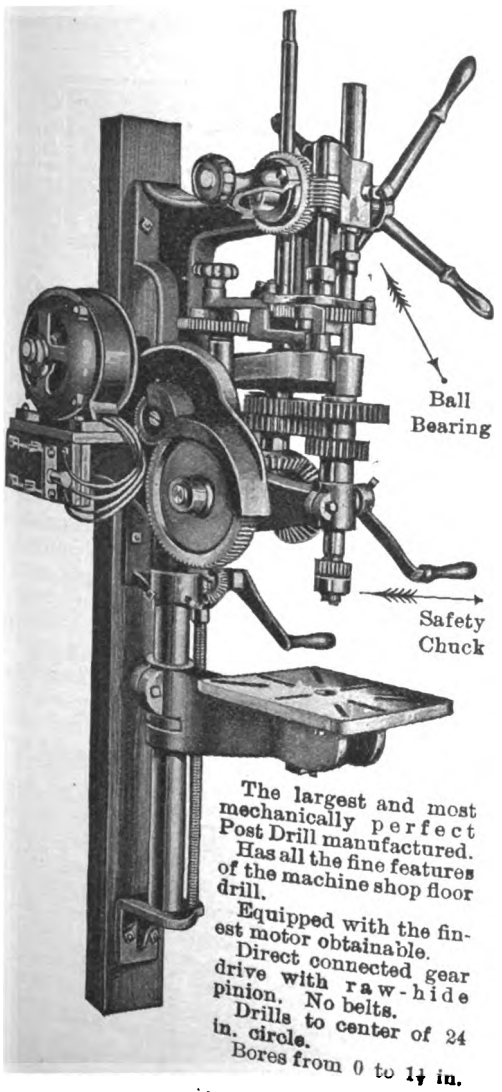
Royal Blower

(Ask the man who owns one)



FORGES
BLOWERS

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 raw-hide pinion. No belts.
Drills to center of 24 in. circle.
Bores from 0 to 1¼ in.

DRILLS
TIRE-SHRINKERS

Over 200 different styles of TOOLS. We can suit every need.

Send for Catalogue

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CHICAGO HEIGHTS, ILL.

PUNCHES
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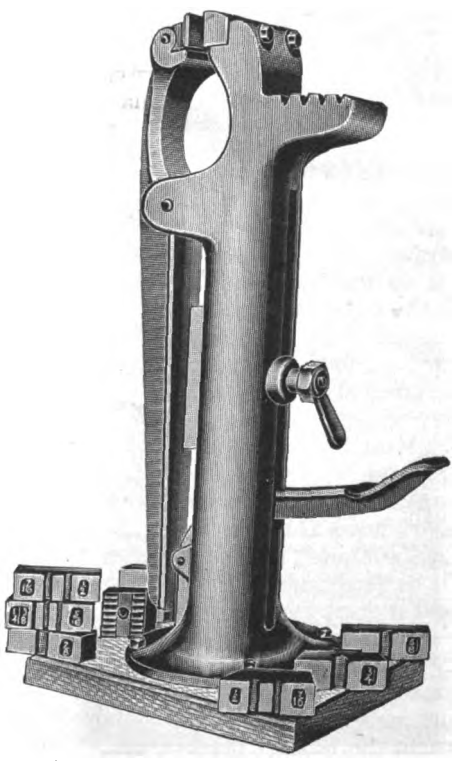
Canedy-Otto Foot Vise and Bolt Header



A powerful, strongly built machine for making bolt heads, forming calks, shaping tools, and everything where a first-class quickly operated vise is needed.

Furnished with or without dies of the following sizes: ¼, 5/16, ⅜, 7/16, ½, ⅝, ¾.

The best of material and workmanship used throughout.

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

A Subscriber from the Beginning.

From Samuel Longenbaugh, Illinois.—I have been a subscriber since 1880, I believe, and want to continue as long as I remain in business. It is fine for me and I have been in business for 40 years, yet it seems to me I have more to learn than when I first began. I have an up-to-date shop with all kinds of tools and have a good trade here. I have been at my present place 22 years, but I am going to leave for New Mexico soon owing to my wife's ill health. My shop is ten miles from the railroad on my farm and land is worth $200 to $250 an acre. I have a lot of repairing to do and get good prices.

For Stump Pulling.

From Thomas Kirk, Washington.—I will show you how to make a handle on an inch and a half ship auger to bore stumps for blasting. The grain in a stump comes from all directions and the pitch often makes it almost impossible to pull the auger out when the twist is full of chips. I take a piece of iron ⅜ by 2½ inches to make a band to go around the handle, leaving it ⅜ inch thick on top of the handle, and tapering a little thinner at the bottom, then when boring a stump you can take a three or four pound hammer and gently drive the auger up out of the hole or drive in the hole to start boring.

Mighty Well Worth Reading.

From C. H. Jones, California.—Brother blacksmiths and craft, my system has always been to try and give a customer a square deal and to demand a living price, as it is better to sit down and read the paper, or something to get posted on, than to work, use up material and get nothing for it. Blacksmiths, try and get together and be sociable and get paid for your work.

ANSWERS TO CORRESPONDENTS

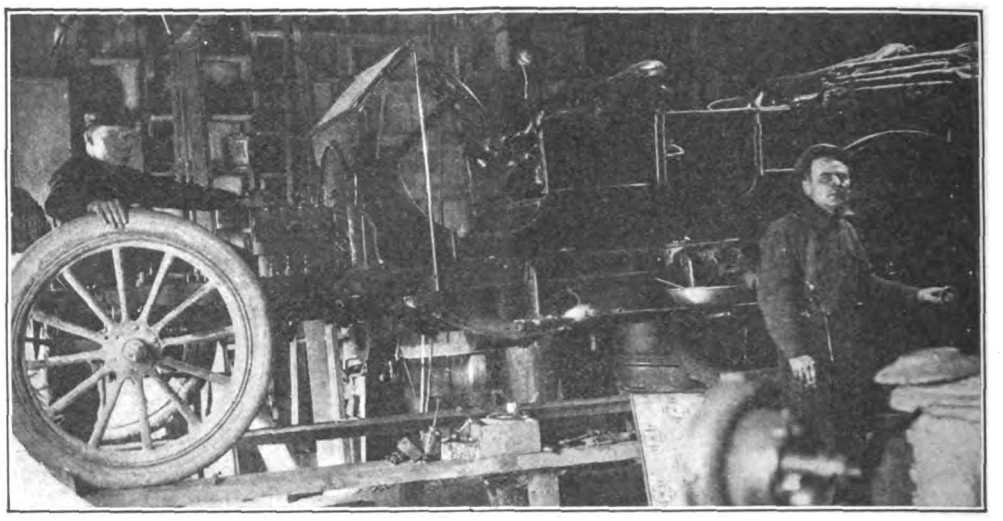
Under this head will be found each month replies to questions asked in previous issues. Our readers will appreciate the importance to inquirers of furnishing the desired information as promptly as possible.

Running Corn Buhrs.

From Theo. Chewning, Missouri.—In reply to Brother Hugh L. Lyman of Kentucky, I will try to write a few lines on the subject of running and installing a corn buhr. I am no expert miller but I have had seven years' experience with a French stone buhr top runner. In the first place, you must set the bed stone level and the upright shaft that the top buhr sets on must be plumb up and down. The tools that I use to dress my buhrs must be dressed a little lower in the edge. The grooves in the buhr must be cut deeper at the eye than at the out edge. The grooves must be dressed out deep enough to take in a full size grain of corn at the eye and about one-fourth that deep at the out edge, so when you are grinding meal it will be uniform. If you get the grooves too deep at the out edge it will let out some of the corn partly ground. The buhrs must be dressed a little lower in the breast than at the out edge so it will feed good. Take a straight edge and paint it with red ochre and lay it on the buhr and turn it around. It will mark the high places on the buhr which must be dressed off. The grooves must be dressed square up and down at one edge and the other edge is beveled about an inch. It depends on to which way the buhr runs as to how to dress the grooves. Most buhrs run with the sun. I have seen a few buhrs that run against the sun, but never run a buhr against the shoulders of the grooves. I have a 10 H. P. I. H. C. gasoline engine and a 30 inch French stone buhr. I grind all kinds of feed and table meal. It pays a fair profit and it gives me more work for the engine. I have several tools in the shop. I run with the engine. I find it pays in a little town to have a side line or two. I handle stock and poultry, medicine and some hardware. I hope that this will benefit the brother blacksmiths.

For Automobile Repair.

From Fred H. Correll, Illinois.—Perhaps the trestle shown on the accompanying photograph will answer the question asked by John Sefcik of Kansas. This will be the case if a shop is so located that drainage for a "pit" is impractical or expensive, or if one does not care to go to the expense of constructing a pit in which to get while working under a car will answer the purpose equally as well. Just get some 2 by 12 inch bridge plank and four 20 inch concrete barn blocks and build a trestle. Set your plank wide enough to accommodate the track of the car on which you are working and put the concrete



Car on a Trestle.

blocks under each corner. A couple more 2 by 12 inch plank make a very good "bridge" up which you can either roll or drive the car to the working trestle. In this way you have it high enough that you can very easily get at all the parts on which you wish to work underneath the car.

When you're through with that particular car, put up your "roll down" planks and back it off. Lift your blocks away to one side and drop the frame right on the floor and let it lie there until you wish to get under another one.

Cure for Thrush.

From D. H. Eastman, New York.—A reader in the April number asks for a cure for thrush. The enclosed was taken from The New York Tribune Farmer:

"Cut away all the diseased frog and dry powder the soles of the feet. Then have ready a shallow trough, large enough for the horse to stand, either both fore feet or both hind feet. Dissolve a half pound of sulphate of copper in three gallons of soft hot water. Place in the trough and let the animal stand in it for about twenty minutes and you will have killed the greater per cent. of the germs that create the trouble. In about four days soak them again, and afterwards put on the frogs and soles a little of the following: Oil of tar and oil of turpentine each, one ounce; carbolic acid, half an ounce; linseed oil, three ounces. Use every fourth day and clean out the feet daily with a hook and you will effect a cure without trouble."

Cure for Thrush.

From Ed. Wetzel, Pennsylvania.—In the April number R. G. Marks wants to know a cure for thrush. It can be cured with powdered calomel worked up in the cleft of the frog and in all other places affected. The calomel should be packed with wool to keep the calomel in and the dirt out. This should be repeated every three days. Generally about three or four applications are sufficient to produce a permanent cure.

Another Remedy.

From E. J. Benton & Son, Arkansas.—The best remedy we have found for thrush is to pack the affected parts with common salt. We have treated several cases in this manner with good success.

He Believes In Advertising.

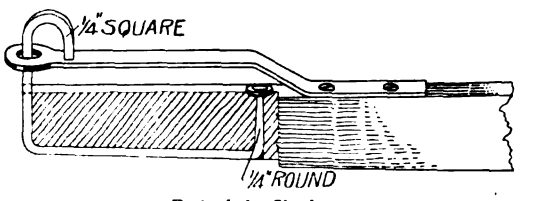
From Porter J. Hand, Nebraska.—I see in the April number that Mr. Charles Barker speaks of advertising by blacksmiths. There is no doubt in my mind but it pays to advertise your business. I have made it a point to keep in touch with patrons and the community by sending out by mail twice a year circulars and letters. March 1st I mailed 500, covering the rural mail routes of this city. At times I use space in the newspapers and moving picture shows. I have been pounding iron for 35 years. I advise brother smiths to advertise, do honest work and read The Blacksmith and Wheelwright, the best journal for the interest of the trade.

His Way of Welding.

From W. D. Ralston, Indiana.—I see items in The Blacksmith and Wheelwright in regard to welding tires. These ideas are all right in a way, but I will give you my way: When you have a wagon tire that is three or four inches wide, always chamfer off the edge and cut each corner of the tire. Fit the scarf down well together and you will have no trouble in welding. In welding buggy axles, chamfer the ends to be welded back a good space and take a chisel and cut small creases all the way along the chamfer, making it something like a rasp. If you do this you will find welding of both axles and springs very simple. I use Crescent Welding Compound and it works wonders.

Sketch of a Singletree.

From W. D. Bartlett, Minnesota.—I am sending a rough sketch of a singletree end for a buggy or light wagon that I find to be quite popular here. For the hook that goes around the end I use ¼ inch square mild steel of rake tooth. I think the sketch will explain itself.



End of the Singletree.

QUESTIONS FOR OUR READERS

You are invited to ask questions freely on all points pertaining to your work. Our subscribers who have solved successfully the problems which confront you will take pleasure in imparting the results of their experience for the benefit of their fellow-craftsmen.

Plows, Crossfiring and a Road Drag.

From H. E. Wiechert, Illinois.—I would like to ask some brother smith how to temper plows in oil and get them right and how to keep the oil from burning. What ingredients to use if any?

I have a pacing mare in my vicinity that crossfires bad. I have been a reader of this journal for some time and have tried every remedy ever recommended for this mare. Some of them help but they do not stop it entirely.

Will some one tell me how to make a good road drag of old binder burs and leave the guards on and make it harrow and drag, working with a lever and for a man to ride on? If some kind reader would advise me I would be thankful.

Has Trouble with His Engine.

From Jeremiah Miller, Pennsylvania.—I have a Robertson gasoline engine manufactured at Buffalo, N. Y. It has a Goodson magneto and spark plug and they have given me lots of trouble. I would like to hear through these columns from others who have either or both these machines and what they are doing or what other

BOOK OF STANDARDS. Published by the National Tube Company, Pittsburgh, Pa. Price, $2.50.

This work is remarkable in its comprehensive quality, covering as it does table after table of useful information and facts concerning tubes and tubular goods and closely related subjects. It contains nearly 600 pages of bible paper and is substantially bound and shaped for pocket use. Anyone who has to do with pipes and tubing will find it invaluable. The subjects treated run well into the thousands, and it is well illustrated. For full particulars apply to the National Tube Company, Pittsburgh, Pa.

WORKMEN'S COMPENSATION AND INDUSTRIAL INSURANCE. By James H. Boyd, A.M., Sc.D. The Bobbs-Merrill Company, publishers, Indianapolis, Ind. Two volumes, 1622 pages. Price, $9 net for the set.

This work is what may properly be termed "monumental." It covers the subject indicated by the title exhaustively and as a reference work will be found indispensable to libraries and to all interested in industrial, social and ethical questions. It may not be generally known that the United States is far behind other civilized countries in making compensation for workmen when injured independent of negligence. To arrive at conclusions that will make for successful and effectual legislation demands a thorough understanding of the problems involved and a clear-cut view into the experiences of all other efforts to prescribe for the same conditions. Where the public is so vitally concerned the public should be well informed. This work, by a man recognized as one of the greatest living authorities on the subject, represents the first complete presentation of these problems in the light of their history and development from the time of the earliest German economists, through the various stages of experimentation, up to the present day, when they are being met by practical legislation. The work contains also the full text and construction of all statutes in force January 1, 1913, in England, Germany and the United States, and gives the full construction of and excerpts from the laws of all the other countries.

It represents a prodigious amount of research, and it is put together in a way to be of the easiest possible access for reference.

The New Little Giant Power Hammer.—No reader can fail, we think, to notice the rather striking advertisement in this issue of Mayer Bros. Co., Mankato, Minn., manufacturers of the New Little Giant Power Hammer which is made in three sizes. It is said that 5,000 of these hammers are in successful operation in different parts of the country. They are the result of 16 years' of experience in the trip hammer business. Write at once for descriptive circular and price list.

Small Steel Stamps.—Every reader of The Blacksmith and Wheelwright ought to have a steel stamp of his name for marking tools for identification. Such stamps are manufactured by the Sackmann Mfg. Company, 88 Canal Street, Akron, Ohio. Unmarked tools are seldom or never identified in case they are borrowed by somebody or stolen. Write for further particulars and prices to the address given above.

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

fixtures or magneto would better do the work. I had the magneto repaired recently at considerable cost but it only gave me six hours service.

From a Young Fellow.

From E. S. Nicholson, Indiana.—It seems to me that the common smith has quit writing and sending drawings of tools they have made. There is plenty of machinery and complex drawings that are all right for the machinist but they are all a dead letter to the average smith.

Wake up, brothers, and give us younger ones the benefit of your experience.

Corns on Horses' Feet.

From H. T. Hart, England.—I would like some brother to give a good corn cure receipt. I have found a piece of loaf sugar very beneficial. After paring the corn out well, lay a lump of sugar on and melt it down well with a red hot iron.

A Tempering Expert Wanted.

From Will W. Olson, South Dakota.—I have lots of trouble in welding on steel. Borax is the best for this purpose of anything I have used. Will some brother blacksmith tell me how to temper chisels to cut rock, also how to temper knives, axes, etc.?

Making a Turning Lathe.

From Earl McNeil, Oregon.—Will some smith please tell how to make a turning lathe, giving sketches? My father takes The Blacksmith and Wheelwright and in one copy some time ago it told how to make one, but I am unable to find it now.

A Grub Puller.

From Curtis L. Smith, Virginia.—Will some reader please give a sketch and directions how to make a grub puller to pull grubs by hand? I hope to hear from some brother smith as soon as convenient.

For Boiler Flues.

From O. C. Kroshang, Minnesota.—Does any one make a device for welding boiler flues for tipping? If so, please state in your next issue.

License Urged for Horseshoers.

From Otto Wurbs, Texas.—It is too easy to be a horseshoer. There is a whole lot written about horeshoeing, the right and wrong ways to do it, but I am sure that man's best friend, the horse, gets some benefit out of it. It always makes me feel badly whenever I see a horse stumbling along the road lame on account of narrow heels and corns, over-reaching and interfering every step. Close examination in nine cases out of ten proves that the cause of the trouble is utter ignorance in the trimming of the foot and the fitting of the shoe. Any one that is able to nail on a shoe is allowed to call himself an expert horseshoer. If there were a law requiring everybody who shoes horses to know the makeup of a horse's foot and its functions there would not be half so many lame horses. Every horseshoer ought to have a license. This is what we need and the horse would be most thankful for it.

A New York tailor announces that he will make coats to order from Russian sable for $12,000, $26,000, and $68,000 each, according to the grade of skin selected. The $68,000 garment is composed of "110 skins of rarest quality."

AUTOMOBILE WATER JACKETS.

How to Repair Them and Some Incidental Welding Observations.

The immense force exerted by freezing water is not commonly realized by autoists until after a water jacket or two have been cracked by freezing up. The junk dealer understood this force better when he took the contract of breaking up some large castings which had defied the efforts of the heaviest "skull-cracker" in the foundry yard. Pieces of scrap iron which are too large to go through the cupola door are of little use to the foundry, so this junk dealing genius, finding upon examination that the castings were hollow, drilled small holes into each cavity, carefully filled them with water, tapped screw-plugs carefully into each drilled hole and then—prayed for cold nights. After a while, he got them—several, in fact, and those castings were split, from hole to hole, where the expanding water had torn the metal asunder.

Water jackets crack very readily indeed, and when a jacket is so constructed—as it usually is—that the inlet and outlet water pipes freeze first, then the water in the jacket is effectually trapped, just as it was in the plugged castings, and the terrific force of the freezing water tears up the jackets as though they were toy balloons.

The preventions of freezing is one thing—that will not be discussed here—neither will I try to tell about a method of designing jackets so that in case of freezing, a graduated area of water space is provided so that the final freezing, which does the cracking, is in a direction which is relieved by means of a safety plug, which in turn is forced from its seat by the expanding ice before the strength of the water jacket is exceeded. This method of crack prevention is quite practical, and the jacket designer may work it out easily. This article is to deal with the repair of jackets after they have been actually cracked and made worthless by freezing.

We have an oxy-acetylene welding outfit in our shop, and cracked metal parts of all kinds are brought there for repair. The handling of some of them certainly calls for all the resources of our best mechanics. Recently, three water jackets came in, all of them badly cracked, the fractures extending for several inches in a general circular direction. Each of these jackets had been patched. And that patching certainly appeared to be a work of art. Three of the nicest fitting patches I ever saw covered the top portions of each cylinder—one patch on each—and the patches were held by 3-16 inch machine screws tapped into the walls of the water jacket, through the patch, and these screws were so spaced that there was just about ¼ inch clear space between the screw-heads. It certainly was the prettiest job of patching I ever saw, and the owner of the engine said the work had cost him $20 and still the jackets leaked.

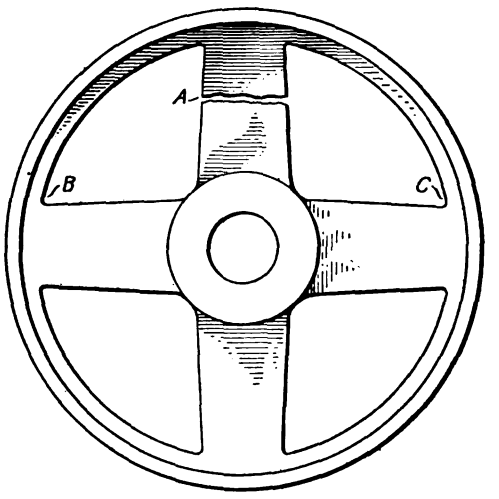
The cylinders were first cleaned of all grease by dipping them for a few minutes into a vat of boiling potash-water, which effectually "cut" the grease, leaving its contained dirt in condition to be readily washed or brushed off. Next, one of the cylinders was heated in a sort of forge fire which is a part of the welding outfit—just an ordinary flat brick bench with a place for fire in the middle thereof, and supplied with blast from a power-driven fan.

One of the cylinders was placed on the fire—charcoal fire is best—to be "preheated" as the oxy-acetylene welder calls it. That is, the portions to be welded are heated to a red heat, and such other portions of the article are also heated as will cause the resulting contraction of the weld to take place without breaking the welded object apart again. Thus, in welding the arm of a very small cast iron pulley, as at A, in the illustration, it is necessary to heat the rim of the pulley, and to heat it about as hot as it will stand, in order to permit the weld which is to be made at A, to cool without being torn apart again by contraction of the weld. Contraction is what probably broke the casting in the first place; the rim cooled before the arms and hub, then when they contracted during cooling, the arm was torn apart at A, because that point chanced to be the weakest one.

By heating the rim of the pulley at C and B, the entire segment of the pulley is expanded, the gap in arm A, is opened, and the hotter the pulley rim, and the more of it is heated, the greater will be the opening at A. It is always the aim of the welder to so heat the portions in any object, which correspond to B and C, that when they cool, the contraction in point A, will be exactly equal to the amount of contraction in the narrow weld which is to be made at that point. And when the welder judges right, then the pulley arm A, will stay welded. But if he guesses wrong, and does not allow enough contraction at B and C, then A will tear apart again after welding. On the contrary, if the welder pre-heats too much at B and C, and puts more expansion into A than the resulting contraction can take care of, then it may be possible that the rim will be cracked at either B, C, or between the two points mentioned. This is not very likely, however, therefore it is better to pre-heat too much than too little.

But heating the rim at B and C, is not really the actual pre-heating as that term should be understood. The real pre-heating is the heating of the point A, and the adjacent heavy portion of the hub, in order that the amount of heating required from the welding flame may be lessened as much as possible. Actually, the pre-heating of point A, works right against the taking care of contraction in arm A, and the rim at B and C must be heated enough more to take care of the pre-heating of parts at A. Hence, it is desirable in a case of this kind, to pre-heat as little as possible and let the welding flame do all the heating possible.

In the water jacket, the conditions were different. There were no confined portions to be torn asunder as in the case of the pulley arm, hence the entire top portion of the water jacket could be brought to a low red heat, thereby reducing greatly the cost of heating with the oxy-acetylene flame. But when the water jacket under



Welding a Cast Iron Pulley.

discussion—or one of them—was placed in the fire for pre-heating, things began to happen rapidly.

First, there was a cloud of thick smoke, rising from the heated portion of the water jacket and the welder snatched it from the fire to see what was the trouble. The top of the water jacket was thickly studded with partially screwed in machine screws, but the beautiful patch had entirely disappeared, except a very small portion of one corner, which remained in place. Alas! the beautiful patch was only sheet lead! No wonder that it had been fitted so nicely to the jacket and presented such a neat appearance! Almost any workman could make a fine looking job with a lead patch—and no wonder that the patch still leaked! The tensile strength of lead is very low—only about 3,000 pounds to the square inch against 60,000 pounds per square inch for steel, therefore it is easily seen that a patch ⅛ inch thick can possess very little resisting strength against the great pressure exerted in the walls of the water jacket when it became heated, or cooled and changed its shape under the influence of expansion or contraction.

Welding is done by means of a small flame, as big as a lead pencil, which is obtained by the burning of a mixture of acetylene gas and oxygen, both gases being brought to the burner under about 20 pounds pressure per square inch, and mixed in the burner about one inch from where they come out and ignite. The little flame, although it looks very insignificant, is about the hottest thing known. The flame has a temperature of more than 5,700 degrees by the ordinary thermometer, and when the little flame is made to blow upon a metal surface, it just melts a hole right into the metal—melts it in before the surrounding metal has time to get hot.

With a piece of the same metal as the work in one hand, the flame in the other, the welder heats a portion of the cracked water jacket until the metal is pasty and almost melted. Then, he melts off a bit of the metal held as a soldering stick, and directs the pencil of flame in such a manner that both the work and the new material—which acts much like solder in joining metals by the soldering method—are brought to the melting point and the new material flows upon and joins itself with the work pieces which are softened and melted only over a very small space which is to be covered with the new material.

Having made the little bunch of new material flow exactly where it is wanted, another section of the work is heated, another bit of the soldering stick melted and coaxed into position, and so along the entire seam or crack. It is not necessary that the corners of the joint be beveled in this kind of welding, for the flame may be used to melt the metal right down to the bottom of the thickness it is desired the weld to reach. Once the metal is melted to the required depth, the melted portion flows into the bottom of the cavity formed by action of the flame, and it is only necessary to add more metal from the soldering stick to bring the level of the finished work to the desired height. In this manner, the weld may be "built-up" as desired.

For a "welding stick" the same kind of material may be used which is to be welded, although it is preferable that in welding steel, a softer variety be used. In welding cast iron, a very soft cast iron should be used because the metal which is melted off the soldering stick and off the work, is very apt to become much harder during the welding operation. In fact, metal thus melted, may be made so very hard that no file can touch it and any required finishing must be done with an emery wheel.

On the other hand, by properly proportioning the oxygen and acetylene gases in the burner, the weld may be made almost as soft—but not quite—as the metals which were welded. When a large amount of acetylene gas is used and a small amount of oxygen, then the weld is carbonized and becomes very hard; that is, the metal receives carbon from the gas-flame and becomes transformed into steel. If the work is heated red hot and annealed, after being welded, it will be some softer than before annealing, but the best way is to use as much oxygen and as little acetylene as possible in the welding flame. This prevents carbonization and the work comes out nearly as soft as before welding. But too much oxygen should not be used, or the welding will be too weak, the joint soft and spongy. Indeed, the oxygen gas alone may be used for cutting off iron, steel or any other metal—"in a pea-green hurry!"

All that is necessary to cut holes in metal, is to heat red hot the beginning of the portion to be cut—that is: heat red hot a little bit where the cut is to commence, then shut off the acetylene and blow a thin stream of oxygen gas right upon the heated portion, where the cut is to start. Where oxygen hits the heated metal, the union is so fierce that the metal burns right up, and is driven off in gas, slag, and lots of sparks, leaving a clean cut through the metal, as smooth as if a saw had done the cutting. With a sliding, screw-operated guide for the oxygen tip, a straight narrow cut may be made through metal four or five inches thick and the metal on either side of the cut will scarcely be heated, so quickly is the metal burned away when the stream of oxygen flame strikes it, provided the starting point is heated red hot, to begin with.

When too much oxygen is used in welding—and this is known by the great number of sparks which fly off—then there is danger of burning the weld, and the remedy is to use more acetylene and less oxygen. When exactly the right amount of each gas is used, the flame will be "neutral." That is, it will neither oxidize nor carbonize. This kind of flame is desirable for welding, but it is a pretty hard matter to tell when the flame is just right—that is, while using the flame. After the job is done, it don't take two minutes to tell whether it is hard or soft—in fact, a single rub with a file, tells that story. But it is too late to remedy matters, or change them, so keep both eyes "wide open" when doing autogenous welding, and the trick of getting the flame pretty near right will soon be learned.

It is not at all an expensive proposition for the repair man to install an oxy-acetylene welding outfit. The acetylene can now be brought safely, compressed in tanks, or a little generating plant is not expensive. The oxygen is a commercial product, being sold in tanks in which

the gas is highly compressed, and shipped easily and cheaply all over the country. A cylinder of each gas, a couple of reducing valves, one attached to each cylinder, two rubber tubes and the blow-pipe welding tip—that is all the necessary equipment for hot-flame welding, the ordinary smith's forge being utilized for pre-heating.

It is some cheaper to install an oxygen generating outfit, together with an acetylene generator. The oxygen generator is quite simple. It is a small closed cylinder in which black oxide of manganese and chlorate of potassium, in the proportion of 8 parts potash to 1 part manganese, are roasted, after being thoroughly mixed. The gas comes off in a few minutes, passes through a filter, called a "scrubber" where impurities are held up, then the gas passes into a storage tank, where it is held under 100 to 150 pounds pressure to the square inch, until needed for welding.

In welding that cracked part the flame is played upon the crack until the metal softens and is about to run, then a bit is melted off the soft cast iron "soldering stick" as described elsewhere, and caused to unite with the metal and fill the crack level full or a little more than level full, if it is intended to finish the surface by grinding after the welding is completed. But usually, the surface is left as it comes from the welding—full of little waves where the separate welding operations left little flow-marks, like ripples on the muddy bank of a creek.

Unless the water jacket is pretty well preheated, there may be trouble in finding a place where the welding can be stopped. For, by the time the weld arrives about at the end of the crack, the welder may see a fine white line in the jacket, extending a little way ahead of the weld. This fine line is an extension of the crack, caused by expansion of the welded parts. There is nothing to do, but to follow this crack, welding it up, until you have reached the end of it. And sometimes again, the crack keeps running ahead until it goes clear around the jacket and runs back into the place where the weld was begun.

Therefore, when estimating upon welding a cracked jacket or other part, do not cut the amount of welding down too much, for that crack may have to be chased several inches more than is apparent when the job is begun. Oxy-acetylene welding is worth from $2.50 to $3.00 per hour, actual time on the work, and it takes time to run several inches more than expected, therefore you can only come out even by estimating considerable more soldering necessary than actually shows when the parts are examined.

Can aluminum be welded? Sure. Almost any metal, or metals, can be welded by the hot-flame process, but welding aluminum is a mighty ticklish piece of business, and you must let it severely alone until after you have mastered thoroughly, the welding of steel, iron and cast iron. Then, try aluminum.

A Ratchet Drill.

From W. G. Persing, Oklahoma.—A simple plan to make a ratchet drill to be used in any shop where ½ inch or 41/64th inch round shank drills are used. It can be made by any blacksmith or machinist who would have use for such a tool and all good repair shops will find it very handy. Take a piece of 1¼ or 1⅝ inch shafting of good quality, Fig. 1. Cut off a piece 5½ inches long. Square both ends. This can be done with a good try square and file. Next center one end and take to a drill press and bore

Those of our readers who have been accustomed to do business with the Sidney, Ohio, factories are informed that the city is now in practically a normal condition as far as business is concerned, the damage from the great flood of waters was confined to the residence district.

The Royal Combination Spring Bar and Rubber Heel Horse-Shoe Device.—This device can be used in connection with any ordinary horse-shoes and it is slipped in between the foot and the shoe and the shoe is fitted in the usual way. The manufacturers guarantee this device to be a positive cure for contraction, sore and knotty thickened tendons. In cases of bad corns, quarter cracks, etc., it is claimed to be unsurpassed. But you can get further particulars and testimonials by writing to the Royal Horseshoe Device Co., Battle Creek, Michigan.

The Scientific Horse Foot Leveller.—This device for levelling horses' feet is made by the John Hood Company, Boston, Mass., and will be found illustrated and briefly described in our advertising department. Every horse-shoer ought to have one of these devices so as to get the right angle on every foot he shoes. Write for full descriptive circular, including testimonials and prices, to the above address, mentioning The Blacksmith and Wheelwright.

New Catalogue of Buggy, Carriage and Automobile Tops.—We learn that Buob & Scheu, Court Street and Broadway, Cincinnati, Ohio, have issued a large catalogue for 1913 giving a description of their buggy, carriage and automobile tops, which they would like to send to any reader interested. Every little while some blacksmith has a chance to furnish a new top for a buggy or other vehicle on which a nice profit can be made. Better write for one of these books to-day before you forget about it.

Banner Welding Compound.—This preparation is made by The Cortland Specialty Company of Cortland, N. Y. It welds at a hot heat, it does not fly under the hammer, does not loose off in the fire and is a great saving of time and fuel from the old process. But consult the advertisement of this company on another page and write for free samples which will be forwarded. This company wants every reader of The Blacksmith and Wheelwright to get a free sample of the Banner Welding Compound.

Contributed to Flood Sufferers.—The Gage Tool Co., of Vineland, N. J., appreciating the fact that many workmen have lost their tools during the recent disastrous floods in Ohio and Indiana, have decided to furnish their Beech Wood Self-Setting Planes at one-half regular list price to any who will write that they have lost tools in this way, enclosing the necessary amount. Such a policy deserves the warmest commendation.

Toe and Heel Calks.—The American Horse Shoe Company of Phillipsburg, N. J., have a full page announcement in this issue with illustrations of a variety of Toe and Heel calks which they manufacture in addition to a full line of horse and mule shoes. Write for catalogue and send for **free samples.** They would like to place a sample of their calks in the hands of every reader of The Blacksmith and Wheelwright.

½ inch hole clear through from the end centered. Next use 5/8 inch taper and plug tap alternately. When the plug tap will screw in 3 inches deep you have enough threads for the pressure screw that completes the body of the drill except the set screw to hold the bit at the smooth end of the hole. Next forge a collar, B, Fig. 1, that will fit A, Fig. 2, nicely. A tight and true collar should be ½ inch deep by 3/8 inch wide. Drill 12 holes all the same distance apart 3/16 inch from the outside edge. Cut those holes on the outside with a file or saw. Then you have notches B to be keyed on A when all is complete. Next forge the handle or lever. Use 2 pieces of ¼x¾ inch sickle bar steel in the center of each piece. Forge down to ¼x3/8 inch 4 inches long. Then bend in the center as shown at C, Fig. 3. When both are bent and a nice smooth ring made just fitting A nicely but loose enough to work easy, you are now ready to weld. You have now four pieces of ¼x¾ inch to weld to make the handle. They should not be welded closer than 1¼ inch from the inside of its eye and kept 3/8 inch apart clear back to the weld or room for collar to work between. Then drill holes 3/8 or 7/16 inch straight back in the handle for its spring. Round up the handle to suit your notions. Make a small dog to be riveted in the handle to work in notches in B.

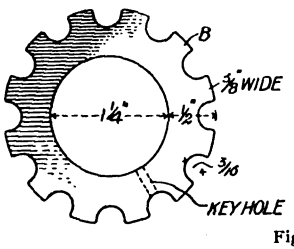
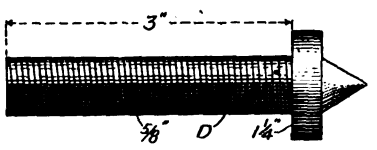


Fig. 1.



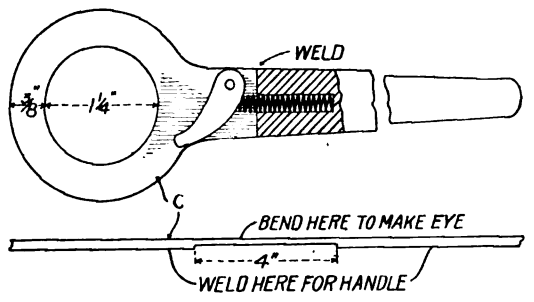


Fig. 2.

It is now ready to be put together and should be all fitted nicely and work smoothly. Use a small open coil spring in the hole drilled in handle to push the dog down. To feed requires a screw; use a piece of 5/8 inch mild steel. Weld a collar or band on to make it at least 1¼ inch. File notches for a hand hold, also drill four ¼ inch holes. To use the punch for heavy feeding, have 3 inch good clean threads as shown at D, Fig. 1, to fit in A, but turn easy. On the other end make a point to fit in the center punch mark.

This can be made in spare time. After once done it is preferred to those on the market as it doesn't need special bits.

American Carriages In India.

It is not generally known that American vehicles predominate in some parts of India and that the American surrey is used to the exclusion of almost every other vehicle wherever there is passenger traffic. The horses are small and underfed and it would be inadvisable, therefore, to introduce large surreys. The present type of surrey has proved eminently satisfactory and thus far the product of no foreign country has threatened American supremacy in this line.

The native prefers the American carriage for its cheapness and superiority, and this is also true of the Europeans. About a dozen American carriages of the surrey type are imported every year and there are now over 130 in Aden.

The satisfaction given by American vehicles prompted imitation by native artisans, mostly Indian blacksmiths, but they were not successful. These men attempted to make wheels but the product was so unsatisfactory that wheels were brought from India and the United States. The first carriages passed muster upon inspection by the local authorities, but it was not long before they required constant repairs. The low price of these carriages, $129, proved very attractive at first, but a few months of wear and tear on the hard, flint roads and hills of Aden soon dispelled the hopes of Aden carriage makers. The Indian blacksmith is now principally in the repair business and painting and finishing are done by local workmen.

It should be borne in mind that it is absolutely necessary for the front seats of the surrey to be of the full-turn pattern and that the step should be low, as there are no elevated sidewalks in this part of the world. Perhaps the only complaint against the American surrey is that the steps are too high, and manufacturers would do well to lower them for the convenience of both men and women. The upholstering should be of leather.

American surreys sell in the Aden market for $227 to $259. If the buyer buys for cash he pays $227, and if he buys on the installment plan he pays $259, usually $16.22 cash and $3.25 to $6.50 a month.

POWER

In this department an expert will reply to any questions our readers may propound as the result of their experience, or inspired by a desire to become acquainted with the value of power in the shop. All inquiries should be addressed to the Editor of THE BLACKSMITH AND WHEELWRIGHT, P. O. Box 654, New York City

MISFIRING TROUBLES.

How They Arise and How They May Be Found and Remedied.

To state a platitude, misfiring may result from quite a number of causes. So that before the remedy can be applied the actual cause in this particular instance has to be ascertained. This is done by a process of elimination. The possible causes have each in turn to be examined. And as each passes in review and is found "not guilty," the next in order must be taken. It may be, however, that the case is complicated by a dual cause. One is found and rectified, and yet the trouble continues in a lessened degree. In this instance it is necessary again to locate the "casus belli," and end or mend it. Briefly, the two main causes of misfiring are defective carburetion or ignition faults. With a multi-cylinder engine the former is more easy to fix as the fault, because most of the cylinders in turn will suffer from it, as the induction pipe serves all equally.

Specifically, the carburetion trouble may result from several causes. An inferior quality or very heavy gasoline, lying at the lower level of the tank, or water in it, will affect the mixture and reduce its combustibility. Grit or dust in the carburetor will affect the supply and cause incessant changes in the quality of the mixture. A choked warming pipe, whether this be exhaust gas or hot-water supply, will in certain circumstances permit the carburetor to "freeze" and so diminish the supply of gas. A punctured float will upset the working of the needle valve. The pressure valve to gasoline supply may easily be deranged and so check the supply to the carburetor. Any of these, or more than one of them, will be sufficient to cause the misfiring. Most of them, it is true, are not likely to occur. But one has to guard against the contingency that they may. Water in the gasoline and grit in the jets, leads, or filter are only to be avoided by scrupulous carefulness. The odd tin of gasoline, purchased when the car has been used for a longer journey than was contemplated when starting, may account for the one. Just a little carelessness in re-assembling after a periodical overhaul may easily occasion the other.

Now let us consider cases of misfiring due to ignition defects. Here, too, the list of possible offenders is a lengthy one. Plugs, terminals, wire, switch, distributor, or contact breaker, and, in coil and battery ignition, accumulators and coil in addition are sources of trouble. Short-circuits, breaks in circuits, or places of high resistance are the immediate causes. Excessive lubrication will cause sooty plugs, which will then short circuit. A loose or dirty terminal may cause intermittent firing; the former by jerking the contacts periodically apart, and then together again; the latter will cause almost continuous misfiring. A chafed lead will ground its circuit; this more particularly on the high-tension wire. The potential here, some thousands of volts, will leap an appreciable distance at ordinary air pressure, in preference to crossing the smaller gap between the poles of the plug in the high compression of the gases in the combustion chamber.

A fruitful source of trouble, and one that is apt to evade discovery, is a wire broken within the insulation, which serves to mask the break. Normally the broken portions are in sufficiently close contact to ensure the passage of the current. A sudden jar by an unusual bound of the car over an obstacle in the road will sever the broken portions and so cause a break in the circuit. Handling the wire casually will not reveal the break. It may, in fact, actually replace the ends into temporary contact. The misfiring will then cease, only to recommence with the next jolt which is great enough to sever the wires again. Now a careful examination of the wires will reveal at once if this is the cause of the trouble, which may then be quickly remedied by the replacement of the wire with a new section. When trouble does occur, the most searching thoroughness in scrutiny is essential, otherwise time is merely wasted in endeavoring to locate the fault.

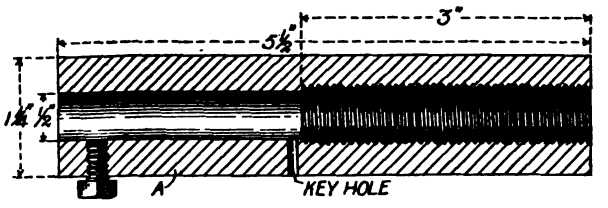


Fig. 3.

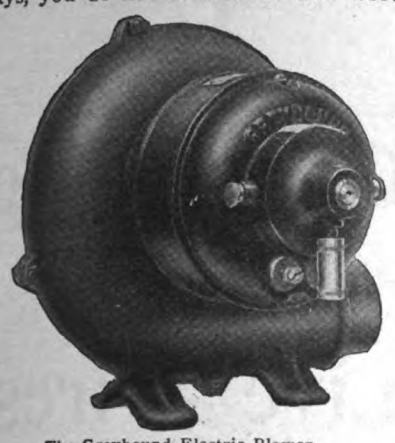
Spark plug defects, too, are not so easily discoverable unless a very close examination is made. A broken-down insulator in the plug may not reveal itself when the plug is out of the cylinder. It sparks merrily enough then. But when replaced, there is an irritating intermission of the due regularity of firing. It is a great mistake to attempt to try to economize in such details. A really high-grade plug is worth not 50 per cent. more, but 50 times more than a poor one. Platinum contacts will pit, and there is thus a defective path caused in the circuit, which will occasion missing. Or even the presence of grease, dirt, or black deposits, from indifferent adjustment, will cause irregularity in the firing. A worn brush carbon, broken or weak brush spring, or scored segment on the distributor, are other pregnant sources of trouble, which may only reveal themselves periodically. An alteration of the speed at which the engine is running, or the vibration set up from that cause, may make apparent the defect which is otherwise not evident.

An imperfectly closing inlet or exhaust valve will sometimes account for misfiring. This may be due to several causes. An obstruction in the valve port, such as grit or carbon, which keeps the valve off its seating, or a broken spring or cotter will have this effect. There is little need to apprehend trouble from these sources in ordinary circumstances. The valves themselves, in the first place, are usually so well made that they may be trusted to work efficiently as a general rule. But there always comes a time when the limit of endurance has been reached or when some little derangement of the part may have escaped notice. It is then, when the unforeseen has happened, that the trouble ensues. Often a more than usually violent shock, by the sudden application of the full braking power to avoid or to minimize an accident, will occasion much derangement, the effects of which are overlooked in the stress of the moment. Later they make themselves apparent, generally at an inconvenient time, and in a most inconvenient manner.

When misfiring occurs, then the owner or driver will arrange his plan of campaign in some definite order. By a mental process of elimination it is possible often to diagnose straightway the rest of the trouble and rectify it in a few moments. It may be there has been a recent overhaul of one or the other of the various systems of the car. If satisfied that it cannot reasonably be expected to occur from defects in the ignition which has been scrupulously overhauled, the carburetion may be scrutinized. But there must be method if time and inconvenience are to be saved. You cannot expect to locate a minor trouble if you jump from one thing to another. Proceed with definite order of elimination if you would be sure of success.

The Greyhound Electric Blower.

The R. Gardner Electric and Mfg. Works, 1714 Columbus Road, Cleveland, Ohio, is making a very liberal offer on the Greyhound Electric Blower which we illustrate herewith. They say they will send to any of our readers located so that they have the benefit of the ordinary electric lighting current, a Greyhound Blower of either size, complete with rheostat, plug and cord, and pay the freight. If, after using it thirty days, you do not consider it well worth



The Greyhound Electric Blower.

the money and a valuable equipment to your shop, you can pack it up and send it back to the manufacturers. If you are satisfied, then they will send you a bill. This is such an unusual offer that we suggest to every reader interested that he send immediately for descriptive circular and full particulars concerning this blower, which will be forwarded.

Triumph Light.—The Brilliant Gas Lamp Company, Dept. 24, 182 So. State Street, Chicago, have an announcement in this issue of their Triumph light at one-third the cost of electricity, gas or kerosene. This light is valuable for the home, shop, store or any place where a light is required. Write for catalogue giving full particulars.

"Western Axle Works." — Wood, Smith & Company (Western Axle Works), Chicago Heights, Ills., in their advertisement in this issue say their axles will not break. They have forty years' experience in manufacturing standard buggy and wagon axles. Their No. 6 "Western Special" has case hardened spindles and case hardened boxes. But consult their advertisement and if your dealer does not handle their axle, write direct to the company as above.

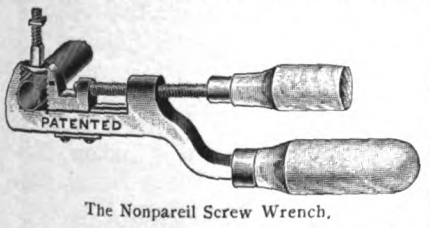
Simonsen Hot Trimming Shears.—This admirable tool is manufactured by the Simonsen Iron Works, Sioux Rapids, Iowa, and is for sale by supply houses generally. If your dealer does not keep it, write direct to the manufacturers for descriptive catalogue. This tool will save you a lot of hard work.

Hart's Improved Duplex Adjustable Die Stock.—This tool is manufactured by the Hart Mfg. Company, 81 Wood Street, Cleveland, Ohio. The dies do not require any reversing and sharpen on a grindstone. Send for catalogue describing not only the Duplex, but other tools manufactured by this company which is an old and reliable one.

A Novel Wrench.

The Nonpareil Screw Wrench here illustrated was invented by a carriage and wagon maker and repairer, to overcome the many difficulties encountered in his work. The first hundred of these wrenches that were made were sold in a week by one man in a country radius of six miles.

"Make me a hayrack full of these



The Nonpareil Screw Wrench.

wrenches," said this man to the maker, "and I will sell them all inside of one month, because everybody wants one or two." He said this after having sold the first hundred.

It will hold a round-headed bolt and keep it from turning while tightening or slackening the nut, also one that will do the work of the best pipe wrenches or tongs now on the market. It is one that can be used as a hand vise or clamp for holding parts while drilling or filing and hundreds of other things that no other wrench will do. While having all the qualities of an ordinary monkey wrench, it is a combination of four tools. It is made of the best material and the price is very low. Manufactured by the Standish Tool Works, Sebago Lake, Maine.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, ETC., OF THE BLACKSMITH AND WHEELWRIGHT.

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M. T. RICHARDSON COMPANY,
M. T. RICHARDSON, President.

Sworn to and subscribed before me this 28th day of March, 1913
[L. s.] (Signed) W. H. ROSE,
Notary Public, No. 68.
(My commission expires March 30th, 1913.)

Subscribe for THE BLACKSMITH AND WHEELWRIGHT. $1.00 a Year.

KEROSENE CARBURETORS.

It Is Difficult to Use Such Fuel In an Internal Combustion Engine.

The topic discussed at the last meeting of the Metropolitan Section of the Society of Automobile Engineers was kerosene and carburetors, says the Commercial Vehicle. A. C. Bennet of the Wilcox-Bennet Carburetor Co., Minneapolis, Minn., was the principal speaker.

Mr. Bennet has been conducting experiments with a view to producing a carburetor that should operate satisfactorily with kerosene and particulars of these experiments were given in his address.

It was brought out by Mr. Bennet that the greatest difficulty when attempting to use kerosene as a fuel for internal combustion motors was that of breaking the fluid up into small particles before it enters the cylinders. In gasoline vaporization takes place immediately after the liquid leaves the carburetor, but in kerosene the fuel is like spray throughout the inlet passages and until its entry into the chamber.

To devise a carburetor that will reduce the fluid to the finest possible particles before it enters the cylinders is the greatest problem, and Mr. Bennet stated that a high velocity of inlet flow was desirable when using kerosene. A smaller manifold than is used on gasoline carburetors was employed and the inlet valve was opened late so that the induction caused by the creation of a partial vacuum would tend to make the kerosene flow faster through the manifold and the carburetor jets.

No benefit is derived from easy curves in the manifold, Mr. Bennet said. In the experiments which he has been conducting, fins were placed in the manifold to make the passage of the fuel more difficult and break it up into small particles. Before entering the kerosene was heated in the multiple-jet carburetor that was used, but the air was drawn in cold. Water was then added from a hand-controlled jet. The necessity of adding water was found to vary with the design of the motor. Preignition is likely to occur in most motors without the water, however. It was found essential to provide more clearance for the piston owing to the increased heat on its surface, but the compression of the motor was not changed.

In taking up the question of carbon deposit, Mr. Bennet said that he had found that results showed that with the correct location of the spark plugs and the use of a good lubricating oil, there was very little carbon deposit. In employing this fuel the spark plugs should not be pocketed, but so placed that their points are swept by the gases and the points should be a very fine wire, so arranged that there is a minimum of carbon deposited.

Blacksmith Shops Wanted.

According to a report of the Chicago, Milwaukee & St. Paul Railway, the following towns along its lines offer good opportunities for blacksmiths:

Michigan, Channing; Missouri, Ludlow, Mosby; Montana, Carterville, Jefferson Island, Plevna, Ringling, Saugus, Straw, Two Dot, Westmore; North Dakota, Bucyrus, Gascoyne, Kaiser; South Dakota, Conata, Draper, Dupree, Farmingdale, Lane, Timber Lake, Weta; Washington, Marcellus, Revere.

Possibly conditions might change before this reaches our readers, but the information is given for what it is worth. As will be noted the towns are all new.

A Pattern Hint.

All metal patterns should be thoroughly cleaned with a stiff brush, then coated with a brush having plenty of beeswax in it and dipped in powdered plumbago. Brush the pattern well and it will draw much better and a smoother casting will be the result.

WANT ADVERTISEMENTS

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

will be inserted under this head at 2 cents a word, including the address for each insertion, payable in advance; but no advertisement will be accepted for less than 50 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 FOR INVENTIONS.

H. W. T. Jenner, patent attorney and mechanical expert, 608 F. St., 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.

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.

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.

PATENTS.

C. L. PARKER, attorney-at-law, and solicitor of patents. American and foreign patents secured promptly. Handbook for inventors sent free upon request. 926 G street, Washington, D. C.

BLACKSMITH.

Here is your opportunity to be an expert blacksmith without help. As life is short, get Toy's Modern Methods of doing hard jobs easy, forging and welding all kinds of steel solid. Also tempering all tools to a standard by colored charts. This is real plain information, not theory, all for $1.00. Send for free samples first. W. M. TOY, Sidney, Ohio.

BROTHER.

Accidentally have discovered a root that will cure both tobacco habit and indigestion. Gladly send particulars. No drugs. G. S. STOKES, Mohawk, Fla.

MECHANICS.

Send for a circular describing "Mechanics' Companions," a tri-square, a centering square, a caliper, rule and protractor. Address J. O. HESS, Oran, Mo.

PATENTS

PATENTS secured. Ideas bring wealth. Prompt service. Personal attention. HARRY PATTON CO., McGill Bldg., Washington, D. C.

WANTED.

WANTED—Traveling men who visit the carriage, implement and livery trade make big commissions selling our steel and rubber tired wheels, poles and shafts as a side line. Why don't you try it? THE BOOB WHEEL CO., Cincinnati, Ohio.

CASH FOR YOUR BUSINESS OR REAL ESTATE.

I bring buyer and seller together. No. matter where located, if you want to buy or sell, address FRANK P. CLEVELAND, 975 Adams Express Building, Chicago, Ill.

Carriage painter wishes to hear from carriage or horseshoeing shop that has a paint shop. Good place, rent free. Address W. A. RIGGLEMAN, Jamestown, Ohio.

FOR SALE.

A bargain. One No. 3 West tire setter, used only short while. Address BALTIMORE HUB WHEEL & MFG. CO., Baltimore, Md.

FOR SALE.

McGovern and West power tire shrinker, Moyer and Defiance hub boring machine. All as good as new at one-third the price of new ones. Address, 554 Freeman Avenue, Cincinnati, Ohio.

DON'T PURCHASE A TRIP HAMMER

Until you have asked for a price from the COLEMAN IRON WORKS, Elmira, N. Y., U. S. A.

FOR SALE.

Blacksmith shop with power. Work for two men year around, 8-room house. Good improvements. $4,500, terms if wanted. W. A. JACK, Evans, Colo.

AUTOMOBILE REPAIRS.

Blacksmiths who own automobiles or repair automobiles in their shops should subscribe for the Automobile Dealer and Repairer; the big 100-page illustrated monthly devoted exclusively to automobile repairs. The only magazine of the kind in the world. The "Trouble Department," with five pages of numbered questions each month from car owners and repair men, which are answered by experts on gasoline engine repairs, is worth many times the subscription price, which is $1.00 per year or 15 cents per copy. The subscription price of this magazine in foreign countries, including Canada, is $1.50 per year. Postal cards will not be answered. CHARLES D. SHERMAN, 52 Windsor Avenue, Hartford, Conn.

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By FRANK P. CLEVELAND, 975 Adams Express Building, Chicago, Illinois.

WAGON AND AUTO TRUCK FACTORY located in Iowa city of 35,000 population; buildings and real estate valued at $30,000; machinery, stock and supplies invoice about $30,000; business established 20 years and a money maker.

BLACKSMITH SHOP, located in Kittson Co., Minnesota town of 200 population; receipts average $4,000 annually; frame building 24x28 feet; full set of blacksmith and carpenter tools; price, $2,500.

BLACKSMITH SHOP AND IMPLEMENT BUSINESS; also one 10-room house; one 7-room house, two shop buildings and lumber shed located in Kent Co., Michigan; receipts average $1,200 monthly; buildings and lot valued at $6,500; will invoice stock.

BLACKSMITH AND WOODWORKING AND AUTO REPAIR SHOP; also house and lot in LaGrange Co., Indiana, fine location for a practical workman; price, $3,750; terms, half cash.

I bring buyers and sellers together. No matter where located, if you want to buy, sell or exchange any kind of business or property. Address FRANK P. CLEVELAND, 975 Adams Express Building, Chicago, Illinois.

FOR SALE.

Best proposition money can buy, half interest in fine paying machine and general shop. Only one in town of 2,000. Shop 24x100; lot 50x150. Located in center of city. Demise of owner reason for selling. Address MRS. MARY DAVIDSON, Casselton, North Dakota.

WANTED.

To sell half interest in good paying blacksmith shop. Partner must be good general workman and first-class carriage smith and horseshoer and capable man, as I must devote my attention to other business. Address J. J. CLUIN, Las Cruces, New Mexico.

SALE OR TRADE.

Oxy-Acetylene welding machine, new, for sale or trade. Write BAGLEY BROS. Garage, Superior, Neb.

BARGAINS! BARGAINS! BARGAINS!

AUTOMOBILES, New and Used, will sell very cheap. Reducing stock. Write for List. Box 275, Burlington, Wis.

POWER USERS.

Gasoline Engine bargains from 1 to 100 H. P. Get our big list and state your power requirements before you buy. BADGER MOTOR CO., Milwaukee, Wis.

WANTED.

A general blacksmith at once. One who can do first-class plow work. Horseshoeing not required. Shop will be furnished with the option to buy. For further information, write at once to E. J. HARMS, Dropmore, Manitoba, Canada.

FOR SALE OR TRADE.

6 H. P. gasolene engine in running order, $75.00. Or exchange for a good cold tire setter. Adddress Box 25, Kent, Indiana.

BROKEN CASTINGS

made good as new in blacksmith forge, easy as welding common iron. Full directions with formula for making flux, $1. Address LAVERNE MACHINE SHOP, Laverne, Oklahoma.

FOR SALE.

A fully equipped blacksmith and shoeing shop as follows: Two engines, turning lathe, emery stands, disc sharpener, cold tire setter, shears, punch, Little Giant trip hammer, drill, "Justrite" plow sharpener, lawn mower sharpener and blacksmith and automobile tools. Location in prosperous Swedish settlement. Plenty of work. Address for further particulars AUGUST NORSTROM, Wausa, Nebraska.

FOR SALE.

General blacksmith business very cheap. Three No. 400 blowers complete. House cold tire setter. Barcus stocks. Two largest Buffalo makes of drills, ball bearing; No. 1 Buffalo hot tire shrinker; No. 1 Buffalo tire roller; No. 1 Buffalo threading machine. Several other small machines too numerous to mention. Shop galvanized iron, 100 feet long by 37½ feet wide, two stories high. One four-room house, cement; one lot. I have made in the last nine years here $20,000 clear and I am going to retire from business. I am fifty-five years old and am a Christian. Now the price for house and business is $1,000, or will give part time. No interest. Enough work for two good men. Shoeing, $2.50. Setting buggy tires, $1.50. New shaft buggy, $4. Singletree, $2. Cross bar, $3.50. Pair shafts, $8.50. Setting axle, $4. New spoke, 50 cents. One-half felloe, $1.75. Shop rent, $22 per month in the best priced town in the world. Write for particulars to P. O. Box 106, Goldfield, Nevada.

FOR SALE.

General blacksmith and wagon repair shop; new dwelling house and about an acre of land, located in a thriving German Catholic settlement in a good farming community of Central Wisconsin. Fine chance for the right man. For particulars address A. J. MARTIN LBR. CO., Bloomer, Wisconsin.

FOR SALE.

Blacksmith and general repair shop in Sunny, Alberta. A good growing business for the right man. Shop, lot, engine and all necessary power. Machinery for an up-to-date two-fire shop. Tools almost new; good town. Ill health reason for selling. For further particulars and price address J. RIVERS, INNISFREE, C. N. R., Alberta, Canada.

FOR SALE.

Blacksmith shop 24x40. Work for three men. Only shop in good growing town. Bargain. Address for particulars, J. Simon, Box 92, Rudyard, Montana.

FOR SALE.

Blacksmith shop, tools, and stock, with power, or will sell half interest to the right man, but he must be a good mechanic and strictly sober. Work for two men. Price, $2,500. Address CLEM STEVENS, Clifton, Colorado.

FOR RENT OR FOR SALE.

In a good location, a blacksmith shop. Address for full particulars and price, J. J. TOMLINSON, Salesville, Montana.

FOR SALE.

Blacksmith and wagon shop, tools and stock, consisting of 8 H. P. gas engine, emery stand, trip hammer, power blower, good supplies of other tools. Shop 24x54. Good location, on Main Street and big territory. This is a snap; it will pay to look it up. Size of town, 250. Only shop in town. Will give good terms. Adress C. H. WHISSEMORE, Alpha, Minn.

FOR SALE.

Up-to-date outfit, blacksmith wood work tools. Power, machinery and material, $2,000. Nice home, $1,500. Cheap rent. Plenty of work. Owner broken down. Address A. YOUNG, Stillwell, Oklahoma.

Champion Tools.—Our readers who may be in want of blacksmiths' tools of any kind should consult the advertisement in this issue of the Champion Tool Company, Department "B," of Meadville, Penna., and write for their catalogue, giving full particulars.

Corona Wool Fat.—One of our subscribers in Vermont, Mr. Chas. A. Williams, writes that he cannot recommend Corona Wool Fat too highly. He says he had a young mare that was all stiffened up, but with the use of Wool Fat she is improving every day. Write to the Corona Manufacturing Co., Kenton, Ohio, for sheet of testimonials showing how Wool Fat does its work.

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DO YOU KEEP UP WITH THE PROCESSION?

If you do not, you are neglecting your business. The blacksmith and wheelwright business must progress just as much as any other if it would keep up with the times. And you cannot keep up with the times unless you know what is going on in the great world of manufacture—the great world of production—wherein the new and improved things that make for betterment in your work are produced.

Please take a little time—this evening, if possible—to read the advertisements in this issue. It will not be found a dull or a difficult or an uninteresting bit of reading.

If you see anything that you don't understand, or if you need more information than is given in these advertisements, write the advertisers and ask for further facts.

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 principles 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.

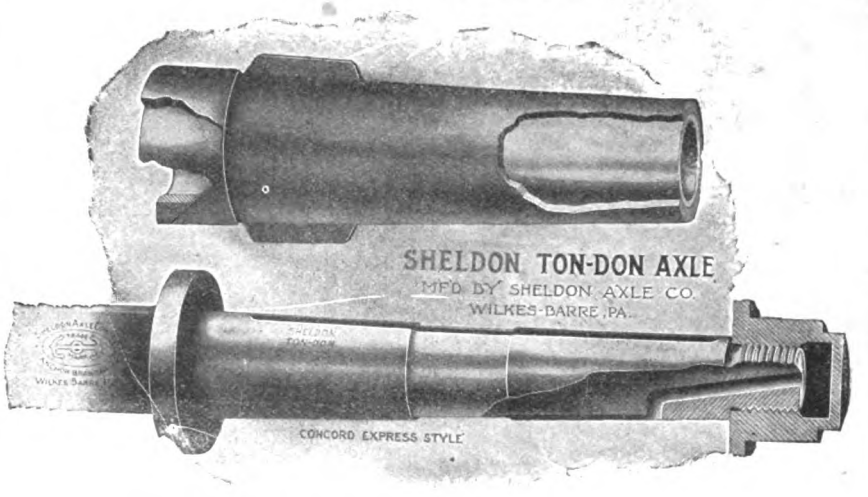
Baltimore, Md.....E. Scott Payne Co.	Providence, R. I.....Congdon & Carpenter Co.
Boston, Mass.....E. P. Sanderson Co.	Rochester, N. Y.....Burke Iron & Steel Co.
Buffalo, N. Y.....H. D. Taylor Co.	San Francisco, Cal...Waterhouse & Lester Co.
Chicago, Ill.....E. D. Kimball Co.	Scranton, Pa.....Bittenbender & 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
Pittsburg, 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 CO..
WILKES-BARRE. PA

LARGEST AXLE FACTORY IN THE WORLD.

ASSOCIATED ADVERTISING CLUBS OF AMERICA — TRUTH

YOUR Kind of Advertising Will be Boosted at Baltimore

You may not think that you are much of an advertiser—but you are—nothing is sold without advertising of **some** kind. Do you want to learn what is being done in your line of advertising—trade paper, technical paper, direct-by-mail advertising—whatever method of publicity you use? Do you want to hear addresses from the men who have made the big American successes in advertising and merchandising of all kinds? Do you want to meet 10,000 live, progressive, thinking men—buyers of advertising—the men who are responsible for the industrial progress and supremacy of the United States? If so, go to the ninth

Annual Convention of the Associated Advertising Clubs

of America. This great Convention will be held in Baltimore, June 8th to 13th. Open meetings, held every day, will be full of inspiration, education, and information on every branch of merchandising. Delegates from 135 American and Canadian clubs will be present, as well as delegations from Great Britain, Germany and other foreign countries. Baltimore will more than sustain her enviable reputation for bountiful hospitality in a series of splendid evening entertainments of wide variety and delightful possibilities.

You will be welcome whether you are a member of an advertising club or not. Make up your mind now to go; write to the address below for information as to the program, hotel accommodations, etc.

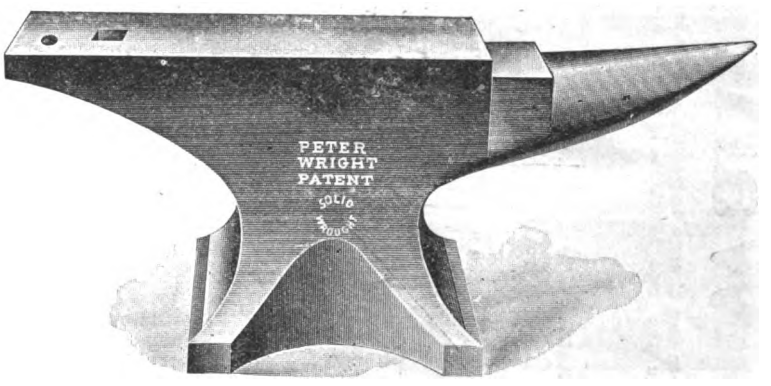
Associated Advertising Clubs of America
Convention Bureau
1 North Calvert Street Baltimore, Md.

PETER WRIGHT ANVILS

Genuine Solid Wrought

Horn, face and end all one solid wrought iron forging.

Face steeled with finest quality Sheffield Steel.



"PETER WRIGHT'S, the Anvil that is fully guaranteed."

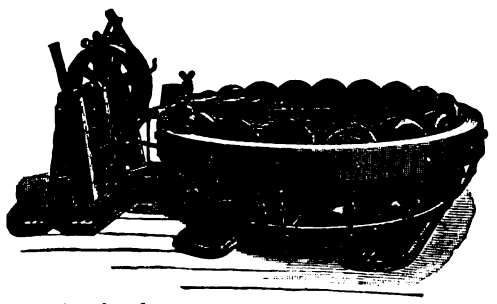
Carried in stock by all leading dealers in heavy hardware and supplies.

SOLE UNITED STATES AGENTS

WIEBUSCH & HILGER, Ltd.

106-110 Lafayette Street, New York, N. Y.

PACIFIC COAST OFFICES:
San Francisco, Cal.—530 Golden Gate Avenue. Portland, Ore.—329 Ankeny Street



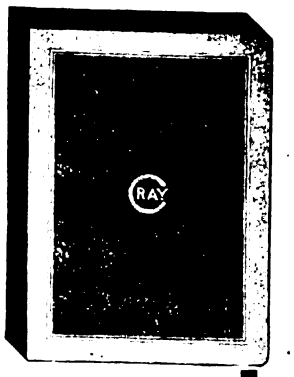
The West HYDRAULIC Tire Setter

is a high-class, carefully built machine for setting tires accurately and properly, at a great saving over the old method of heating and shrinking. "Sets 'em cold. Does an Hour's work in a Minute." Hand or Power Machines.

For Catalog, Address,

THE WEST TIRE SETTER COMPANY
ROCHESTER, N. Y.

Will You Read This 480 Page Book If We Send It Free?



This **Repairers' Guide & Price Maker** is issued in the interest of Automobile repairers, dealers and garage men, blacksmiths, carriage men, etc. **It's free to the trade** and sent to them only.

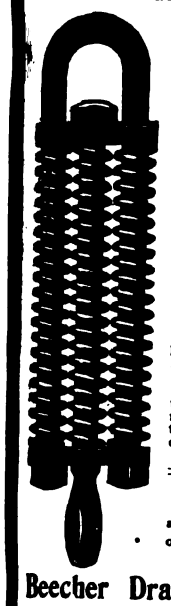
Think of it, **480 pages of bargains**—about 3000 illustrations—a complete auto repairers' guide and price maker—quotes **lowest wholesale prices** on first quality carriage and wagon hardware, automobile supplies, auto repairers' tools, tool kits, spark plugs, horns, lamps, pumps, springs, forgings, brass fittings, batteries, coils, switches, auto-tops and in fact **everything used on an auto or carriage.**

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.

A QUICK AND READY SALE

Follows an explanation of the advantages of



BEECHER DRAUGHT SPRINGS

All wagon owners need them

We want agents. Will you represent us? Our proposition is particularly pleasing.
Write for circulars.
For simplicity, durability and usefulness our Draught Springs simply cannot be equalled.
They act as a cushion to the horse's shoulders; they HELP horses START heavy loads; they assist in drawing the load after it is in motion. They prevent collar wounds; they save from twenty to thirty per cent. in harness repairs, prolong the life of the team and increase their working capacity.

You can make money as well as please your customer by selling our Springs.

Beecher Draught Spring Co.
NEW HAVEN, CONN.

TRY THIS BLOWER BEFORE YOU BUY IT

We know from experience that this Blower will satisfactorily meet the requirements of all blacksmiths and will send

The GREYHOUND

blower anywhere without charge and with the understanding that it may be returned at our expense after 30 days, if not entirely satisfactory.

A special inducement will also be made, for a limited time, on the No. 1 Blower.

Write today for descriptive literature.

R. Gardner Electric & Mfg. Works
1714 Columbus Road, Cleveland, Ohio.

YES, THIS IS JUST WHAT I WANT.

Don't start in to calk your summer shoes by hand. It is a big waste of time and money calking shoes by hand. The work of the L. S. P. Calking Machine is much more satisfactory to yourself and customers.

The machine is used every day in the year, on either sharp or blunt work. Used on every shoe you calk. And you are wasting money every day until you have one, whether you are alone or have five men working for you.

The machine that is in use by the U. S. Government.

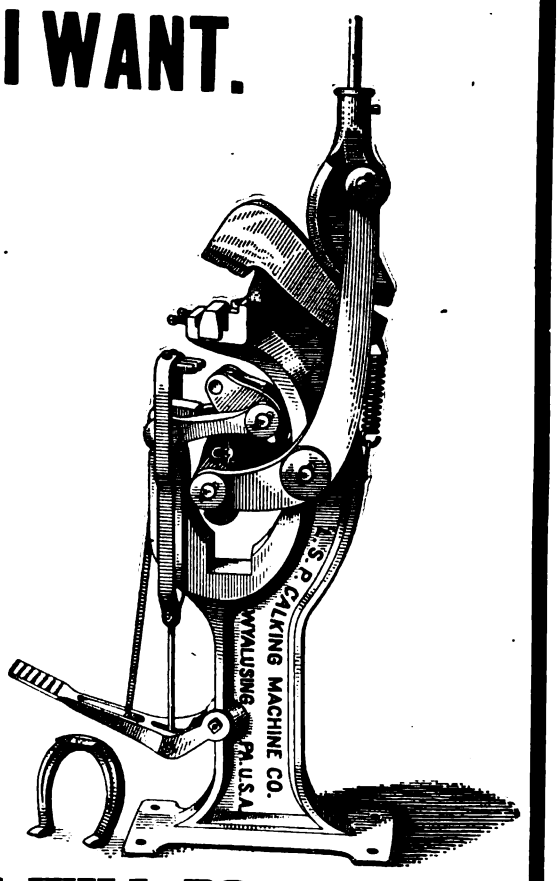
The machine that is in use in the best shops.

The machine that pleases Bosses, Journeyman and Customers.

The machine that the users claim more for, than the manufacturers.

The machine you will eventually use.

The machine that was on exhibition at the Master Horseshoers' National Convention at Denver.



WHAT THE MACHINE WILL DO.

With one pull of the lever it will completely make either a sharp or blunt heel calk of any desired length, on any size shoe, with the stock where it is needed, and no galls or cold shuts, producing a perfect calk. One pull of the lever welds either a sharp or blunt toe calk, and forms clip or not, as you may desire. No weld like the pressure weld, no losing of toe calks.

It has a shear to cut off the end of shoe for shoeing flat or with pads. It works finely on old shoes and resharpening. It makes the Single or Double Block Heel, or the "Phila. Kink," without the use of hammer or change of dies. And in Changing Dies you have no bolts or screws to bother with; all dies pick right out with the fingers.

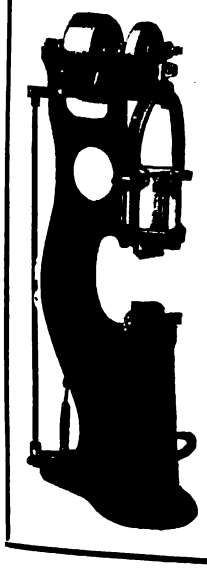
The machine is made of the very best material and by the best mechanics, and is fully warranted and guaranteed. Write today for testimonials and prices.

"THE EXTREME OF HAND LABOR IS THE EXTREME OF EXTRAVAGANCE."

THE L. S. P. CALKING MACHINE CO.
Wyalusing, Pa., U. S. A.

NATIONAL MACHINE COMPANY
Brighton, Ont., Canada.

IMPROVED STA-RITE POWER HAMMERS.



For Durability—Economy in Space and Price.

Save your muscle, time and patience. Turn out more work of better quality, at least cost. Increase your income and reduce cost of production. Get a STA-RITE and watch your business grow with less grief to you. Write for full particulars. Let us present our proposition. It will mean profit for you. STA-RITE machines can be purchased through any jobber.

50-lb. high carbon steel head. All steel unbreakable guide, best tool steel dies, adjustable spring links.

All machines fully guaranteed. They are right.

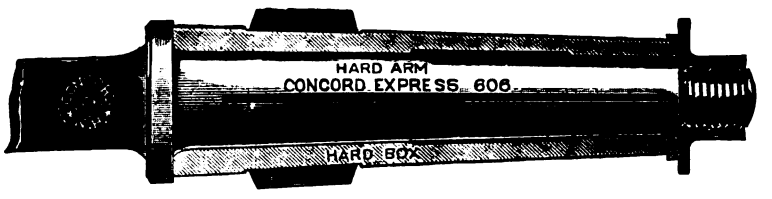
Write for Description and Prices.

STAR FOUNDRY COMPANY,
AUSTIN, MINN., U. S. A.

A STRAIGHT LINE

Is the shortest distance between any two given points.

IT GETS THERE FIRST.

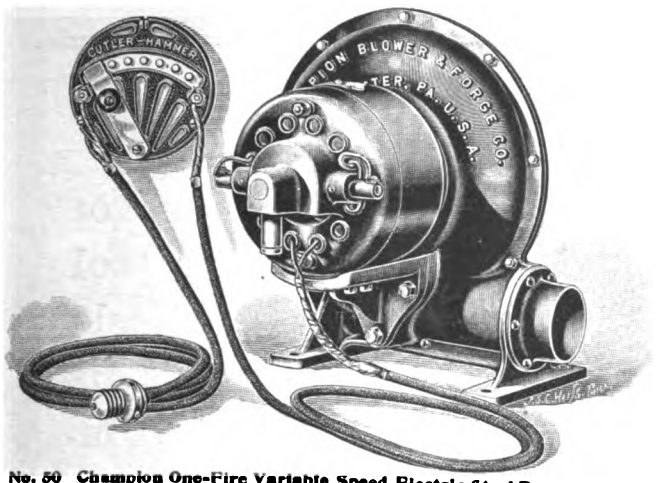


Our No. 606 Axle, with STRAIGHT, SMOOTH ARM, GETS THERE first because its form is the nearest approach to mechanical perfection; and because its hardened surface, of arm and box, insures the longest service.

Manufactured only by

CONCORD AXLE CO., PENACOOK, N. H.

The Champion "Steel Pressure" One-fire Variable Speed Electric Blower



No. 50 Champion One-Fire Variable Speed Electric Steel Pressure Blacksmith Blower with Universal Motor for both Direct and Alternating Current, either 110 or 220 volts, with Detached Rheostat for six speeds, with attachment cord and plug to fit any light socket (therefore can be installed without any expense), and Steel Pressure Fan Case, for all kinds of general Blacksmith work.

Champion Motors are all GIANTS in strength. They are 40% larger than requirements. Endurance guaranteed.

All Champion Motors are designed and built with sufficient units of power guaranteed to run the fan at highest speed of 3000 Revolutions per minute, and at high pressure open and away from the fire for ten hours without a single stop.

Measure your Motor capacity and be certain you get what you are paying for. **The Heart of the Blower is in the Motor.**

All Champion Motors are built from the very highest grade materials, best workmanship, and machinery of the latest up-to-date design employed in winding and manufacturing the Motors.

We manufacture Electric Blowers in eight styles to run from one to nine fires.

The Champion Thread-Cutting Machine

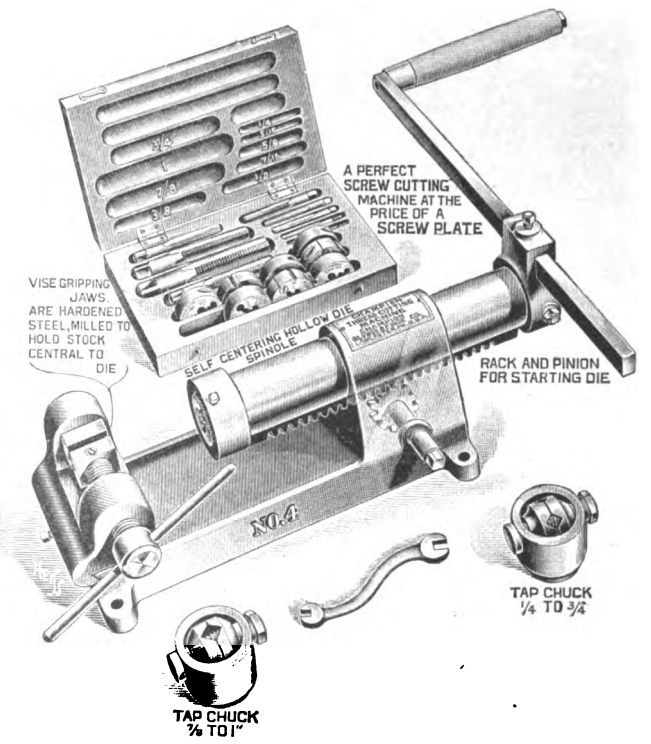
Furnished with Dies only, or with Dies, Taps and Tap Chucks

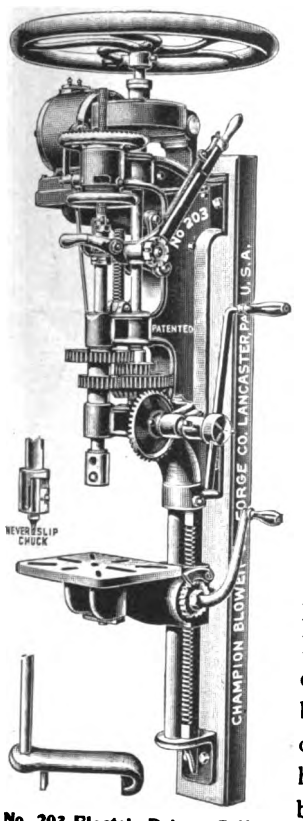
A Thread-Cutter to do quantity jobs equal to machines costing ten times the price

The Champion Thread Cutting Machine represents a wonder in its line, as it meets conditions practically equal and sometimes superior to machines costing ten times the price. It will do **better work** and produce **superior threads** at **machine speed**; therefore, no shop cutting threads can afford to do without this labor saving tool.

"Costs about the price of a Screw-Plate."

Made in two sizes and several styles from 1/4 to 1 inch.





No. 203 Electric Driven Self-feed and Double Compound Lever-feed Drill.

No. 203 CHAMPION AUTOMATIC SELF-FEED AND DOUBLE COMPDUND LEVER-FEED ELECTRICALLY DRIVEN POST DRILL

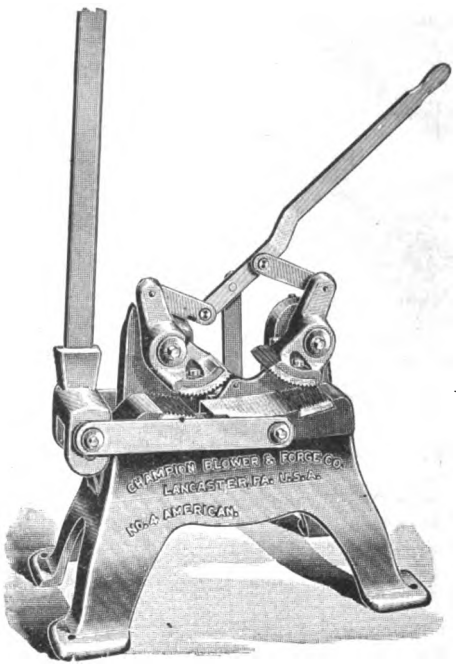
MADE WITH CUT GEARS AND BALL BEARINGS

The Drill represents simplicity and durability. The Direct Connecting of the Motor is an entirely new invention on Drilling Machines and is worthy of the most careful attention of any smith looking for a Drilling Machine. It represents a Drill to be operated by Motor or Hand Power.

The Double Compound Lever-Feed produces 80% more pressure to the Drill Bit than any drill ever manufactured, therefore, drills holes quicker and with less labor. The Self-Feed or Double Compound Lever-Feed can be changed from one to the other in an instant. There is no turning back of the feed screw to get the bit out of the work. The wonderful rapidity by which holes can be drilled on this tool places the blacksmith in position to drill holes as quickly and cheaply as the largest machine shop plants.

No. 4 CHAMPION AMERICAN TIRE AND AXLE SHRINKER

The No. 4 American Shrinker has been manufactured by us for over six years, and is used by over 9,000 smiths. Quantity manufacturing has enabled us to spend thousands of dollars to build a special moulding machine to mould this shrinker with the feet up (or in other words upside down), therefore, the hot metal is poured in from the feet, which cannot possibly be done by hand moulding, thus saving all risk of the dirt in the metal combined with air to honeycomb the arm holding the main eccentric gripping dog, as the hot metal must be poured from the top of the arm when the mould is made by hand. We positively guarantee no honeycombing in the arm holding the eccentric gripping dog or main body of this shrinker where the strength is required.



No. 4 Champion American Tire and Axle Shrinker will shrink up to 4x1 inch round edge tire and axles up to 1¼ inches, with two steel jaws 4x2 inches wide.

Our 1913 Catalogue can be had upon application, showing the very latest and greatest inventions in the Blacksmith line in the world on BLOWERS, FORGES, DRILLING MACHINES, TIRE BENDERS, TIRE SHRINKERS, POWER BLOWERS, POWER HAMMERS, PUNCHES AND SHEARS, SCREW PLATES, THREAD CUTTERS, Etc.

WRITE FOR OUR 1913 CATALOGUE — IT IS FREE FOR THE ASKING

THE CHAMPION BLOWER & FORGE COMPANY, Lancaster, Pa., U. S. A.

THE

BLACKSMITH AND WHEELWRIGHT

Vol. LXVII. No. 6. NEW YORK, JUNE, 1913. TERMS: ONE DOLLAR A YEAR

A COMBINATION WAGON.

For Fighting Fire, For Patrol, Hose, Ambulance or Ladder.

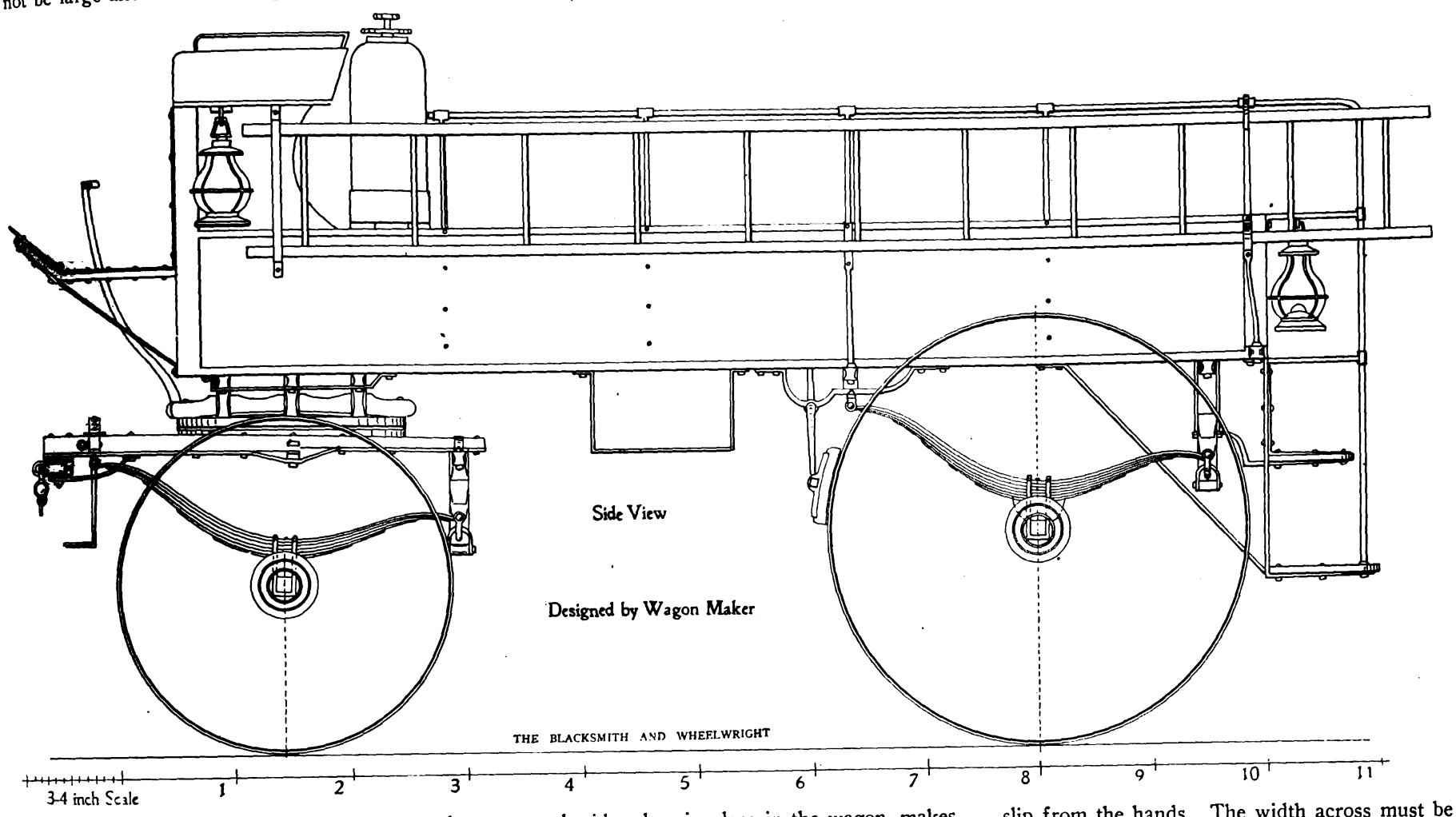
BY WAGON MAKER.

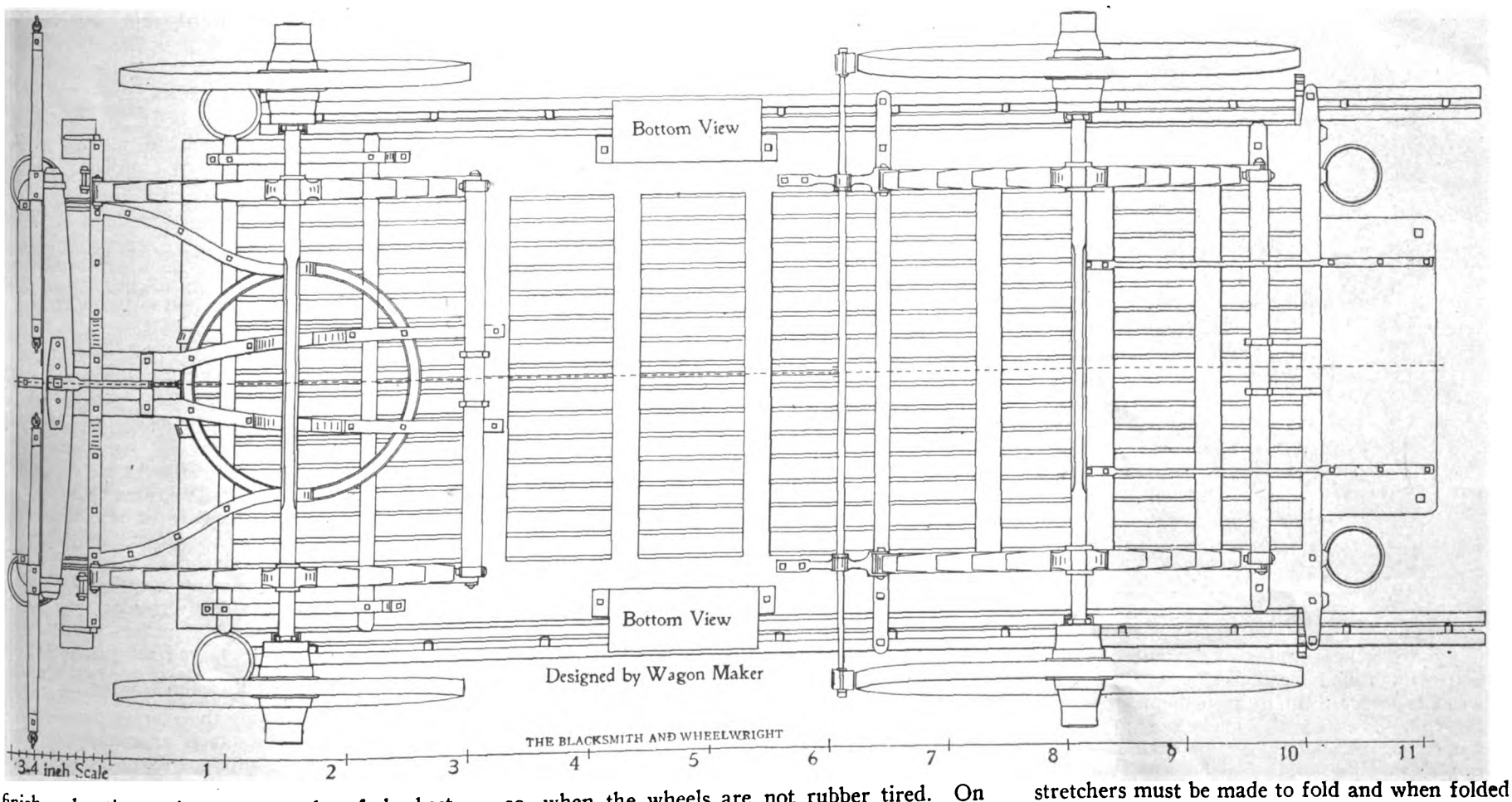
In small towns the fighting fire equipment need not be large and in fact an expensive one is out of the question, but something is necessary and a combination of single equipments can be combined without a great deal of expense.

The construction of the body and gear, its finish and entire equipment, must be of the best and kept in first class order, ready at any moment if a fire should occur. For patrol service, a cot, a folding stretcher or two and a divided canvas stretcher, are necessary. The cot is of sail cloth canvas 6 feet long and 3 feet wide bound on each side and ends about 1½ inches, strengthened on the sides with four leather badges with ½ inch hole in the center and sewed to the 1½ inch binding. Through these holes the best ⅜ inch ropes are drawn, and must be long enough to fasten securely to the rails on each side of the body. Fastening the ends loose on each side when in place in the wagon makes a kind of hammock which is far superior to the roller stretcher, which receives the shocks from bad roads and stone pavements, and especially so, when the wheels are not rubber tired. On each corner of this cot there are strong leather or rope handles to carry a patient, if necessary, by four men lifting up by the large straps into the wagon and fastening to the rails.

This stretcher is used for a stair stretcher. They are used in factories, public buildings or private houses and hospitals for carrying the patients up and down.

The length of the folding stretcher is from 6 feet 8 inches to 7 feet long, including the handles on each end, which are generally 5 inches long, rounded and heavier at the ends so not to slip from the hands. The width across must be ½ inch narrower than the space in the body, making the stretchers 22 inches across, which is the regular width on most ambulances. These stretchers must be made to fold and when folded occupy no more than 3½ by 5 inches, including the rollers. The folding rods slide on the parallel system over each other and therefore close up tight.





The rails are made of hickory or close grained stiff ash 1½ by 2 inches. The rollers are on the under surface and so are the folding rods.

To trim folding stretchers, use white or brown duck. The medium length of the canvas is 5 feet 6 inches, with 5 inch long handles, making the whole length of the stretcher 7 feet 4 inches. Cut the duck the required size, but allow 1½ inches for a hem in length and across. See to it that the hem laps ¼ inches over the corner of the rails to avoid cutting on the rail corners where the greatest strain is. In fact, it would be stronger if it lapped over both of the corners, and the trimmer should see to it that both corners are slightly rounded to prevent cutting the duck.

Each stretcher is furnished with three straps, one around the shoulders, which is the longest, or about 5 feet, one around the waist about the same length, and a shorter one around the legs. They are generally fastened stationary at one end with round headed screws, with copper washers under them to keep them from pulling through. They are also made loose; that is they are drawn through loops on each side of the rail, so that the straps can be removed entirely. These loops consist of ¼ inch round wrought iron flattened on each end with a countersunk hole for wood screws. Three such loops are required for each side. The duck is fastened with 10 ounce saddle nails 1 inch apart.

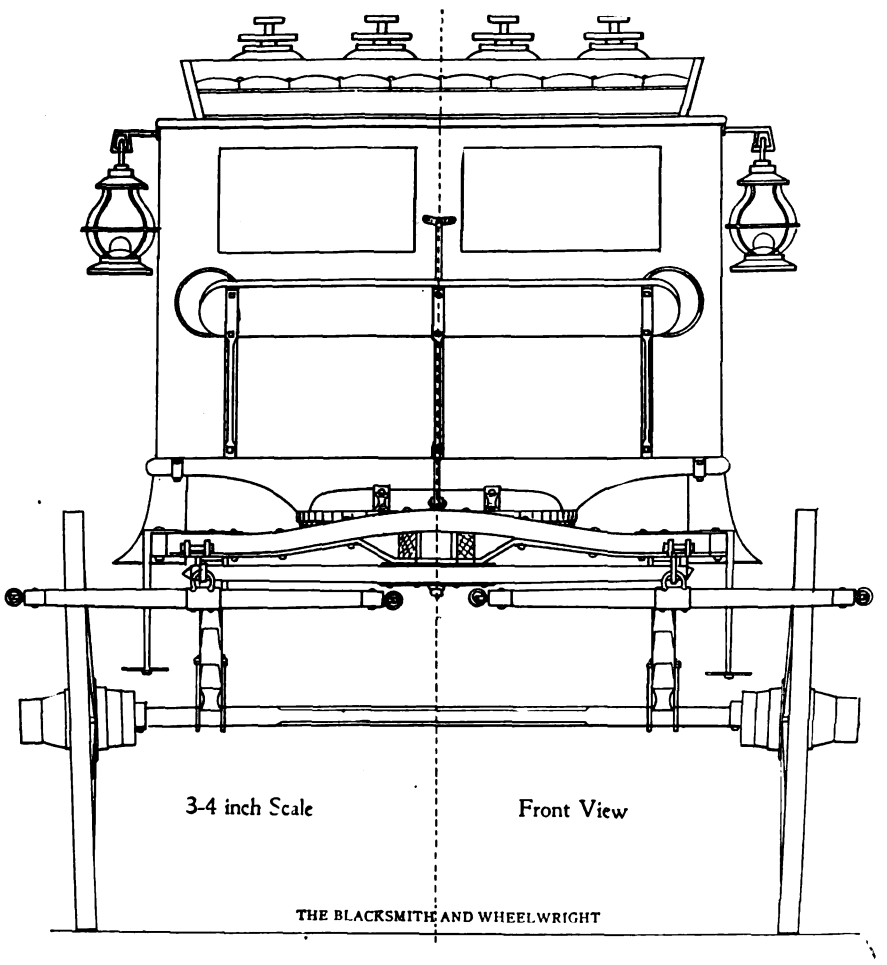
To make a suitable pillow for the stretchers, sew two pieces of duck together, cut to size 15 by 24 inches. Leave part of it open and fill with hair. To hold this pillow in its place on the stretcher sew a small strap to each side of the pillow, punch a ⅛ inch hole in the strap, slit open ⅜ inch, drive a round headed screw in the rail and fasten to it.

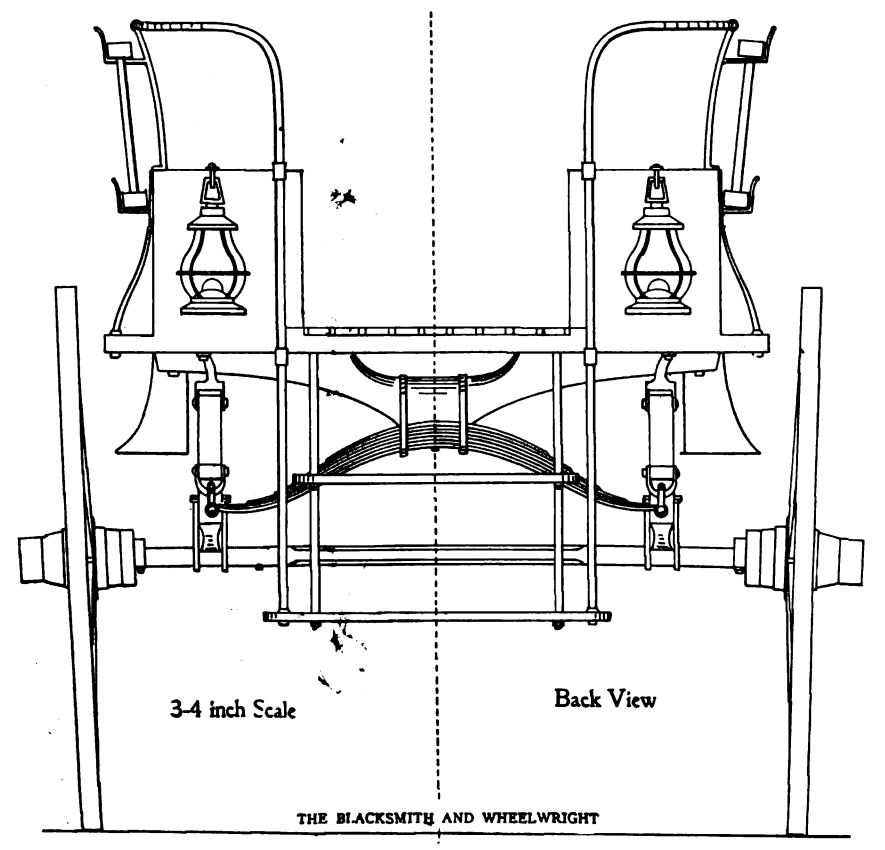
The hose can be carried in the side boxes and if these boxes are not large enough, the body can be made as wide as 54 inches for a 62 inch wide tractor. On this draft the body is 48 inches only so that 3 inches in width could be added to each side which would be sufficiently large to carry a great deal of hose and stretchers. The length of each box could be made 9 feet 4 inches or longer. There is room for four or five chemical tanks back of the seat or base of the tanks.

The ladders on this draft are 9 feet 4 inches long, but should not be less than 12 feet each, being of the extension kind as made for house painters, and are quickly adjustable and easily carried on the side rails of the wagon.

The side steps in front are of rod iron or soft steel. The rear steps are of ash, covered with corrugated rubber and equipped with two nozzle holders if desired.

The lever brake is of the most approved kind. The railing can be made of brass tubing if expense is not considered, four brass lamps, two in front and two on the rear end. Two pickaxes and two wood axes both with long hickory handles, and a 9 inch brass rotary tread gong are attached under the heel-board.





Construction of the body and gear: The length of this body is 9 feet 6 inches; 4 feet wide; side panels 15 inches deep and height from under surface of sill to under seat 28 inches.

The size of the sills is 1½ by 6 inches, crossbars 1½ by 3 inches, except the end crossbars, which are 1½ by 5 inches front and 2 by 2¼ inches on the rear end. The depth on this crossbar is 2¼ inches because the other crossbars are 1½ inches thick and the slats are ¾ inch thick, which are let into the crossbar level with the top surface, but ends of slats not cut through, as shown on back view. The end corner posts are lapped to the sills and crossbars. The boards lap over the sills, screwed every 6 inches to the sills with 1¾ No. 16 screws and screw heads covered with moldings. At the ends the whole ⅞ inch thickness of boards is grooved into the posts. There are five iron posts on each side, which hold the rails and ladders. These posts have sockets on the upper ends through which the brass rails or pipe rails pass, but the lower parts are strap bolts bolted to the ⅞ inch boards and going through the sills with nuts below. These iron posts can be best seen on the rear view. The risers in front under the seat are 1⅛ inches thick, with grain up and down. A lap of ¾ inch over the side boards and screwed to it, the same thickness is grooved into the corner posts, which are 2¼ by 2½ inches. To the top edge of these risers is screwed a piece 1⅛ inches to keep it straight and to screw the seat to.

The framing of the seats is made from ⅞ by 2½ inch ash. The posts are mortised into the crossbars and lapped into the rails, covered with ⅜ inch panels. The top lips are made in two sections for each side hinged to the ⅞ inch thick side boards, so that they can be lifted separately. The entire bottom is covered with ¾ by 2 inch slots between the sills, so that the water can run through. The seat board is 49 inches long and stands over ½ inch on each side. The side boards measure on the outside 44½ inches across on top and 42 inches on base of seat boards.

The body is hung to a regular wagon gear having three springs on the front and three on the rear gear; pole futchels, roller bearings, fifth wheels, lever brake with cast iron shoe attachments and shaft and shaft shackles on draw bar if needed.

WARNER WHEEL DIMENSIONS:

Diameter of wheels front and rear, 34 by 44 inches.
Diameter and length of hubs, 5⅝ x 9 inches.
Diameter and length of bands to match.
Width of spokes, 1⅝ inches.
Number of spokes, 14 and 16.
Thickness and depth of rims, 1⅝ by 1¾ inches.
Size of round edge tires, ⅝ by 1⅝.

SPRINGS FOR FRONT GEAR:

Length from centers of bolts, 38½ inches.
Open from centers of bolts to outside, 7 inches.
Length of front ends, 20½ inches.
Length of rear ends, 18 inches.
Difference in lengths, 2½ inches.
Number of plates, 6.
Width of plates, 2 inches.
Length of cross spring, 37½ inches.
Number of plates on front cross spring, 7.
Side springs clipped to axle.
Cross spring clipped to spring block.

SPRINGS ON REAR GEARS:

Length from centers of bolts, 38½ inches.
Open from centers of bolts to outside, 7¼ inches.
Length of front ends, 20½ inches.
Length of rear ends, 18 inches.
Difference in lengths, 2½ inches.
Number of plates, 7.
Width of plates, 2 inches.
Number of plates on cross spring, 7.
Side springs clipped to crossbar.
Width across body, 48 inches.
Width of track front and rear, 62 inches.

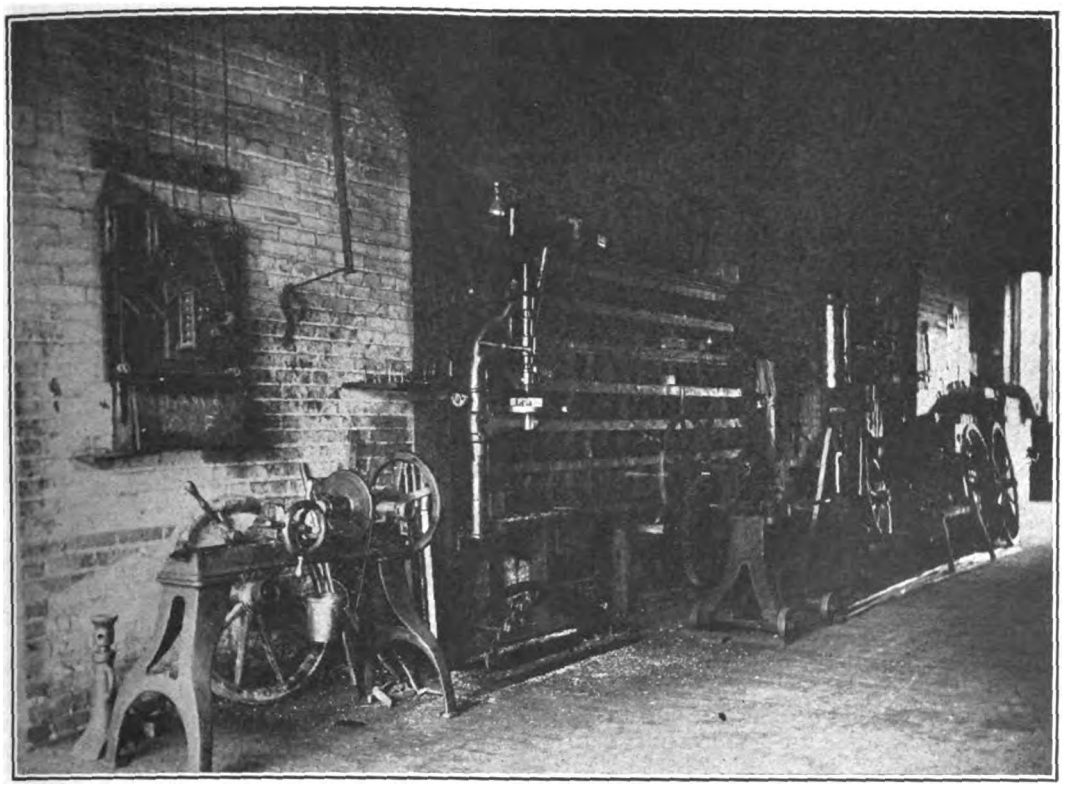
Cost of Keeping Horses.

The cost of keeping the average farm horse in the State of Minnesota is approximately $85 a year, says a contributor to "Farm Journal." This includes such items as feed, shelter, labor in caring for the horse, depreciation in value, shoeing and all other expenses. It is also estimated that the length of time which each horse works during the day is a little less than four hours for a yearly average, excluding Sundays and holidays.

KEEPING UP WITH THE PROCESSION.

One Blacksmith Firm That Has Let Automobile Work Crowd Out Horseshoeing.

From G. D. Crain, Jr., Kentucky.—The general blacksmith and wagon repair shop of P. M. Andriot & Sons, in Louisville, Ky., is one which should be of interest to every blacksmith and wheelwright, not only because it is modern and well-arranged in every respect, but because it shows the success which lies in the policy of following the development of the vehicle business into the automobile field, and of performing there exactly the same useful and indispensable work which the efficient mechanic is called upon to do in connection with the ordinary vehicle.



Blacksmith Shop, showing Boring Machine, Bolt and Nut Cases, etc.

The Andriot shop, conducted for many years by P. M. Andriot, deceased, and now by his two sons, is located in a splendidly advantageous position in the very heart of the city, a little over a block from two of the busiest streets in Louisville, and entirely surrounded in all other quarters by hurrying traffic. Naturally, this location has resulted in much business coming to the shop, especially where a quick job is desired, and this point might well be borne in mind by the blacksmith who does not see that it is sometimes worth while to pay high rent for conveniently-located quarters.

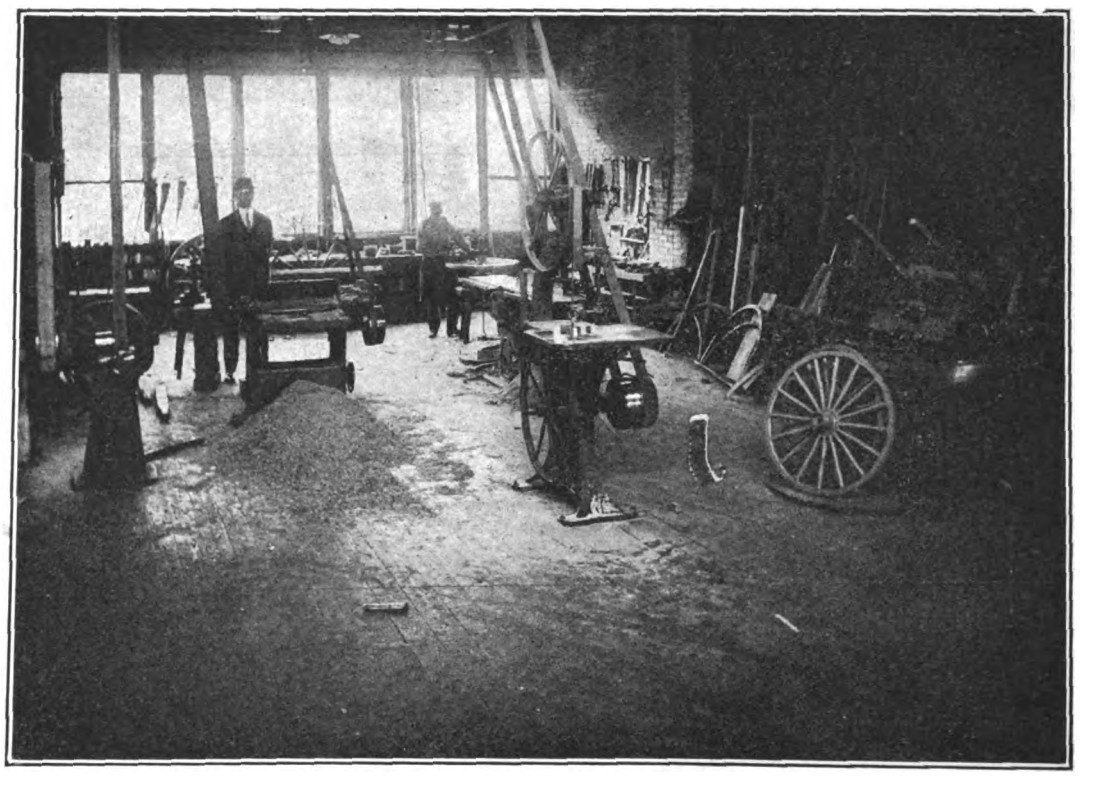
The firm conducts a general blacksmith and wagon-repair business, which includes the handling of body and running-gear work on automobiles, both pleasure cars and trucks. It has not been thought advisable, however, to attempt engine repairs, as there are service stations in the city where troubles of this sort are handled for owners by experts. The repair work, however, thus limited; has long since grown to a point where horseshoeing was found too unprofitable to handle; and it has now been nearly five years since this line of work was abandoned.

"It was the constant interruptions which is caused to more important work," said one of the firm, "that led us to give it up. The men would all be busy on some important job, which ought to be finished as quickly as possible, and here would come a horse to be shod. Somebody would have to stop whatever he was doing in order to shoe the horse. One of the forges had to be used for this purpose very often when it was needed for something else, and there was so little profit in it, as compared with the line of work we were getting into, that we decided to cut it out entirely."

Body building for automobile trucks has for some time been the firm's best line, and it might be said that it is specializing on this class of work. At any rate, its success has been such that it gets the cream of this highly desirable business. The firm not only does the work of building and finishing the body, but designs it in the first place, with reference to the chassis which is to carry it and the requirements of the service in which it is to be used, and this unusual combination of talent has won the success indicated. For example, bodies have been built by the Andriot shop for several of the very large trucks built by Louisville motor concerns, some of which run as large as five tons capacity, and all four of the motor police patrols used by the city of Louisville were built as well as designed by the firm, as was the body of the city hospital motor ambulance. It also handles a large business in converting old pleasure cars into trucks, designing, building and fitting bodies to the old chassis, and many a business house has in this way been able to use the services of a motor truck as good as any for any practical purpose, at a very low cost, as second-hand pleasure cars can be had for very little.

The one difficulty of which the firm complains is that its growing business is rendering its space inadequate, and expansion in its present location is all but impossible, by any other means than building upward, which may be done ultimately.

The building now consists of two stories, covering an area of about 57 feet by about 90 feet deep, and behind this is another small building, measuring probably 25 by 35 feet, used as a wareroom for the storage of shafts, rims and lumber, and also a small yard, of about the same dimensions, where considerable old material is stored.



Wood Shop.

The first floor of the building is given over to the blacksmith shop and to the office and receiving room. The office is in the corner in front, leaving space also in the front of that half of the building for the entrance and exit of cars and wagons. Several vehicles are here all the time, lined up in the order of their receipt, ready for the attention of the skilled mechanics who comprise the force.

Here is also kept the 1,500-pound Atterbury truck, the property of the firm, a twenty horsepower machine which is used in hauling in jobs, delivering finished work, bringing material to the shop from the yard or from the railroad stations and for the score of other purposes for which an active shop of this sort requires haulage. The firm has the local agency for the Atterbury, by the way, and expects to handle a brisk business in this line; which indicates another possibility for the enterprising wheelwright who grows with the demands of the times upon his trade.

At the rear of the receiving room referred to is the elevator which is used in conveying work from the first to the second floor, where are located the wood shop and the body department.

At the rear of this room is a small space occu pied by the tool-dresser's forge and a Gogel gas tire heater, which will take a five-foot tire. The tool-dresser who keeps the edged tools of the shop, hand as well as machine-driven, in good condition, is employed on the piece-work system, and is permitted to handle such outside work as his time will allow. This plan has been found to produce good results in this instance, for the obvious reason, as one of the firm puts it, that it is to his advantage to work as fast as possible, and thus to turn out this work in jig time, reducing delays from tool trouble to the minimum.

The blacksmith shop is equipped with two forges, with fan blasts, each of which is driven by a horse-power individual motor. Preparations have been made for the installation of a third forge.

The individual motor idea is carried out in the concern wherever possible, and the Andriots express their intention of fitting all of their machinery eventually with this type of drive, by reason of its obvious economy, no more power being consumed than is actually used in driving the machine while it is being worked. A three horsepower motor, located on the floor above, is belt-connected to a group of machines in the blacksmith shop, consisting of two drill presses and an emery wheel.

An interesting feature of the blacksmith shop, worth noting in passing, is the manner in which the supply of bolts and nuts necessary in the work of the shop is stored. A wall-case of one-inch boards, divided into boxes about six inches square, serves as a very convenient repository of these goods, the various sizes being kept to themselves in their proper compartments, so that it is only a matter of seconds for any of the men to lay his hand on what he wants in this line.

On the second floor, which is reached by a flight of stairs as well as by the elevator, all of the woodwork of the establishment is handled. The entire space is included in one big room, which is so well lighted as to attract immediate attention from anyone understanding the prime necessity in the delicate work of body-making of an abundance of unobstructed daylight. This requirement is fulfilled as fully as could be desired by the most exacting worker; for at the front and

rear and entire 57-foot width is one solid window, a complete series of sash, without a break. And further light is given from above by two rows of loft windows, likewise extending across the width of the building.

In the northeast corner of the second floor is the wood shop. Its power-driven equipment consists of a band-saw, a 24-inch planer, a Universal woodworking machine, which performs the functions of the joiner, rip-saw and boring machine, and a sand-belt, all of which are driven by belts from a line-shaft connected to a ten horsepower motor. All of the machines are of the J. A. Fay & Egan make. Two work-benches, along the walls, complete the equipment.

Ever since the shop has been using power drive it has utilized central station current, and thus has had no experience in the generation of its own current by means of gasoline engines, nor in the direct application of mechanical power.

The body department is in the opposite corner, and here the finishing work is done, after the timbers have been prepared and assembled. The rest of the space on this floor is taken up with material, unfinished jobs, and so forth. No painting is done in the shop, on account of the lack of space which was commented on above, and which is one of the penalties which the firm pays for its extremely advantageous location. The absolute cleanliness and dustlessness required for a paint shop cannot, of course, be attained in a room where woodworking is done, and consequently the firm lets out all of its painting to shops where nothing else is done.

Progress might be said to be the keynote of the firm and of its business. As indicated it has simply grown into the automobile business as a natural part of its work, and as a result has more than it can handle. Many wagon men have distrusted their own ability to handle this sort of work, and as a consequence have been able to see the time when their occupation would be gone, as a result of the steady encroachment of the motor vehicle. Not so with the Andriots. They believe in their business, and in the ability of their shop to respond to all demands upon it, and every member of the trade might do well to take as his own text a remark made by a member of the firm along this line. Commenting on the development of the business, he said with a smile:

"A few years ago we were making and repairing wagons and wagon-bodies, as a sort of side line to our horseshoeing business. Now we have worked into the automobile trade to an extent where it is the largest part of our business, and I haven't much doubt but what in a few years more we'll be tinkering with aeroplanes.

"Why not?"

SPEED IN PAINTING.

In this "Efficiency" Age It Is Regarded as Quite an Important Essential.

From M. C. Hillick, Pennsylvania.—The spirit of the times has taught men speed, and to-day, as never before, speed in painting is regarded as a fairly important essential.

Whether a carriage or automobile is to be painted at home, or at the shop of the professional painter, the insistent demand is apparently the same. In a very real sense it is the practice to "paint while you wait;" the inference which such a statement is intended to convey is that you take the car to the shop in the morning for painting repairs and return home with it at night with all painting requirements attended to in detail. In a way this is figurative language but it serves, nevertheless, to express the attitude of mind taken with respect to this matter by the general automobile using public.

The main point to be reached by both the painter and the vehicle owner is this, namely, that all coats applied to the car should be allowed adequate time to dry thoroughly. The saving of time should never, under any circumstances, be effected by sacrificing the natural power and strength of the paint or varnish used. All paints, and in the main, all varnishes, used at the present time are quick drying, and when such materials are incapable of meeting the usual requirements of the consumer, it will be found the wiser course to omit a coat of either paint or varnish, or even more than one coat, in order to get the vehicle into service within the prescribed time limit demanded by the owner.

A coat or two of paint or varnish short of the painting schedule provided will ultimately prove, in the event of meeting an abbreviated time allowance, of greater value than the full number of prescribed coats imperfectly dried. The durability of a painted and varnished surface depends, other things being equal, upon the uniformity, and the complete drying of the applied coats of material. With this consideration in view men expert in such matters have gone about to quicken the way of drying the coats by installing drying ovens, and in some instances, baking ovens. The latter, however, are to a certain extent in an experimental stage, discussion of which is deferred to a later issue. With the drying ovens and drying apartments success in getting work out several days at least in advance of results obtained by the ordinary air drying methods is to be had.

The drying oven, or the drying room, is simply an apartment specially equipped with weather and window strips, and an extra tightening up of everything about the place; also with an equipment for introducing a volume of heat anywhere from 90° to 125° or more.

An oven for paint and varnish drying purposes recently built at Altoona, Pa., by the Pennsylvania Railroad, has a heating capacity of 290°.

In all these hot rooms, ovens, etc., which even the novice is coming to recognize as an agency of no mean value in the curing out and drying of paint, color and of varnish coats, it is the practice, approved by experience, to put the work, freshly coated into the apartment at a temperature of 80° or 90° and gradually running the heat up to 150°, or to the maximum, whatever that may be, and maintaining it there for some time and then gradually reducing the temperature until 75° is reached. For this class of work, dried at the maximum temperature here designated, paints and varnishes specially designed for the work will be in order. The ordinary paints and colors for normal air drying are not suited for the work, and by their use good results cannot be expected.

It is not anticipated, of course, that readers of The Blacksmith and Wheelwright will resort to these methods of hurrying up the ordinarily quick drying colors and paints and varnish; at any rate, not to the extent here referred to. The lesson this is intended to teach is that a hot, dry temperature uniformly maintained is a wonderful help in drying paint and varnish.

Even during the fairest days of summer when drying conditions are apparently ideal, the introduction of hot, dry air into the room where the work is set for drying will greatly quicken the drying conditions. When the hot air is introduced for more rapid drying of all the pigment coats, each coat as it is applied to the surface is exposed, as above noted, to the heat until the coat of pigment has become firm and hard and quite fit to receive an additional application.

Heat—pure, dry heat—is the great mother of invention in drying paints and varnishes, and whether we get it in the natural or artificial form it matters little, so long as it is pure and practically dry.

Aside from the hot room or drying oven methods there is the arrangement within reach of everyone of using a series of quick, rapid drying pigments and paints made up of excellent ingredients and qualified in every way to promote rapid handling of work without menacing the durability of it.

To illustrate this point more comprehensively: The first coat of paint over the old foundation may carry one part pure raw linseed oil to three parts turpentine. Use pure white lead colored to meet surface requirements, mixed to the proper spreading consistency in the above proportions of oil and turpentine, and in good drying quarters the coat of pigment will be hard and firm enough to re-coat in 40 hours.

Putty on this coat and the following day surface down and apply a second coat of surface, or a coat of body color, the condition of the surface and the demands of the car owner governing the process selected at this point. In any event the surface will do to work over the following day, and should the color be applied instead of the surfacing coat, a coat of varnish color can be applied the same day.

The following day lightly rub the varnish color and apply another varnish color coat if necessary, and if not, then a coat of clear rubbing varnish. Apply the striping lines previous to putting on this coat of slow rubbing varnish. In a couple of days rub this varnish coat down and apply the finishing coat of varnish. This is quick and good work.

BLACKSMITH FOUNDRY WORK.

The Rudiments of Successful Molding Made Easy and Practical.

BY JAMES F. HOBART, M. D.

Somehow or other I overlooked the query from Brother W. E. Etter, Bower Mills, Mo., on page 542 of the February Blacksmith and Wheelwright. I trust the brother will obtain the desired information regarding melting the iron in "hydroleum" burners; but I can tell him to begin with that kerosene is expensive fuel for melting metal of any kind. There is nothing like the good old coal pile where melting is to be cheaply done. Gas and crude oil will do the work all right, and do it nicely, but the cost is apt to be higher with oil than with coal.

In regard to articles on molding, the following may be of interest to Brother Etter, but if he

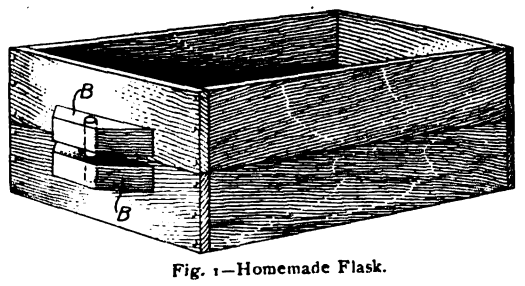


Fig. 1—Homemade Flask.

desires to go to the very bottom of foundry work, either for pleasure or for profit, then let him obtain a book on "Foundry Work" by Thomas D. West. I believe this book is published either by John Wiley or the D. Van Nostrand Company, both of New York. In all probability the publishers of The Blacksmith and Wheelwright will engage to supply this book or any other book on foundry work which Mr. Etter may require.

Small pieces of foundry work may be done with very crude apparatus. First there is needed some molding sand. Almost any clean yellow loam will answer this purpose. Good molding sand is made up almost entirely of silica sand with which a portion of clay has been mixed. Ordinary yellow sub-soil where the black surface has been removed will make good molding sand, provided you can find a place where the loam is clean and free from stones, pebbles, roots or other undesirable articles. The best molding sand comes from gravel countries. It lies on top of the gravel, just underneath the soil which bears the vegetation. In securing molding sand the vegetable soil or till is removed by scraping. Then the molding sand, which is the yellow strata or layer between the till and gravel is carefully removed.

As stated, if the smith cannot find molding sand but can find some clean fine sand and some

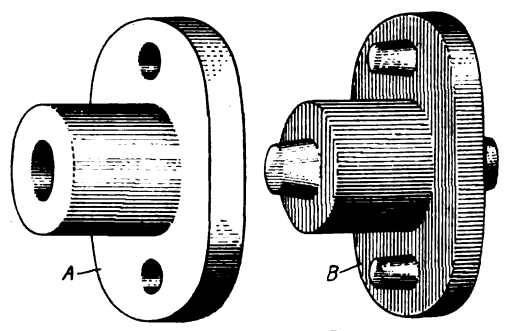


Fig. 2—Casting and Pattern.

equally clean clay, he can make a very good molding sand by mixing a small quantity of the clay with the sand. He must not mix in too much clay, just enough to make the sand stick together when slightly moistened.

The smith who anticipates starting in the foundry business should by all means make a trip to the nearest foundry, and should stay there two or three days looking things over and getting a line on the methods of doing the work. Foundry work is the simplest of all work, and apparently there is nothing hard or intricate about it, but the smith will find when he comes to work at the business, that in many instances a high degree of skill is required in order to bring forth a perfect casting, particularly when the patterns are of an intricate or complex nature, but this will come to the smith in due time. To start, let him begin with a very simple pattern, then gradually work into more difficult shapes.

The molding sand having been procured, the next apparatus required is a supply of foundry flasks. These are made in innumerable forms. Fig. 1 shows a home-made flash which may be nailed up in fifteen minutes from a few pieces of

1 inch board. This flask is merely a double frame, or two frames, rectangular in shape, placed one upon the other and made of the same size. A block "B" is fastened to each end of either frame, and holes bored in these blocks permit the passage of pins or dowels. The dowels are fixed in one block, and slide closely through the hole in the other block, thereby causing the flasks to come together fair with each other. This arrangement permits the flasks to be taken apart and closed again with the assurance that they will come exactly opposite each other after the closing has been effected.

The foundry smith should send to a dealer in foundry material and obtain an illustrated catalogue showing the different flasks, tools and other articles necessary for the molding business. The nearest hardware dealer will be pleased to send for catalogues of foundry supplies, or the hardware dealer himself may have several such catalogues. Having obtained a catalogue the smith will find a bewildering array of riddles, runners, flasks, draw irons, slickers and "such like." He should select three or four riddles or screens, one about No. 12 and another 16 meshes to the inch. For large work they use a No. 1 riddle, but No. 8 or 12 will answer the smith's purpose. The smith may make the flasks he needs, or he may purchase the irons which are readily fastened upon the outside of home-made flasks and take the place of the awkward wooden dowel arrangement shown at B, Fig. 1.

For small work the smith may perhaps purchase a couple of snap flasks. These flasks are about as shown by Fig. 1 except that they are hinged at three corners and have a locking device at the fourth corner, whereby after the mold has been completed and placed upon the floor ready for pouring the flask may be unhooked, slipped off the mold and used over and over again for other molds. Hence, the term of snap flask. These flasks are quite useful on very small work. The smith must make up flasks

Fig. 1—Cores.

having a length, breadth and thickness which will contain the various articles to be cast. Indeed, the smith will soon find the flask question a serious one, and the ordinary iron foundry seems to require eight or ten acres of land simply for the storage of flasks of every description.

The next thing in iron foundries is to have a pattern which has been made to the exact size and shape for which the casting is required. Fig. 2 shows a finished casting at A, and sketch B shows a pattern from which the casting was made. It will be noted that the simple casting A has three holes through it. It is proposed to core these holes. By coring is meant the forming of holes in castings by means of a small cylinder which has been placed inside the mold where the hole is to be located, and being fixed in the mold during the pouring of the molten metal, the core causes a hole to be left in the iron of the exact size and shape to which the core was made. There are several kinds of cores, namely, the green sand core, the dry sand core, etc. Fig. 2 shows at B a casting fitted for dry sand cores. Sketch A shows the holes in the casting, while sketch B shows projection outside of patterns. These projections are coiled core prints. They are small pieces of wood fastened to the pattern, the diameter of the core print being almost exactly the same as the hole required in the casting. If a hole in the casting is to be finished about 1½ inch in diameter, then the core is to be about 1¼ inches or 1⅜ inches in diameter. This allows the hole to be made small enough so that it may be finished to the required size. Fig. 3 shows the cores required in a model made from pattern B, Fig. 2. There are two cores shown in Fig. 3, and one core is required of the large shape A, while two cores must be made small like B. It will be noted that the projecting core prints in Fig. B are shaped to the exact size of the ends of the cores shown in Fig. 3.

The manner in which the cores are made is perhaps best shown by Fig. 4, in which one-half of a core box is illustrated. It will be noted that there are a couple of dowel pins projecting upward from the base of the box in Fig. 4 to receive the other half of the box which is not shown in the engraving. This box shows how the taper ends are made upon the core.

Fig. 5 shows a core box closed, with both heads of the box brought into position upon the dowels and held together by a piece of spring steel which is bent to the form of a horseshoe and slipped over the sides of the box where it holds them together as if it were a gigantic clothes-pin.

The next thing to do is to make some cores, and dry sand cores are usually made from silica sand mixed with a certain proportion of clay and a little rye meal. Very little water is used in mixing up core material, but a quantity of black molasses, which, together with the rye meal, makes the cores adhesive and tenacious. The core box being set up as shown by Fig. 5, it is placed on end upon a piece of iron or a smooth board. A little of the moist core material is dropped into the hole in one end of the box and

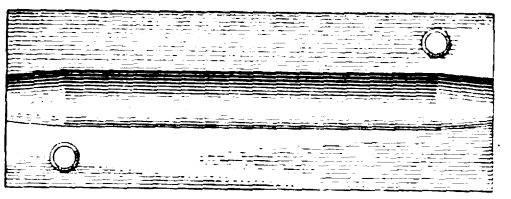


Fig. 4—Half Core Box.

is lightly tamped with a small rod which is slipped into the open end of the core box. More core material is added, and the ramming continued until the box has been filled. Then the box is struck several smart but light blows, which tend to loosen the core from the box, after which the steel clamp is removed and the parts of the core box carefully separated, tapping them lightly all the time until one part of the box has been removed and the core is exposed to view lying in the other half of the core box.

The next step is to roll the core carefully out of this half box upon a piece of iron, perhaps a bit of tank steel ⅛ inch or more in thickness. For light cores common sheet iron may be used, but for heavy cores cast iron plates are provided, which are made purposely for core oven service. After the core has been placed upon a plate, it is placed inside of a core oven where it is baked until all the moisture has been driven out of the core. If the core mixture has been rightly combined and the core well rammed, it will come out of the oven strong yet light and very porous. It is necessary that cores be very porous, for the reason that the gases which develop during the pouring of the metal into the molds may escape through the pores of the core. Were they not permitted to escape they would cause blow-holes in the casting, and might possibly cause an explosion which would tear the mold to pieces.

In making very large cores, the molder sometimes uses only one-half the core box, as shown by Fig. 4. He makes two pieces of the core, then cements them together either before or after they have been baked.

Fig. 6. shows the manner in which the pattern has been placed in a flask and the molding sand rammed around the pattern. Sketch A, Fig. 6, shows the pattern illustrated by Fig. 2. This

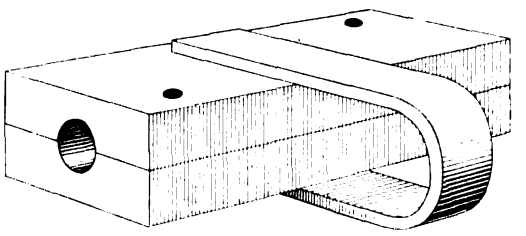


Fig 5—Core Box Closed.

pattern is just flush with the upper edge of the box which has been rammed full of molding sand. Sketch B, Fig. 6, shows the manner in which the draft iron is inserted in the pattern to form a connection by means of which the pattern is raised out of the sand. While the pattern is being drawn upward, it should be tapped lightly and continuously with a piece of metal, in order to disengage from the pattern any particles of molding sand which might adhere to the pattern. Sketch C, Fig. 6, shows the mold after the pattern has been withdrawn. It will be noted that there is a hole left in the sand inside the flask of the exact size and shape of the pattern.

The next step is to place the cores in the holes which have been left in the bottom of the mold by the core prints which projected from the pattern. It is for the purpose of causing the cores to easily enter the mold that the ends of the cores are made taper, as shown by Fig. 3. The cores are carefully placed inside the mold, the taper ends being pressed into the holes made by the core prints, and then when the mold has been finished and the cores are exactly in vertical position, the upper portion of the mold is lowered down upon the cores which pass into the holes formed by the core prints in the upper part of the mold. This operation is called closing the flask, and if it be done carelessly so that the smallest portion of sand shall fall into the mold, then there will be a serious defect in the casting, perhaps a defect which will render the casting useless. When it is possible to make a mold with the pattern lying down sideways, then the cores may be slipped into place in a horizontal position and the taper ends of the cores will not be necessary. Sometimes a plain box is used instead of the taper end box, as shown by Fig. 4. When a straight box is used, the molder quickly tapers the cores by giving them a few rubs on the ends with a very coarse file.

The manner of drawing the pattern from the mold is crudely shown at B, Fig. 6. This is one of the most interesting parts of the work and one which if not done properly is very sure to spoil the casting. Before the pattern is drawn from the sand, it is thoroughly loosened by tapping, as above described, lightly upon the draw-iron. Sometimes these draft irons are made to screw inside the holes provided for them in the pattern, but usually the draft iron is simply a piece of sharpened steel which is driven into the pattern. This method is pretty hard on patterns, but it saves a lot of time, and the molder unfortunately cares more for his time than he does for the value of the patterns given him to work on.

Frequently when a pattern is drawn from the sand, a portion of the sand will break down and fall into the mold. To prevent this the molder

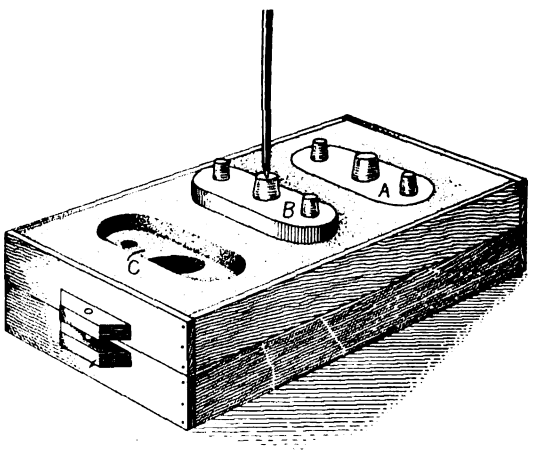


Fig. 6—Drawing the Pattern.

usually wets the edge of the molding sand entirely around the pattern. He uses for this purpose a dish of water in which is placed a bunch of tow made by unwinding the end of a soft rope. This tool is trimmed until it is pointed at one end, and when dipped in the water it will bring up considerable of that liquid, which runs off the end of the tool in a fine stream. The molder deftly passes the wet end of this tool around the pattern, taking care to deposit the liquid close to the pattern but not touching it. The wetting is to prevent the mold from crumbling when the pattern is withdrawn.

When there is patching to be done, the molder always drips some more water around the edge of the mold, then with a small trowel or a tool he calls a "slicker" he carefully and painstakingly builds up the broken piece of mold with some moist molding sand. After the mold has been made perfect as above, it is dusted with a mixture consisting of graphite and old cores which have been ground up. The powdered substance thus prepared is usually called "facing sand." When dusted over the mold before the metal is poured, it seems to cause the casting to come out of the sand much cleaner than when the metal is poured in the ordinary way.

German chemists are experimenting with processes for the recovery of the combustible material remaining in coal ashes. One mechanical method is said to save 38 tons of coke from 2,000 tons of ordinary boiler ashes. The process consists of first merely crushing the ashes and then separating the ingredients by placing them in liquids of different specific gravity.

An old torpedo boat of the German navy has been converted into a combined tugboat and ice breaker and is now in service in the former capacity on the upper Spree, the river that traverses Berlin.

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JUNE, 1913.

PARTIAL CONTENTS.

WRITE FOR INFORMATION.

New subscribers are informed that which old ones already know: They are invited to ask any and as many questions as they please in relation to the blacksmith, wheelwright or horseshoeing business and they will be answered as best they can be in The Blacksmith and Wheelwright. In cases where an immediate reply is needed, it will be sent by mail provided some time will elapse before the next issue appears.

These information bureaus, as they may properly be called, include answers to legal inquiries, veterinary inquiries, gasoline and steam engine inquiries, and questions in relation to practical shop matters. These last mentioned inquiries must as a rule be answered by our readers themselves, relating as they do to technical work, details of which the editor is of course unfamiliar. Nor can any one man be secured who is capable of answering more than a very few of them. Such knowledge must usually come from widely varying individual experience, covering the entire English-speaking trade.

The only requirements of those asking questions are that the inquirer must be a reader of The Blacksmith and Wheelwright and that he write carefully and plainly, so that there may be no mistaking his meaning. In all cases of this kind the replying is a pleasure and a duty that we owe the most loyal and friendly body of readers, that ever a periodical possessed.

PROFIT IN AUTOMOBILE WORK.

The article on another page of this issue in relation to the business trend of a shop in the city of Louisville, Ky., does not relate to a situation that would apply to a very large share of the readers of The Blacksmith and Wheelwright. In many country and village shops horseshoeing is a profitable feature of the work, and considering the experience, talent and knowledge required to shoe a horse properly, it should be far more profitable in all shops. With the exception of here and there in isolated or newly settled places, the price of horseshoeing is everywhere ridiculously low, and no one is responsible for this but horseshoers themselves. They can get fair prices for this work if they will. But this cannot be done where competition impels some horseshoer to cut prices or fix them at a low figure in order to get more than his share of the work. It is certainly significant that this Louisville, Ky., firm found horseshoeing so unprofitable in comparison with their other work that they chose to abandon it.

But there are two features of the development of the shop referred to that are significant. In the first place it has been found profitable to have the shop located in a much traveled and convenient part of the city, even though the rent was much higher than in some out-of-the-way place. It is a fact that patrons of a blacksmith shop no less than patrons of any sort of retail business will not even cross the street if they can be served approximately as well by not doing so. Thus high rent is often cheap rent as well for the blacksmith as for any one else.

The other interesting feature of this Louisville shop is that automobile work has been found so profitable. Louisville is a good-sized city, but in degree the situation does not vary much from other localities. Of course more automobiles are used there than in smaller places, but so likewise there are used more horse-drawn vehicles.

We have urged our readers to get into line for doing automobile work and the article referred to is mainly used to give a practical illustration of the success of doing so. Admitting that conditions are far different in the case of a large share of our readers, in ten years from now the blacksmith who is unable to repair an automobile as well as a horse-drawn vehicle will be greatly handicapped and be liable to lose a good deal of profitable business.

Quite likely some readers are now saying that this advice may apply to some smiths, but not to them. They may say that there are very few automobiles in their locality and, what is more, there never will be. But on the other hand, few realize the extent of the automobile industry in this country, and much less, the increasing momentum of its growth.

Census reports show that in 1904, nine years ago, 18,000 cars were produced at a value of $19,000,000, and that in 1909, four years ago, 120,000 cars were produced at a value of $135,000,000. Thus 1909 produced 102,000 more cars than 1904 and the value was $116,000,000 greater.

For 1912 the output is estimated at 250,000 cars, valued at from $250,000,000 to $300,000,000. Thus, since 1909, the product and its value have more than doubled.

Compare this present day $300,000,000 output of gasoline cars with 1910 census figures for other industries. The agricultural implement industry's product was valued at only 140 million, carriages and wagons at 159 million, electrical machinery and supplies at 221 million, chemicals 117 million and all our carpets and rugs at only 71 million dollars.

The automobile industry is by far the largest of any in the United States unless it be that of boots and shoes or clothing, which are things of universal use, and if we reckon all the varied ramifications of automobile manufacture and the expense of mtaintaining, it would probably show up greater than any.

ATTRACTIVE SHOPS.

Rev. Dr. Lyman Abbot's magazine, The Outlook, published recently a short article called "White Blacksmithing," in which the idea was advocated of painting shops white within and without, dressing the workmen in white and carrying their tools in white boxes or bags.

Although this is going a bit too far, for at its best, work at the forge or shoeing a horse or repairing a wagon, would so quickly soil a white suit that the only alternative would be to have two suits a day or work in a suit that would be conspicuously and offensively of a soiled appearance.

But that the average blacksmith shop might well be more clean and less offensive to the eye, goes without saying. 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 general confusion. If a tool be always kept in one place no time never 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.

The Engineering Magazine gives an account of the application of neatness in a blacksmith shop operated in Pittsburgh by the Pittsburgh and Lake Erie Railroad. The shop had previously had windows "carbon incrusted," the air "contaminated with sulphurous acid and carbon monoxide, so that even the leather belting, which ought to last fifty years, corroded in a few weeks". The interior walls are now painted white and repainted so that they are always white. The forges are whitewashed outside and in and maintained white, requiring a few hours' labor once a week. "The panes of glass are as clear as in a careful housekeeper's home," while the soot, sparks and gases from the forges are carried through the roof by an exhaust through hoods and stacks. The fuel is kept in closed receptacles attached to the forges, so that there are no barrels and boxes standing about. "The result is a very superior daylight illumination, which must produce results in superior quality of workmanship." The writer of the article in the magazine referred to says that the railway named is controlled by men of ideals, which are applied not simply to the blacksmith shop, but throughout the rest of the system. The public and all employees have free access to all officials, and the departments are run with less average cost, better service, greater returns and higher safety than previously.

One reason for the too prevalent idea on the part of the public that the blacksmiths' trade is an inferior one and that it requires very little save the application of muscular exertion is that the average shop is so unsightly.

It often seems to us that if the average smith would have a little higher respect for his shop and if he would keep it worthy of that higher respect, that the average customer would have a higher respect for his work and be willing to pay the higher prices that are honestly earned.

A CHANGE BUT NO INJURY.

It is sometimes a little difficult to know just how much space in this publication should be given to the automobile. It goes without saying that we wish to be of "the greatest good to the

greatest number," but this service is not always easy.

In some localities the automobile is used very little and in others it has made quite an inroad upon the use of the horse and of horse-drawn vehicles. Thus what would be valuable information to some of our readers might be practically useless to others. And yet the chances are that automobile knowledge will be of future use to all mechanics, and this will be the case whether the horse is to be used more or less for business and pleasure.

Our readers are requested to tell us how the advent of the automobile has affected their business. In some localities the automobile is seldom seen, while in others it has become by far the most common vehicle of pleasure and business travel.

But be this tendency and condition gratifying or ominous, it is no use to stand in the pathway of progress or attempt to stay its wheels. Progress is something like the famed car of Juggernaut; it ruthlessly destroys all who oppose it just as it ran over the superstitious pilgrims.

The automobile means more work for the blacksmith and wheelwright than they ever had from the horse vehicle, although the change from the use of the one vehicle to the other will be injurious or beneficial to individual shops according to the steps taken to care for the new form of work. The far harder usage of the automobile and its machinery complications not only cause it to get out of order more frequently than the carriage but necessitates special knowledge as to its construction on the part of those who would put or keep it in repair.

Of course, forging, welding, the properties of steel or of other metals, and the handling of machinery, are precisely the same in the case of an automobile as in the case of anything else. There is nothing new for the blacksmith or wheelwright to learn concerning the repair of an automobile, but he must learn the principles upon which it operates and how to take it apart and put it together again. Having learned this, he is just as well fitted to repair it as any machinist whatever.

The only business with which the advent of the automobile will seriously interfere is that of the horseshoer, but if we can place any dependence upon government statistics, there are quite as many horses in the country as there ever were.

So the general effect of the advent of the automobile is a direct gain for the blacksmith and wheelwright, and thus far it is of no great loss to the horseshoer; it merely shifts the work from the thickly settled localities to the new countries where the roads are bad and the horse is still of the highest service to man.

ART IRON WORK.

There is published elsewhere in this issue something concerning the artistic flower work a blacksmith is doing. No doubt he makes such work profitable; work of this kind is in demand for ornament or decoration more than may be imagined.

But there are other branches of art iron work that might pay better. Take, for illustration, lamps and shades in metal. Prices for such goods in the stores of the large cities are so high that we see no reason why the smith who has a taste for doing things of this sort could not make it profitable to make up some as samples and then take orders for them. Nowadays, people of means like to have individuality in such furnishings, and this the bright smith can supply. While we are not familiar enough with the work to give special and complete instruction, we have seen a lamp shade made of brass and colored sheets of glass of various kinds. The sheet brass should be from, say, one-fortieth to one-sixty-fourth inch in thickness. This can be worked easily.

Of course, one must have enthusiasm and interest for such work, which may well include all sorts of lamps and shades, and we are not recommending it except in case the smith takes to doing art work of this kind, or unless his own work is slack. Our contention, in fine, is that such work is more profitable than art flower work and that it does not require so much artistic talent.

A bright surface on galvanized wire may be obtained by excluding air from the zinc coating as the wire issues from the galvanizing bath. This is done by subjecting it, for a few inches of its length, to an inert gas, such as steam.

TOE AND HEEL EVILS.

Lecture on Horseshoeing at the Royal Show in Liverpool.

At the recent horse show of the Royal Society in Liverpool, England, W. Jones Anstey, A. F. C. L., delivered the following lecture, which of course applies all over the world, for the art and science of horseshoeing are not of local but of universal application. Mr. Anstey spoke as follows:

In having the honor of giving this lecture for the second year in succession, I am pleased to see the subject is considered of such interest that it brings such a large audience together, and I am more than pleased to see such a number of ladies among my audience. In the matter of the prevention of cruelty the ladies have always taken a prominent part, and as a friend of the horse I hope to-day to convince all present that the particular part of the subjects I intend to deal with is not only against the interests of the horseowners, but cruelty in addition.

I allude to the matter of toes and heels on the shoes as carried out so commonly in the North of England, and nowhere to a worse degree than in Liverpool, where I am sorry to say, the system is simply barbarous. Not only do I see the poor horses with feet and joints distorted, but the mutilation in chopping off the toe straight across, is carried to a worse excess than I have seen elsewhere.

All thinking farriers have been agreed in condemning the system as carried out in Liverpool, and the weight of the shoes put on is out of all reason.

The contention put forth for the use of these toes (called spurns locally) and heels is that it enables the horse to get a better grip of the ground, and to draw heavier loads, 4, 5 and 6 tons, I am told, is frequently put behind these poor animals to drag along. Well, I utterly deny that it serves the purpose claimed for it, as if it was to be effective the horses would have to be shod every three or four days, as after that time the spurns have become rounded by wear and the grip consequently gone, but if one would watch, as I have done, a horse traveling in a hurry, it would be seen that only occasionally does the horse step between the stones, but in some cases they cannot get between them at all. It seems strange that with all the advocates of the system no one can explain why it is that horses do their work half the time with neither heel or toe-piece, because that is the state they are in for a good half and often more of the time they carry the shoes. Let any one who doubts this pay a visit to the stack heap of a farrier's shop and see the old shoes that have been taken off, and they will find plenty that have not a vestige of toe-piece left, and often very little heel, and yet these horses go on working, and this is the period that is the salvation of the horse, otherwise they would be done up far quicker than they are. It is nothing more or less than fashion without the faintest show of reason to support it. I have enquired in Liverpool why they do it, and they say they do it on account of the setts and loads; in Manchester, much the same; in Bradford, it is the hills; in Cheshire on macadam roads; they say, "We might go into Manchester some time," so that in the latter case, if they go or not, they put the animal through this torture day after day, and month after month because they might have to go to town once; but worse still, I have seen horses on the outskirts of these towns working on the ploughed land, and when I asked why they were shod like it, I was told, "Well, we've always had them shod that way," so it amounted to "What was their fathers' custom should be theirs, right or wrong."

I think I have said enough to show you that I totally disagree with the system, and I will now proceed to say why I disagree.

First, they do not carry out what is claimed for them in the prevention of slipping, as is easily proved by an examination of the old shoes where the toe-piece is worn off. Next they are continually affecting the joints, tendons and ligaments, and I contend are the chief factors in the production of sidebones. In Liverpool, Manchester and all the large towns of the North where this system is in vogue, sidebones are prevalent; in the South of England, where it is not practiced at all, they are comparatively rare.

To deal properly with this question it is necessary to study the structure of the foot and hoof, and the functions it is designed to carry out, to understand how the balance of nature is upset. The wall of the hoof is composed of dense masses of horn fibres, consisting of three kinds of horn in its make-up, the chief portion being fibres of horn with a dense outer covering called the tubular horn, with a pith of softer horn in its center, these fibres or horn tubes being bound together by another horn called the inter-tubular, thus giving by the tubular structure a more rigid mass. When it is seen that this portion has a great work to do in carrying the weight, the reason will be seen for its greater strength than the other portions of the hoof. It is also in shape cylindrical, being narrower at its upper border and spreading outwards all round towards the ground surface. The weight, as we shall see, hangs from its inside surface. This shape helps it in its work.

The Laminae.

All round the inner surface of the wall, extending to its termination at the end of the bars, are small leaves of horn standing at a right angle to the sides, called the horny laminæ, very similar to the underneath part of a mushroom. There are nearly six hundred of them in all, and every one has on its edges a large number, amounting to many thousands of smaller laminæ known as lemellæ or secondary laminæ. Interlocked between these are a similar number of sensitive leaves which form thus a double locking and hold the sensitive foot and the horny wall together. It is estimated that if these leaves could be stretched and laid out like the leaves of a book, they would, in an average sized horse, cover an area of about eight square feet on each foot, so that the actual base by which the weight of a horse's body is sustained would be about 32 feet in all, and not the area across the bottom of the foot as would be obtained by measuring across from side to side and from heel to toe.

The whole weight of the horse's body can be and mostly is carried hanging in suspension from the inside surface of the wall or outer crust of the hoof. The fore feet carry the greater portion of the weight, hence the reason of sidebones more often in front and breaking down of the forelegs first. It is a matter of common knowledge that horses are perfectly healthy in all other parts of the body, but gone groggy on the fore legs, due largely to mutilation of the feet and improper shoeing, in the shape of heels and toes and want of the frog coming to the ground.

It has been stated that sidebones are hereditary, but this I very much doubt, indeed I am inclined to think they are no more hereditary than broken legs; certainly there may be some more liable from their peculiar construction to be more easily injured, just as there are in the case of so-called "corns," which is in no sense a corn but an injury to the sensitive sole, and I think the fact of sidebones being more prevalent in horses shod with toes and heels than those shod flat, proves it.

At the top or upper portion of the wall is a hollow groove known as the coronary cavity, about half an inch or so in depth. Into this fits the coronary band or cushion, from which the growth of the horn of the wall takes place. This cushion also forms a pad, and is sufficient to ward off any concussion received in bearing weight. Sustaining weight is one thing, and receiving the force of concussion is quite a different thing to letting it drop from a height on to the shoulder. The concussion in this case would probably prevent any carrying, and this is exactly the position with toes and heels.

The Frog.

The frog is the pad of the hoof and foot, and is to receive the force of concussion and prevent ill-effects on the different structures above. For this reason it is made up of nearly half its elements in the form of water, and also is supplied with materials to make it elastic. In a healthy condition (and it is only so in use) it is rubber-like, springy to the touch and is admirably adapted to perform three special functions well, viz., to prevent slipping, and in this its shape helps it, being wedge-like at its apex and hollowed at its center back portion and sides to allow its bulbs to spread and tighten their grip; to ward off concussion by its elastic property, and by its upward pressure to squeeze the sensitive frog immediately above and force the blood along to increase the circulation through the foot, the plantar cushion or fatty frog being composed of fibre-elastic tissue helps the frog in its work of receiving concussion, and by its outward lateral movement under pressure expands the back part of the foot, and by pressing against the lateral

cartilages which enclose it, also assists in forcing the blood along, every pressure of the frog on the ground and subsequent lifting alternately emptying and filling the blood vessels, and when it is considered that the foot is very liberally supplied with blood, this is of extreme importance; and we must keep in sight the fact that not one of these functions can be carried out with the frog off the ground, and is the reason why we have insisted on all competitors in the competitions making an endeavor to get the frogs on the ground.

Now I want to show what happens with regard to the wall and the immediate structures when heels are on the shoes, and the frog put out of action, and what I have to say applies much more forcibly to the fore feet, on account of my previous statement that they carry the greater portion of the weight. I suppose no one would contend that any lady with high French heels could walk better than in a broad low heel; if anything could be claimed for them for looks, nothing could be for utility.

I have seen shoes on horses here and in Manchester, and I have measured some of the heels 2½ inches in height from the face of the shoe. The frog is raised from the ground, and the whole of the force of concussion is received by the wall and the wall alone. Now consider when the pressure takes place it passes upwards, and the heels in natural action actually strike the ground first, not the toes, so that the force is principally received at the heels. This passing up of the pressure comes to a stop at the coronary cavity, and the coronary band, which, as we have seen, is sufficient for its own work, now has to do that of the frog as well, and it is not sufficiently strong for the purpose. It cannot be received higher, as there is only skin next, consequently,

The Lateral Cartilages

which are two flat plates of gristle enclosing the plantar cushion and extending above the horn from the back portion of the quarter to the heels, and down inside the wall, carrying on this portion the sensitive laminæ, are next affected by the jar. The result is a stiffening of these by deposits of bone, Nature's effort to strengthen the part on account of the jar; result,

Sidebone.

So that a sidebone is really the lateral cartilage rendered inoperative for its legitimate work, on account of the stupidity of interfering with natural functions as designed in the Economy of Nature.

I have had it put to me as a proof of sidebones being hereditary that horses have developed them that have never been shod. My answer to that is that it is quite as easy to get a sidebone in an unshod horse as a shod one, on account of neglect of the feet, and I would say at once that whether a horse is shod or not, his feet should always be attended to at least once a month, to keep as nearly as possible the angle of the foot correct. First the wall grows indefinitely; there is no provision made for its reduction except wear. A horse in a natural condition would wear away the hoof about equal with the growth, and would be far better without a shoe than with it, but artificial roads, and putting weight on the back or to draw means extra wear, and in consequence horses must be shod, and in shoeing the object should be protection only from undue wear, and the nearer natural lines are kept to the better, but immediately we put on a shoe we stop the wear of the wall except at the heels, the expansion of which, rubbing on the shoe, wears them away, as can be seen by the bright surface on the foot side of an old shoe when taken off. The toe, being rigid, continues to grow, and gets longer and out of proportion, giving rise to the idea that the toe grows most. It does not; the ordinary growth of the wall is equal all around. This extra length of the toe means therefore, to keep as near as possible the right angle the shoes should come off whether worn out or not (if not worn out they should be lighter), and the toe shortened, not by chopping a piece off the front as we have seen so much of in the horses used in this competition, but by shortening from the ground surface only.

In case of a horse unshod and turned out to grass the ground is softer, consequently the horn of the wall is faster in growth than the wear, the sole exfoliates, that is, shells out in pieces and drops away, which is the means adopted by Nature to regulate the thickness of the sole, and the wall gets longer and ultimately beyond the frog, putting the frog out of action in a similar manner to thick heels on the shoes and the result is therefore the same, and sidebones may thus be produced. The remedy is to have all colts' feet or the feet of horses turned out seen to regularly, at least once a month, just as in a shod horse. My opinion is that if this was done the tendency to the production of sidebones would be reduced.

The Joints.

The joint of the foot is formed by working of the pedal or coffin bone, the small pastern and the navicular against each other. The articulatory or working surface of the pedal and the navicular bones consists of two hollows in each, and fitting these hollows are two convex surfaces on the bottom of the small pastern bone, which allows of only one form of movement, front and backwards, similar to the end bone of the human finger. The pastern joint is similar in its working and in comparative anatomy the foot of the horse and the finger of the man are identical, the knuckle of the man being the fetlock joint of the horse. We find we can only move the bones of joints between the knuckle to the finger ends in one direction; the horse is exactly the same. Now consider what unlevel shoes and feet mean; and we attach in these competitions great importance to the feet being got ready level, for the reason that an unlevel foot or unlevel shoe such as is usually found soon after wear with heels, that there is a tendency for one heel to wear away faster than the other (usually outside), and thus the foot is distorted, the joint thrown out of its true line of working, and a strain put on the ligaments which bind the bones together and keep the joints in place. This can be demonstrated by putting the finger point downward on a table and pressing sideways; it will be found to hurt, as the bones are pressed out of their line of action. Consider what this means for days together, and nights too, as we do not take their shoes off at night and put on slippers, in addition to this, heavy loads to draw; if not causing visible lameness, going far to wear out the animal much sooner, and rendering it less able to perform its work with any degree of comfort; and the most skeptical among my hearers cannot but agree that a shoe with no heel left on the outside, and perhaps an inch or more in height on the inside, with a toe-piece also worn unequally as well, must be causing a good deal of inconvenience at least, and my contention is that this evil is a great deal worse and effecting much more mischief than it is commonly thought to be doing.

Considering the work of the tendons, there are two coming directly to the foot; one in front known as the extensor, for the purpose of raising and carrying the foot forward, and which is attached to the front upper portion of the pedal bone; the other, one of the flexors attached to the lower back portion of the same bone for the purpose of bending the foot upwards and backwards in conjunction with its fellow. These are both severally stronger than the extensor, and for that reason are better able to stand the strain of the movements of the foot and leg, but immediately we put high-heeled shoes on, we are in the position of the lady with the French heels, we throw extra strain on the tendon in front, which is less able to sustain it, hence horses going over at knee and becoming, as we say, "groggy." I suppose no one would argue that a lady shod in the fashion mentioned would develop good walking, and especially going down hill; the tendency would be for sore shins, and in the horse the same result would follow.

But besides all these evils, the greatest is probably that of putting the frog out of action, and I would reiterate, with all the force I can, the necessity for all those who have the care of horses, to insist, where it is not done, that the frog should be allowed always to come in contact with the ground, and on no account to have any paring done. Farriers, I am glad to know to-day, are convinced so far of the benefits accruing from the use of the frog that they do not mutilate it as formerly, but far too many cases of ignorance with regard to the frog and its uses still prevail, and some people still insist on having frogs pared, soles scooped out and walls rasped up, and these bad practices are responsible for the majority of the bad feet we have to contend with.

It is now about seventeen years since I first began to denounce the practice of toe and heel shoeing in the city of Manchester, and from the universal astonishment expressed by my statements I concluded I was looked upon as a mild sort of lunatic to think horses could travel without them, and especially to say travel better, but the long experience since that time has only proved it to be true that a horse with a level shoe gets a better grip and more hold through the shoe than is possible when perched on a tripod in the shape of a toe-piece and two pegs behind. I am glad to know that I have converted to this view a good many horsemen who would not on any consideration now go back to the old system.

In this, as in everything else, common sense must be used. I have known people try, and after a very short trial give it up, saying it was not successful, but why? Well, in the first place, when the frog is off the ground it is like any other organ not used, it becomes weaker, and as the wrong-doing of years cannot be put right in a few minutes, so neither can the frog be used with the same freedom, it has lost its power through non-use. There will be a stretch of the heels, and probably a little soreness on the frog being brought again into action. If soaked in warm water, this generally relieves, but as the use goes on increasing strength of the part is the result always. My experience has extended from Manchester setts to Bradford's hilly roads, and in all cases experience has proved that a rational method of shoeing has enabled horses to do their work better either up hill or down, or on the level and over all kinds of roads, whether wood setts, asphalt or macadam, and no one who has honestly tried, that I have come across, but has admitted that toes and heels are a mistake, and that the frog in action is the best under all circumstances.

My advice is, if you are afraid to go wholly to it, at least let the forefeet be shod in a rational manner, because they are the ones that suffer most, and from which we see most painful results.

I am hoping for the day when the pet abominations which so many still cherish in the form of cruelties practiced on our friend the horse, will be relegated to the limbo of the past; along with the other barbarous practices, such as cropping ears, nicking, the use of blinkers and bearing reins, and the many stupid practices adopted by our forefathers with the idea of improving nature.

In conclusion, if what I have said bears fruit in the way of someone trying what I have advocated, I shall feel I have accomplished some good purpose, and some poor horse will be the better for it, and if farriers would make the most of their opportunities much more good might be effected. There are many instances when their theories might be put into practice, but are lost for want of thought or the result of habit. I have known men to write an essay and say in it the frog should not be mutilated, the bars should not be cut out, and in practice calmly slice a piece off the frog and chop out the bar without a thought. This is not "Practice with Science." The motto of the Royal Agricultural Society is a good one, and if farriers carried it out on every occasion, their work would be easier, the horse more comfortable, and of longer and better service to the owner.

The practical application of common sense in horseshoeing means beneficial results to everybody concerned, the horse included.

Correspondence

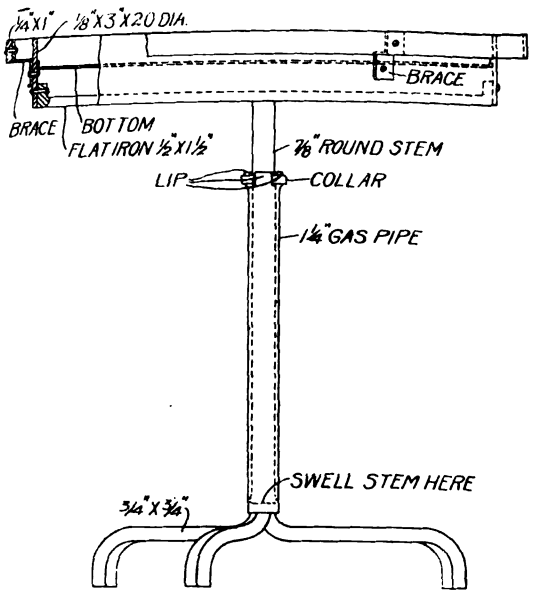
WITHOUT A HELPER.

One Smith Who Does Not Need Nor Use One.

From W. H. Chambers, Washington.—I have always worked alone with the exception of a few months. I claim the man who has worked alone has a greater efficiency than the one who can do nothing without a helper. There is an old adage that "The smith that isn't worth his helper is not worth much." That may be true in one way but there is another side to it. I had an expert work for me for a while. He was seven hours making a wagon brake and I helped him, then I had to make it over. I can make the same brake alone in a half day with no one whatever to help me. Of course the "one man" must have a "one man shop." It must be conveniently arranged with labor saving tools—a place for

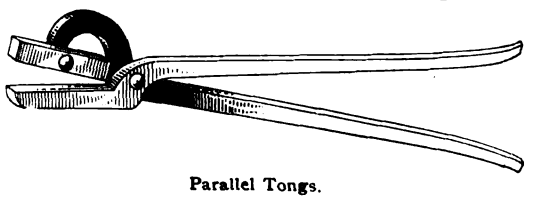
everything and everything in its place. You take a smith who has always had a helper, and give him a fire by my side, and I will work him to death. Then you give him a helper and make me also take a helper, and he will out-do me, because he knows how to make the other fellow do the work, and I know how to do it myself.

I have a revolving tool rack in between the forge and iron bench and back of the anvil, as



Tool Rack.

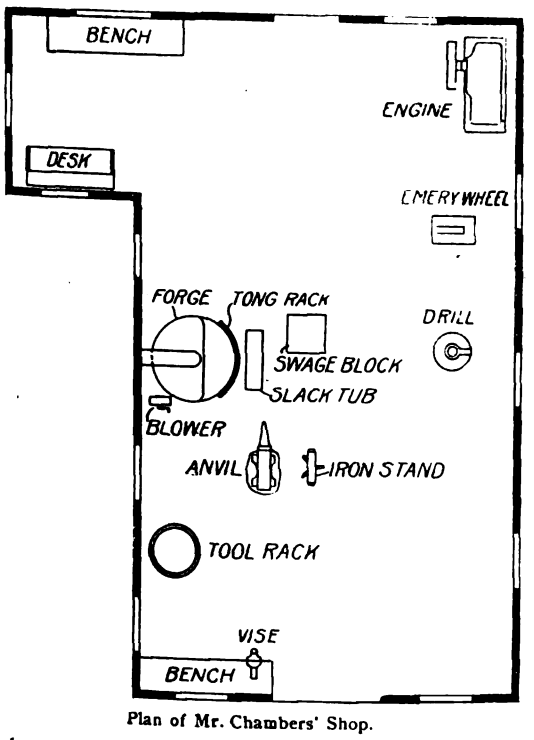
per illustration. I have an adjustable iron stand which supports iron in cutting or welding. I use an 8-pound sledge in one hand and cut hot or cold. I have a five-pound one-hand sledge or hammer which I use for heavy welding and for sharpening plow-shares. Then I made myself a drop table cooling tank for tires, and I have a 1,250 pound D. H. Potts hot shrinker. I have set two sets of heavy truck tires with my outfit alone, while two of my competitors were setting one set.



Parallel Tongs.

I can take down a spring wagon and put on a set of 1¼ inch axle stubs in a day easy, all alone. Some men would never think of tackling 1¼ inch stock alone. I can lay one end of an axle on the forge, place my stub on the iron stand and weld at ease, with seldom more than two welding heats. I have watched two men at it, too. I am not talking about factory smiths. I have reference to the general repair man. You will find spoiled iron in every slack tub and under the forge or hid in the cinders.

Some men cannot put buggy tires on without a



Plan of Mr. Chambers' Shop.

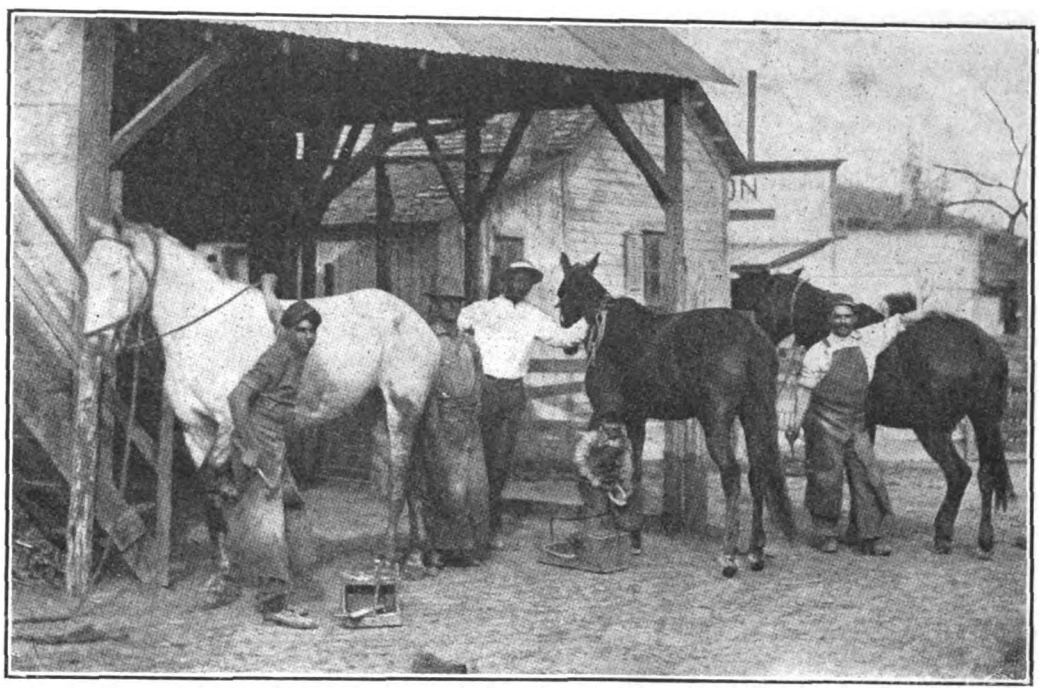
helper. I lay my wheel on a pair of trestles, have a wire to go through at the felloe plate and heat the buggy tires in the forge. I put my wire through, then take a pair of tongs and hammer, and walk around to the opposite side of the wheel, draw the tire down, draw the wire and roll in the slack tub.

If the "one man" has a trip hammer, a good punch and shear machine, a D. H. Potts big hot shrinker, a drop table cooling tank, with other tools handy, he can do more work alone than a man who never worked alone can conceive of. I made myself a pair of parallel tongs. Make one piece a common straight lip pattern, then make the block preferably of tool steel, and the goose neck side. These tongs will hold any thickness of flat iron from ¼ to ¾ and will hold a bevel iron or wedge shape. Below is illustration of tongs and forge corner of my shop.

I might tell how to make the tool rack. Make a hoop of ⅛ by 3 inch band iron 20 inches in diameter. Then make a hoop of ¼ by 1 inch, enough larger to allow hammer handles to drop between it and the other hoop. Put a bottom in the 20 inch hoop. This will make a tray for chisels, punches, etc. Make three small angle irons, then rivet them onto the 20 inch hoop, then rivet the larger hoop to the top angle and you have a double hoop to drop hammer handles through. Be sure to get the hoops level in connecting them. To make the stand, take a piece of ⅞ inch round iron, weld a T of flat iron on one end. The flat iron should be ½ by 1½ and long enough to turn up at each end to rivet on the inside of 20 inch hoop. Now take a piece of 1¼ inch gas pipe and three pieces of ¾ inch iron. Lay the three pieces of ¾ inch together in the fire and weld them together at one end. Then weld to gas pipe. Turn your three feet in a nice curve, the end will set flat on the floor; then swell the lower end of the stem that goes down in the pipe, so it will slip in the pipe; then weld a collar on the stem close up to the top of the pipe. Now take a hack saw and saw three lips in the top of the pipe so when you put the stem in the pipe you can turn the lips over and the foot of the stand will not fall off when lifting about. The stem should be long enough to reach the bottom of the pipe, and a few washers in the bottom of the pipe will make it revolve with more ease.

A Texas Shop.

From Martin Keller, Texas.—I am sending a photograph of my shop and will call your attention to the youngest horseshoer in Texas holding up the horse's foot. He is five years of age and wears an apron while at work. He can bolt wheels and do several little jobs around the shop.



Mr. Keller, his Son and His Workmen.

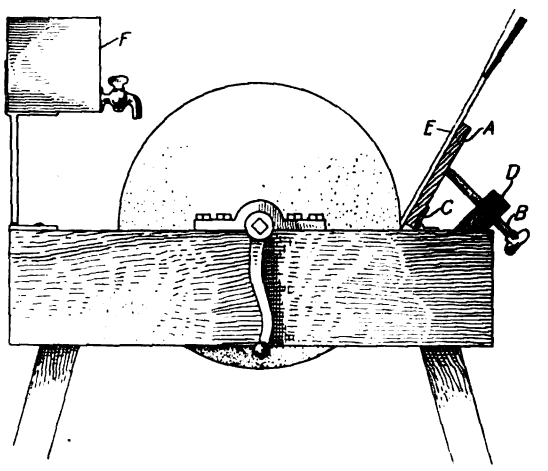
I wish some one of the brother readers would kindly let me know of some good process to bore through buggy and automobile springs.

Pretty Good Advice.

From H. D. Lyle, Arkansas.—I can sympathize with all blacksmiths for I know they are the least valued and yet they are the most valuable of all members of the mechanic arts. They do the hardest work and receive the least pay of any class of laborers living. Now the cause of this is all very easily understood if one will only think a little. I don't mean to say it is brought out by one and only one cause, but the blacksmiths and their patrons are both to blame to a great extent. We all know there is a class of people that will patronize only the smith that will do their work quickly and cheaply for them and there is also a class of smiths that is anxious for this class of trade. So if we look at both sides we can see that both are to blame to some extent. I am not following the trade at present and don't know anything but what probably almost every one knows, but the smith will never get the respect of his patrons until he deserves it by making fair charges for his work. My advice is: Do your work well if you don't do so much. Keep a correct record of your business, no matter how small it is. And last, but not least, don't fail to charge enough for your work. Charge all alike.

A Simple Grinding Device.

From O. A. Appleby, Maryland.—In one of the back numbers of The Blacksmith and Wheelwright I noticed a fine device attached to the grindstone for grinding tools, etc. I think it



Mr. Appleby's Attachment.

was most too costly for general purposes so I send you a simple and perfect device costing less than 50 cents complete on which you can grind any tool from a half inch chisel to a broad axe. The table rest is 10 inches long and 5 inches wide, hinged to the grindstone frame C. The screw B, 4 inches long, passes through a piece of hard wood, D. It buts against the table A, which is raised or lowered to suit the bevel of the tool to be ground. Hold the tool with your right hand and turn the stone from you with your left hand. F is the water tank attached to the frame with a spigot to regulate the water flow. This device has a tendency to keep the stone true on the face, which is a very important point. This arrangement I have used for a number of years and give any mechanic the privilege of copying it.

A Quick Fire.

From F. Walker, Alabama.—Very often during the day a blacksmith's fire will go out several times, and in using wood to build it again the shop will become filled with smoke, thereby causing a loss of time. In such emergencies I pursue the following method: I have a quart bottle of kerosene oil always handy; I remove some of the coal, pour out a little oil, light it, work the bellows, put on coal, and in a surprisingly short time the fire is ready to work, with no smoke, and very little time lost.

ANSWERS TO CORRESPONDENTS

Under this head will be found each month replies to questions asked in previous issues. Our readers will appreciate the importance to inquirers of furnishing the desired information as promptly as possible.

Shoeing for Contracted Feet.

From Henry H. Beale, Maine.—Contraction is in itself no original disease. Except in a few cases it is mostly the effect of some disease. Contraction follows sprains of the tendons, corns, founder and navicular disease. When contraction is the result of a long standing disease of the foot or leg it will be in only one foot at a time. Because the horse will rest the affected leg the healthy foot receives more pressure than the diseased, is spread out more and the feet become uneven—they don't look like mates. This kind of contraction is generally the result of some chronic disease, but in most cases contraction is the result of shoeing and artificial living. Before the colt is shod his hoofs are large and open-heeled, the quarters are spread out wide and the foot on the under side is shaped like a saucer. The reason of the colt's foot

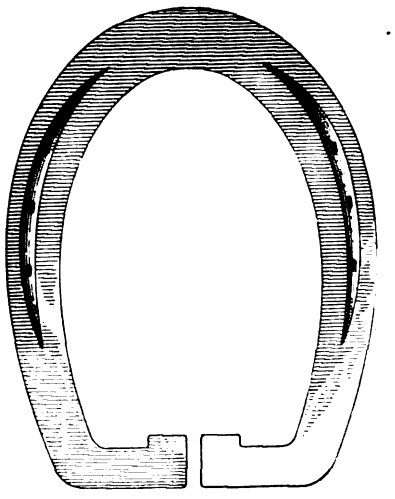


Fig. 1.

being so large is that he has been running on the green and moist turf, without shoes, and the feet have in walking in mud and dampness gathered so much moisture that they are growing and spreading at every step. This is changed when the colt is shod and put on hard roads, or taken from the pasture and put on hard floors, where the feet become hard and dried up. A strong high heeled flat foot is seldom afflicted with this trouble.

When contraction comes from bad shoeing

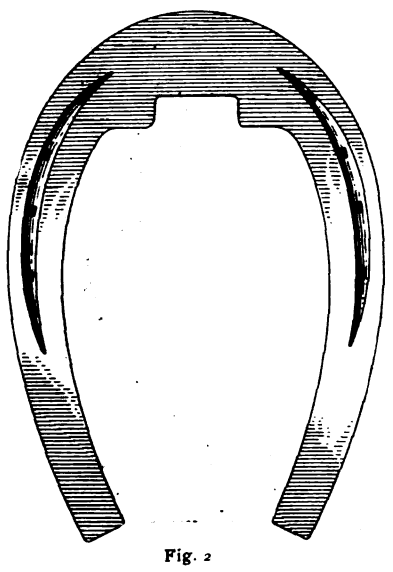


Fig. 2

or from standing on hard floors, pull the shoes off, pare down the foot as much as as you can, leaving the frog as large as it is. Rub in some hoof ointment once or twice a day at the coronet and quarters, and turn the horse out in a wet pasture. But if the horse must be used on the road, proceed to shoe as follows: First ascertain if the frog is hard or soft. If soft, put on a bar shoe with open bar. I have invented a shoe for this purpose. See Fig. 1. The idea of shoeing with an endless bar shoe is wrong. In most cases contraction is caused by letting the shoes stay on too long whereby the hoof has been compelled to grow down with the shape of the shoe. If an open shoe has helped to bring on contraction, much more so will a bar shoe which will tie the hoof to the shoe with no chance of spreading, no matter what the frog pressure is put on. Make the shoe as light as you can, with very low or no calks. Let the bar rest against the frog; keep the hoofs moist with hoof ointment; use an open bar shoe as in Fig. 2.

Make a low box and fill it with manure, mud or clay, and let the horse stand in it when convenient to soften the hoofs. Spread the shoe a little every week to help the hoofs out or the shoes will prevent what the frog pressure aims to do, but this spreading must

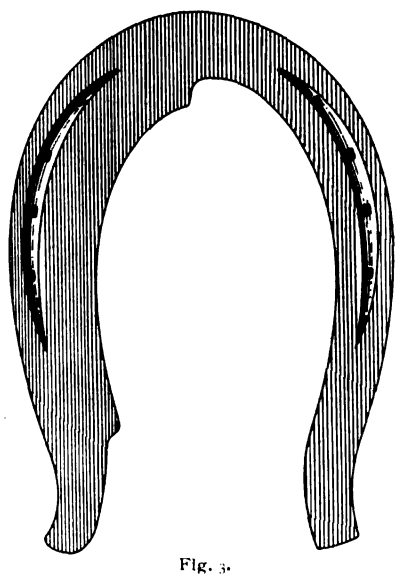


Fig. 3.

be done with care. If the frog is dried up and hard, don't put on a bar shoe as it will do more harm than good.

In such a case make a common shoe with low or no calks; make holes in it as far back as you can nail; spread them with care a little every week. Fig. 3. Let the horse stand in a box with mud or manure, even warm water, for a few hours at a time. Keep the hoofs moist with hoof ointment. In either case do not let the shoe stay on longer than four weeks at a time. In addition to the above, pack the feet with some wet packing or a sponge can be applied to the feet and held in position by some of the many inventions for this purpose.

No man can comprehend how much a horse suffers from contraction when his feet are hoof-bound and pressed together as if they were in a vise. The pain from a pair of hard and tight boots on a man are nothing compared to the agony endured by this noble and silent sufferer.

It must be remembered that there is no such thing as shoeing for contraction. Contraction is brought on by artificial living and shoeing. A bar shoe for contraction is the most foolish thing to imagine. The pressure intended on the frog is a dead pressure, and in a few days it will settle itself so that there is no pressure at all. If a bar shoe is to be used it must be an open shoe like Fig. 2. This shoe will give a little pressure, and if made of steel will spring up against the frog at every step and it can be spread.

I will say, however, that I don't recommend spreading, for it will part if not done with care. It is better to drive the shoe on with only four or five nails, and set them over often. Contraction never affects the hind feet because of the moisture they receive. This should suggest to every shoer that moisture is better than shoes.

Economy in the Shop.

From H. N. Albeck, Iowa.—There are a good many ways in a general shop where a smith can economize and save time if he has a system. For instance, where he cuts up a bar of round or square iron and has a short piece left (most smiths throw it in the scrap pile), let him have a rack and place the pieces on it and he can always find them and save time instead of getting a new bar down and cutting off a piece. When the rack gets crowded and he has a spare hour he can take the lighter pieces, say from 5-16 to 9-16 inch, and bend them up for chain links, placing them in a box, and when a man brings in a chain on a busy day, he can put a link in and not lose much time, and satisfy the customer. The larger sizes he can make grab hooks out of and get well paid for his time, while if he has to use new bars to make them out of, it would be cheaper to buy the hooks ready made. Now economy can be overdone. I have seen smiths take an old wagon tire and work it in on a job and they would put in more time cutting it and strengthening it than the new iron is worth, and when the job was done they could not charge full price on account of using old iron. Now, if the flat pieces are also placed on a rack, it will surprise you how little waste there is at the end of the year, if you have it where you know where it is, and not all mixed up in a scrap pile where it takes more time to find it than it is worth. If a smith has a power saw and planer in the woodshop he can use up nearly everything if he has a system, the same as with the iron. While if he hasn't power, he had better buy everything as nearly finished as possible, as time is worth more than the finished article, if he has to do the work by hand.

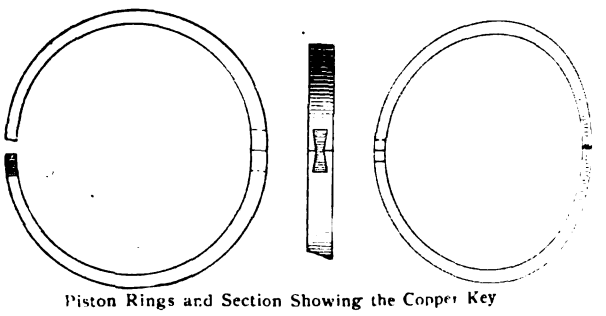
Brazing Band Saws.

From F. R. Tomlinson, Kansas.—In relation to brazing band saws. I have a machine that I made myself, a point I got, I think, from one of your readers. I have seen a number of ways illustrated, but mine beats them all on a saw up to ½, which is the largest I ever used. I file the saw, taking it back about one tooth, using two wood blocks about 4 inches square and 10 inches long, hard wood. I take a few brads and brad the saw to the blocks, driving the nails at the sides of the saw, being sure to get it straight both ways. To do this you must have the blocks on your table or on another smooth block. I have a double jet gasoline torch and a brazing spelter and powdered borax, mixing the two so as to make a good fuse when heated, until the spelter melts. This is the only way I ever saw a band saw brazed.

I have been at the trade for six years and live about 300 feet from my shop. I have a 3 horse power engine, emery stand, drill, band saw, circle saw, disk sharpener and grindstone.

Piston Ring Repair.

From "Igno Ramus," Washington.—I am going to tell how I made a repair to a piston ring when I was unable to get a new one. The ring was broken in the middle. I took a hack saw and made a small dovetail slot in each of the broken halves, then took a small piece of copper and filed it out, fitting the slots, then tightly clinching over, the slots being slightly countersunk at the edges for the purpose. In fitting the copper key, the



Piston Rings and Section Showing the Copper Key

ring halves will spring one way or the other and the broken edges will have to be eased off a little with a fine file so as to throw the halves out, otherwise, if the halves spring in, you will break the dovetailing out in putting the ring on the piston. My sketches will show what I mean. The ring I repaired had ample spring outwards against the cylinder walls to be tight. At least the engine ran as well as ever, until a new ring could come from the factory.

Tempering Axes and Picks.

From J. C. Concord, Colorado.—I will give you my way of tempering axes and picks: To temper an axe, heat it all over to a cherry red, cool off the bit up to the eye, scour off bright with sandstone, and then open the fire out so as to have a good hot bed of coals. Place the axe on the bed so that the bit will be out of the fire, so as to have the heat come from the poll down to the bit. Draw the temper to what is commonly

called pigeon blue. If the steel has not been overheated, your axe will stand good wear.

My method of tempering picks and stone tools for ordinary work is as follows: I heat the tool to a cherry red, cool off an inch and a half upon the tool, scour the steel, let the temper run down, then take a hammer handle and run over the sharp edge until shavings burn in a bright spark. I then cool off. Soft water should always be used.

The following is the way in which I temper picks and stone tools for ordinary work, as in limestone, etc.; I heat the tool to a cherry red, cool off one and a half inches upon the pick, scour the steel, let the temper run down, then take hammer handle and run over the sharp edge until shavings burn in a bright spark, then cool off. Always use soft water.

Drop Forging.

From R. W. Wood, Illinois.—In your April number Brother Peter of Ohio asks information in regard to drop forging of a special blacksmith tongs. I may say that the ordinary power hammer cannot be successfully used for drop forging. It will be necessary to use a steam drop hammer or a board drop hammer, as every blow must be under control of the smith and of course dies have to be used. The jaw of the tong is first made. The rein or handle is afterwards drawn out with the second heat. A power hammer can be used for the later operation, using the large dies.

Using Broken Drills.

From W. Morgan, Connecticut.—Some time ago a brother smith wanted to know how to use broken twist drills. I use a drill holder, but sometimes the drill is too short to use in the holder, and I then take a piece of Norway iron, fit it to the drill spindle, then drill a hole in the end a very little smaller than the broken drill and heat it a cherry red. I then insert the drill and cool quickly. I have one mended in this way, which I have used for two years.

To Cut Stud Bolts.

From John A. Sanders, Montana.—A handy arrangement to cut stud bolts is to thread one end first, then cut off the length required and take a nut the same size as the bolts which has one side sawed out with a hack saw; screw in the threaded end of the bolt and set in a vise. This will hold firmly to thread the other end.

QUESTIONS FOR OUR READERS

You are invited to ask questions freely on all points pertaining to your work. Our subscribers who have solved successfully the problems which confront you will take pleasure in imparting the results of their experience for the benefit of their fellow-craftsmen.

Who Can Tell Him?

From R. F. Tomlinson, Kansas.—I have been thinking of putting in a tank and air compressor to blow my fire. I want to ask if such an outfit would be practical and how large a tank would be required, say for running the compressor for ten minutes, for two or three hours work with one forge fire. How large a pipe would be required to carry air at 150 pounds pressure? Also, I would like to run a washing machine at my house, if such would be practical. Is there a small compressed air engine made of about ½ horse power? About what would it cost?

I would also like a receipt for a compound to put in the water to fill up a cracked water jacket.

Acid for Use In Babbitt.

From J. H. D., Oklahoma.—I would like to know what kind of acid is used in babbitt or paint to keep it from burning. I have seen it used in babbitt in making gaskets or fillers and it would not burn the wood.

Brazing Spelter Wanted.

A Reader, Nebraska.—I would like to ask the trade for a satisfactory brazing receipt for brazing castings, such as engine cylinders and other castings of like nature. I would be glad to know the proper spelter and how to mix it.

Time for Cutting Timber.

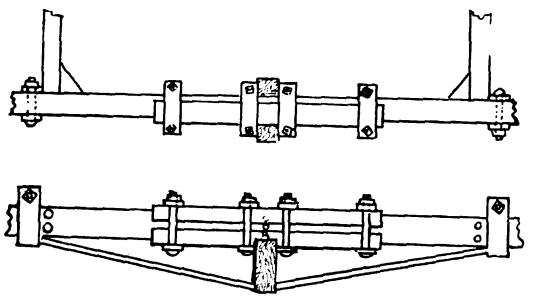
From Joseph Byczek, Colorado.—When is the right time or season to cut white oak timber in order to get the best lumber and to keep it from checking, warping and becoming wormy? Also what is the best season to cut red oak or hickory to secure the best results also?

AN EMERGENCY REPAIR.

How a Broken Automobile Frame Was Temporarily Patched Up.

A broken automobile frame is unusual, fortunately. Yet once in a while a frame will break, and a car with a fracture of this kind is about as helpless as it is possible for a machine to be. Frames have been broken and mended, however, at least temporarily, with no better facilities than are offered by a small blacksmith shop, says Motor World, and the accompanying illustration shows how one such repair job was repaired. A jack was put under the cross-frame a few inches inside of the point where the crack occurred, and pressure was applied until the frame was brought straight and the crack closed up. No channel iron was available for splicing, so two pieces of heavy angle iron were cut, each about eighteen inches long, and clipped to the frame, at top and bottom, by means of four clips similar to those used in securing springs to axles. The bolts were pulled down as tightly as possible.

The engine in the car in question was carried



The Repaired Frame.

on two cross frames, one in front and one in the rear at the flywheel end. The frame cracked at the point where the rear motor frame was riveted to the main frame member; the rivets were a little too big, the drilling weakening the frame unnecessarily and finally causing its fracture. The crack was discovered before it had gone quite through; there was about an inch of the web of the channel intact, and the upper flange, of course, was all right, but the lower end of the crack, which went through the lower flange, was nearly an eighth of an inch wide. In fitting the angle irons it was necessary to "let in" the heads of the rivets which protruded from the frame. As drilling would have weakened the angles, they were heated and depressions punched into them with a round-ended tool, bulging the metal at the places where the rivets came. This was rather a "mean" job, but it was done, and the irons settled flat and close in place. Oak blocks were placed in the channels to prevent the crushing of the flanges by the clips, and were made a very tight fit. When the bolts were pulled down the slight bending of the flanges gripped the wood still tighter.

The next step was to make a truss of flat iron, 1¼ inches wide and 3/16 inch thick. The ends were welded to the centers of two short pieces of bar iron somewhat heavier than the truss piece, so that each end formed a T. The ends of the cross-pieces were bent up in U-shape to clasp the main frame, as the illustration shows, and holes were drilled in the tops for bolts. As in the case of the angle-iron fish-plates, oak blocks were inserted to prevent the crushing of the frame by the pressure of the bolts.

The truss was made of such length that the U-shaped end fittings came one just ahead of the front cross-frame supporting the motor, and the other just behind another cross-frame toward the rear. The crack was not midway between these two points; in fact, there was considerable difference in the distance from the crack to the front and to the rear points of truss attachment; but this made no difference in the job, so far as its successful holding up was concerned. Of course, the truss was given a drop just under the crack, the space left between the frame and the truss at the widest point being not very far from four inches.

A "pedestal" was made of a heavy oak block notched to fit the truss and the under side of the frame, and when put in place was held from slipping by the two middle clips. The pedestal was made such a tight fit that it sprung the frame upward slightly; but, as it happened, this was not quite enough, for the various rough joints developed considerable play, and before they finally settled down solidly, after a dozen miles on the road, there was a slight sag in the frame. However, the job held long enough to permit the car to be driven some sixty miles over the roads that were only fairly good. Without great difficulty a threaded iron pedestal could have been made, thus making it possible to follow up the "give" and keep the frame straight. In case a long run had to be made with a repaired frame doubtless the adjustable pedestal would be well worth while; at least it would be more permanent.

Legal Department

All legal questions answered free of charge. Address Communications to Editor "Legal Department," THE BLACKSMITH AND WHEELWRIGHT, P. O. Box 654, New York City.

Of Uncertain Meaning.

Question.—Can a telephone company that has never paid taxes or received a charter from the State of Missouri, sue its members to get money to pay for or keep up an exchange the minority of the shareholders get no good of, and never use and have refused to pay exchange as they never use it and never get any dividends and never agreed to pay, but through false representation of the majority did pay a while; and can a majority force its will on the minority of the shareholders in said company?

In this case the original line was built out ten miles in the country and then some people farther out wanted shares and put in a switchboard and extended the line ten miles further out and the shareholders on the inside end don't use the middle switchboard and don't wish to pay an operator for something that don't pay dividends and they get no good from.—S. G. H.

Answer.—I must confess that I am in grave doubts as to the import of the above question. If the questioner wishes to know whether the telephone company can sue its stockholders for any unpaid balance on the stock which he owns, I would say that undoubtedly they could sue him and collect the amount of his unpaid subscription; or in case the stock is assessable, that the company could assess him on his stock and sue him for the amount of his assessment. If the stock, on the other hand, is fully paid for and non-assessable, the telephone company surely cannot sue its individual stockholders for the cost of installing an exchange. It seems to me that the questioner is not fully informed as to his exact position and I suspect that further inquiry into the matter would show that the company is legally incorporated and existing. If the questioner will further inform himself as to the exact facts in this matter and will send a further question to this paper I will be glad to give him a more definite and certain answer.

An Active Race.

The Jewish race, as everybody knows, is increasing in wealth and numbers in New York City; but the facts have rarely been so graphically presented as in an article in "McClure's." This states that Jews are the greatest owners of real estate in New York, after the hereditary proprietors like the Astors; that they control the clothing business, the theatres, most of the department stores, many great banking houses, and some branches of the city government; that the school teachers are largely Jewish, the police force is becoming Jewish, and that most of the prize-fighters are Jews with Irish names.

In wider business activities, the writer in "McClure's" asserts, the Jews are extremely influential in the railways of the country; they control the whisky business, eighty per cent. of the members of the National Liquor Dealers' Association being Jews; they make eighty-five per cent. of the cigars, leaving the great American Tobacco Company only fifteen per cent.; while 90,000,000 Americans look to them for their amusements.

Thousands of people, according to an authority, grow up with weak eyes solely because they spent their infancy in white surroundings.

POWER

In this department an expert will reply to any questions our readers may propound as the result of their experience, or inspired by a desire to become acquainted with the value of power in the shop. All inquiries should be addressed to the Editor of THE BLACKSMITH AND WHEELWRIGHT, P. O. Box 654, New York City

ENGINE TROUBLES.

How to Avoid Them and How to Remedy Those Not Avoided.

From A. J. Brennan, Jr., in "The Gas Engine."

—Internal combustion motors have during the past few years been developed to a wonderful degree, yet with all the care and attention that has entered into their design and construction many of their old time faults are still apparent when fostered by neglect. In other words, if the modern motors received a reasonable amount of care and attention the often prevailing drawbacks would become for the most part a thing of the past and uniform operation would take their place. Sometimes we hear the remark that steam engines are superior to these prime movers under discussion. To a certain extent this is true; but the fact should not be lost sight of that a steam engine's operation is practically dependent upon one consideration, viz: the expansion of steam, while on the other hand a gas engine may be said to be partly mechanical, partly chemical, partly electrical and partly functional, each function being directly and indirectly dependent upon each or all of the other functions. From this the fact naturally suggests itself that in order to realize efficiency for this form of self-contained power producer, that a thorough understanding of its fundamental principles as well as of the care and adjustment of its several parts must be understood in a practical, applicable manner, and the only way to acquire this knowledge is in a practical way, but it must not be supposed for an instant that if you are not already conversant with gas engines that you will be called upon to make a lot of mistakes to begin with and then profit by them later on. A better way is not to make them and thus gain an advantage to start with, for some of the blunders made by operators not thoroughly familiar with motors are for the most part quite unnecessary. Of course mistakes will happen. In fact we all make mistakes at times; but the point is if a few painstaking suggestions of experienced engineers were thoughtfully considered by those less conversant with this type of engine, the benefits derived would be very considerable. It is not to be conceded from this that a set of hard and fast rules are to be committed to memory, quite the contrary, but a working sense of the "why" and "how" of an explosive motor should be acquired.

Motors of the present day are as formerly, more or less complicated; but in some respects gas engines resemble steam engines inasmuch as several of their features do not require any attention or adjustment. And so considering this fact the remaining parts should not give very much trouble. In order to become thoroughly conversant with a motor it is advisable and in most cases necessary to become thoroughly familiar with the indications or symptoms of the several troubles, for if this is done this difficulty will be experienced in tracing a trouble and applying an immediate remedy, even if it is in the nature of a most elusive short circuit. A large majority of motor troubles are indicated by no other symptoms than sounds of various kinds, therefore an operator should familiarize himself with the several sounds that are peculiar to the engine in his charge. All motors generate several sounds while in operation, although these sounds are not necessarily apparent until listened for, but then they can be divided into several classes, such as the roar of the gears, click of valve stems, rattle of automatic valves. These sounds might be said to be a component part of the gas engine and when these sounds are recognized they should never be taken as an indication of trouble.

Some motors are especially noisy when operating under a very light load or altogether disengaged from the load; but if the motor settles down and operates in a regular manner when the load is applied these former noises do not indicate any parts at fault.

In order to become perfectly conversant with this all important phase of engine operation it is necessary to spend more or less time in close proximity to the motor, for otherwise the lesser sounds would be drowned out by the louder noises, and only a few would be heard.

Sounds are of a varied character but may be grouped as follows:

1. Knocking (a) mechanical (b) functional.
2. Pounding (a) mechanical (b) functional.
3. Squeaking and rubbing.
4. Hissing sounds. (a) interior (b) exterior.

Knocking varies to a considerable extent, but in most instances it resembles a tapping sound and usually takes place within the cylinder. When produced by a mechanical defect it can in most cases be attributed to one of the following:

1. Crank pin or piston pin bearings of the connecting rod, worn or loose.
2. Lateral play of piston rings.
3. Badly worn piston or cylinder.
4. The piston head striking shoulder in cylinder wall due to excessive wear and play in bearings.
5. Main bearings loose or worn.
6. Loose fly wheel.

Knocking attributable to a functional origin may be due to:

1. Incandescent carbon deposits brought about by using too much good oil or by employing a poor oil. Or in some cases to continued operation on an excessively rich mixture.
2. Spark too far advanced.

In either of these cases, ignition of the compressed gas takes place too early, which is commonly referred to as pre-ignition, which causes undue stress on the several bearings of the motor and if allowed to continue will induce detrimental results of a serious nature.

Pounding is very similar to knocking and can be said to be an advanced form of knocking. In other words if a knock is remedied a probable pound will be prevented, except in some cases when a bearing or fly wheel suddenly becomes loose.

Squeaking sounds are invariably attributable to inefficient lubrication.

Induced wear is nearly always brought about by poor lubrication, which will eventually lead to slack parts producing a knock, and if the trouble is allowed to continue pounding will follow in most cases.

In regard to lubrication, all parts should be supplied with a constant film of some non-friction element irrespective of the speed at which they operate or the amount of weight they support. It is not to be conceded from this that an equal amount of oil is to be supplied these several bearings, but at the same time they should all receive constant attention, for in order that a gas engine mantain high efficiency, its actuating devices must be in good repair and adjustment as well as its main features and in consequence attention should be paid to details. All oils are not adapted to given mechanism, that is a medium duty gas engine might require a certain oil for the cylinder lubrication that would prove quite inadequate for a high speed motor.

There is little use in giving a set of formulas for testing the different properties of an oil such as flash point, etc., for when it comes down to bed rock they prove of little value.

If an operator will obtain the best grades of cylinder oils possible that are recognized as being perfectly adapted to the motor he is operating, there will be little likelihood of him making any serious mistakes.

An oil to be thoroughly adapted to lubricate the bearing surfaces of the piston and cylinder of an internal combustion motor must possess certain properties—suitable flash point and viscosity. Flash point has to do with the temperature an oil can be subjected to before the vapors it gives off will ignite.

The fire point of an oil has to do with the temperature an oil will withstand before the oil itself will ignite and burn.

Thus taking into consideration the fact that the high temperatures induced by the intermittent explosions have a decided tendency to destroy the nature of the oil and thus impair its function, it naturally follows that only certain oils or those of a mineral origin are adapted for this purpose.

Oils of vegetable and animal origin are, however, thoroughly adapted to various forms of lubrication that is not exposed to excessive heat.

All oils of a high flash point are not adapted to gas engine cylinder lubrication, thin oils are in most cases to be recommended for use in conjunction with light high speed motors, while on the other hand oils of more body should be employed on heavy duty machines. However an oil no matter how thick the body may appear is not necessarily a good lubricant unless the viscosity is of a high order. Viscosity has to do with two properties that are contained in an oil—cohesion and adhesion. Cohesion has to do with the power that exists within an oil to hold the many particles of which it is formed together. Thus if an oil is very cohesive, although it may possess a thin body still it will be better adapted to lubricate under heavy loads than an oil of a thicker body yet possessing a lower cohesive quality. The second property, adhesion, has to do with the oil's tendency to remain on a bearing, that is adhere to the moving parts without a marked tendency to spread.

In regard to the bearings and other parts where oil is not used, suitable hard grease, non-fluid oils or graphite paste should be employed. This holds especially true in enclosed gearing, etc.

It is a common practice to place ordinary hard grease in timers. This is a poor policy, for the grease is not of the right consistency. Petroleum jelly (vaseline) is far better for this purpose and a small bottle will last almost indefinitely.

This same point holds true in regard to magneto and small dynamo operation, the bearings of these machines should be supplied with small quantities of the best machine oil obtainable, which should be of a thin body, but suitable cohesive and adhesive properties.

All bearings should be kept well supplied with oils or grease. In regard to the cylinder lubrication, the amount that should be supplied each cylinder depends upon the piston travel. For instance, take two motors of the same bore and stroke: one operates at 500 r.p.m. and the other at 1000 r.p.m. Well, if they are fitted with gravity feed oilers an allowance will have to be made for this discrepancy. But if the motors are fitted with mechanical oilers whose supply is governed by the speed of the motor, the engine will in consequence receive a suitable amount of oil at all speeds. The same holds true in regard to the splash feed system of oiling.

Since there can be no stated rules laid down for the correct amount of oil to allow a gas engine cylinder, still any amount of oil that does not induce smoking at the exhaust will not be too much. However, if smoking takes place it is a sign of too much good oil or an approximate amount of poor oil.

In regard to engine troubles they are either in order when an attempt to start is made or else during operation, and so the troubles peculiar to a non-start will be considered first.

FAULTY IGNITION.

1. Open circuit, switch not in position.
2. Loose or broken wires.
3. Broken down insulation on wires.
4. Dirty or damaged spark plugs.
5. Dirty or damaged igniters. (Low tension.)
6. Igniters out of time or hung up.
7. Weak battery.
8. Defective spark coil.
9. Faulty contacts at timer.
10. Timer ground impaired.
11. Poor adjustment of coil tremblers.
12. Contact points on coils dirty or pitted.
13. Timer slipped on shaft.
14. Broken wire inside insulation.

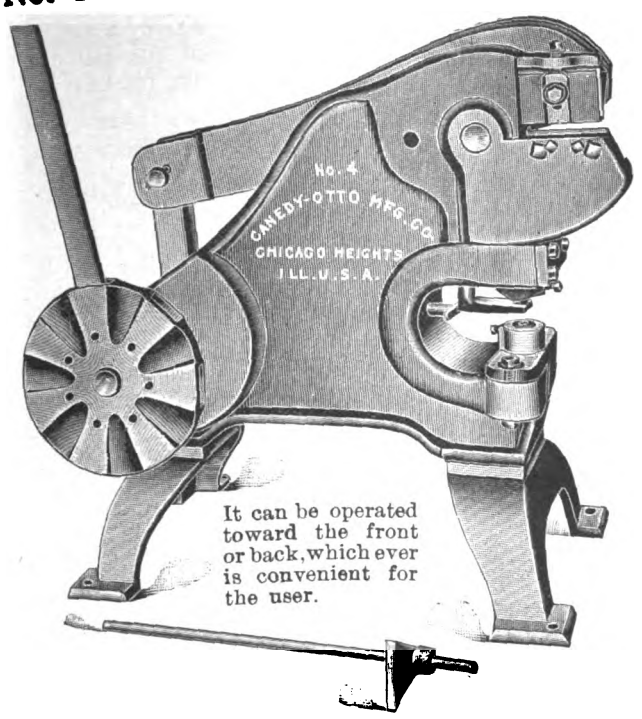
CARBURETOR AND FUEL.

1. Gasoline supply turned off.
2. Tank air locked.
3. Gasoline pipe clogged.
4. Carburetor not primed.
5. Gasoline too low or too cold to vaporize.
6. Dirt in needle valve.
7. Air intake stopped up.
8. Water in carburetor.
9. Float punctured (metal) fuel soaked (cork).
10. Bent float guide.
11. Carburetor out of adjustment.

However the motor may fail to start through some trouble evidently due to the carburetor, yet in point of fact the trouble is not due to any deficiency in this department, but to one of the controlling features which indirectly comes under the head of mechanical features which indirectly control the functional features. For instance, suppose the compression in engine is low when the vacuum pulling power of the cylinder would also be low and in consequence although the gasoline or other fuel supply might be sufficient and the carburetor in perfect adjustment, still the effect of good carburetion would be lost.

Hence any trouble that militates against good compression also militates against efficient carburetion. Therefore in order that the function

No. 4 Combination Punch and Shear



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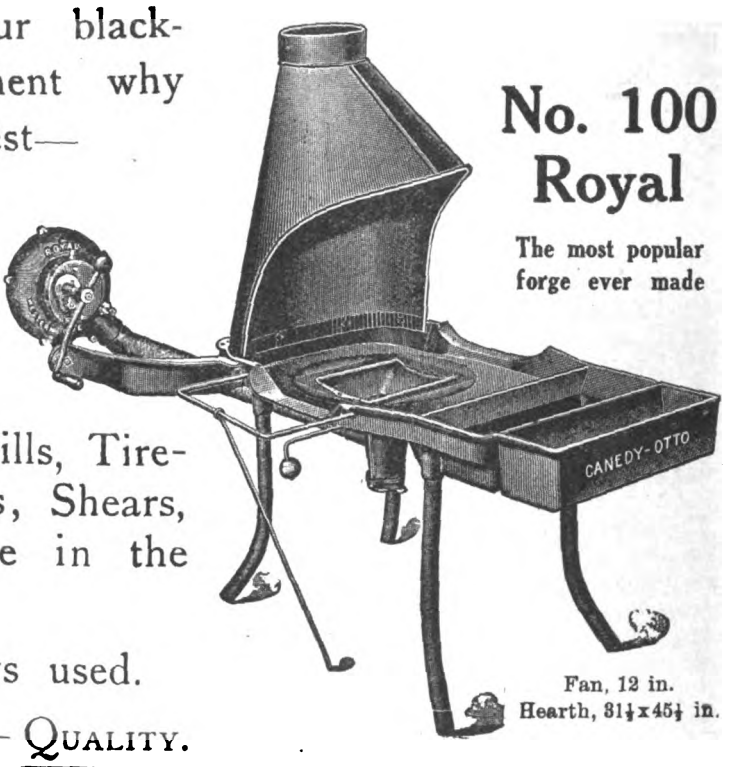

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Hearth, 31½x45½ in.

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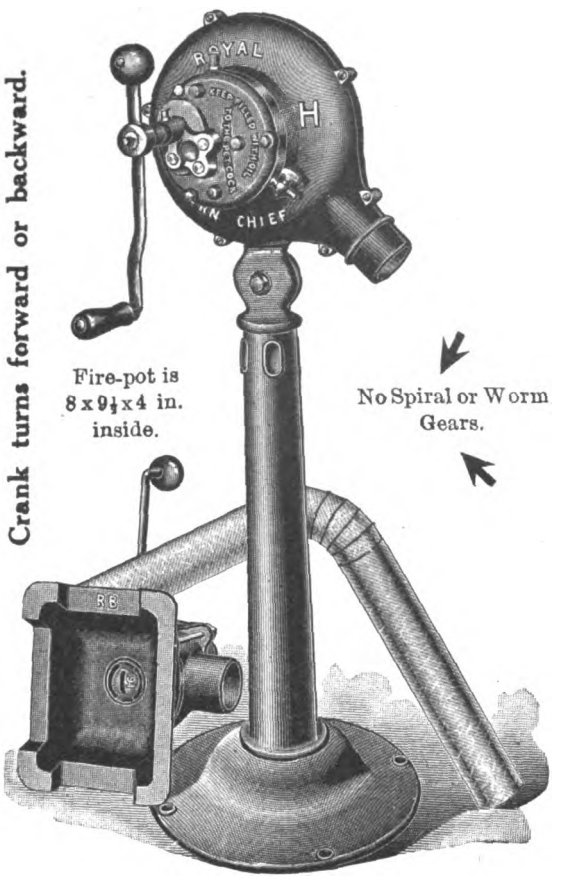
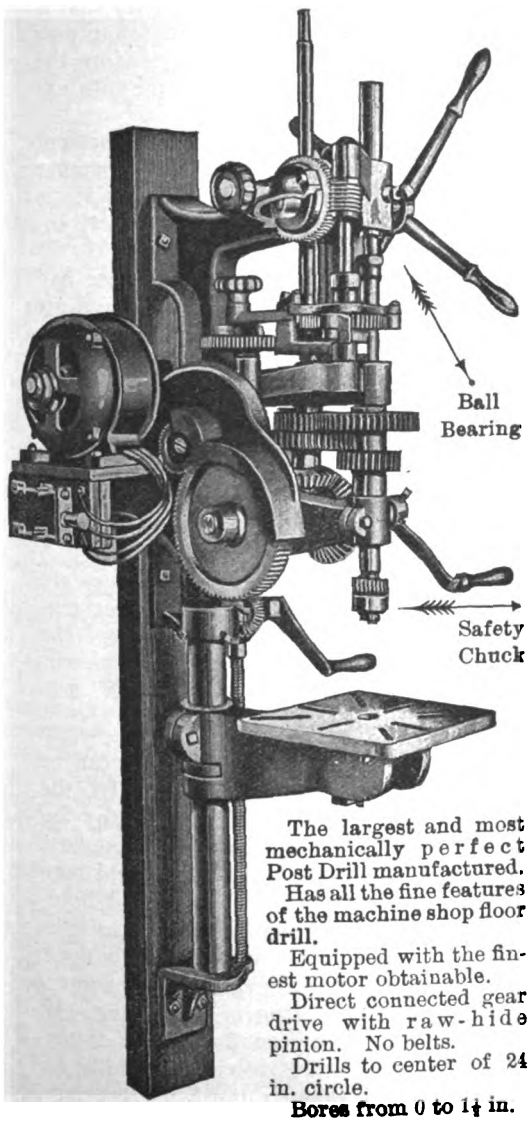


FORGES BLOWERS

PUNCHES SHEARS

No. 16 Electric Drill



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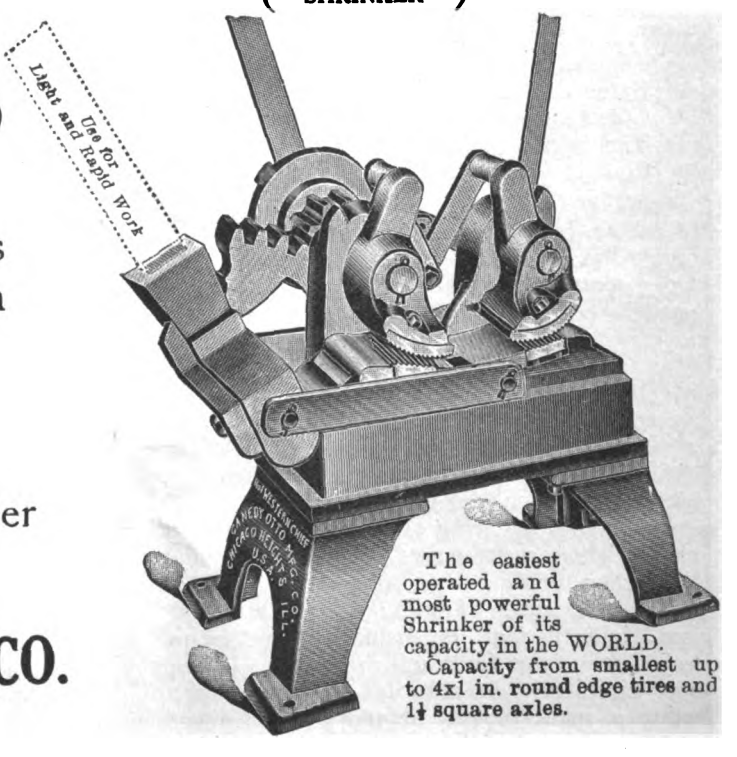

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of a carburetor be fully realized the mechanical features will have to be in order.

Any one or more of the following will interfere with high compression:

1. Cylinders dry, worn or scarred.
2. Piston rings worn or stuck in their grooves.
3. Piston rings cuts in line.
4. Faulty inlet valves.
5. Inlet valves stuck (automatic).
6. Inlet valve spring too strong (automatic).
7. Pitted or damaged exhaust valves.
8. Exhaust valves out of time.
9. Faulty gaskets.
10. Loose spark plugs, igniters, etc.
11. Open compression relief.

To test the compression of an engine it is merely necessary to crank the motor over against compression and if considerable resistance is encountered which is not in the form of steady bind it is fair to assume that the compression is O. K.

The indications of faulty mixtures are very dissimilar, a weak mixture invariably producing back-firing in base of a two cycle motor or carburetor, or in intake manifold or carburetor on four cycle motors. On the other hand rich mixtures will cause sluggish operation or stopping.

Suppose we consider the several steps that are best followed when attempting to start a multi-cylinder engine fitted with jump spark vibrating coils that does not at once pick up its cycle. But first we will consider the best order to follow out the several preliminaries previous to starting:

1. Look engine over for any loose parts.
2. See that there is sufficient fuel or oil on hand.
3. That battery has sufficient reserve.
4. That all lubricators are filled and working properly.
5. Prime motor if it has been standing over night.
6. Open gasoline valves.
7. Open throttle half way.
8. Retard ignition.
9. Place switch in position.
10. Crank motor.

After cranking the motor over two or three times suppose the priming charges are ignited, one or two series of good explosions take place but then the motor stops accompanied by back firing, this would indicate that the ignition and mechanical features of the motor are in order; but that the engine is not getting enough gasoline and means should be taken to correct this fault. By increasing the amount allowed at needle valve or by decreasing the air or the auxiliary air. Perhaps the carburetor is in good adjustment but the gasoline supply is partly choked. To find this out depress float and flood float chamber or disconnect pipe at carburetor and see if the pressure of the flow is sufficient. If you try to adjust the matter by opening the needle valve two or three turns and still the motor ignites the priming charges and the back fires you may be positive that the fuel supply is exhausted or else is stopping up. But on the other hand suppose that after the steps already suggested were followed out the motor failed to start, perhaps caused by poor ignition. The first thing to do is to test the ignition by turning the engine over by hand, spark retard and switch in place and observe whether the coils buzz or not. If you find that each section of the coil buzzes, the existing trouble if peculiar to the ignition cannot be in any of the following:

1. Batteries or connections.
2. Connections or wires of the primary circuit.
3. Timer points or its connections.
4. Contact points on coils.
5. Primary windings of the coil.

And so from this it will be seen that the trouble has been reduced to the secondary wiring or spark plugs. The spark plugs should be tested by disconnecting the secondary wires, removing spark plugs from cylinders, rewiring as before and resting the threaded portion of plugs on cylinder. Care should be taken not to allow the secondary wire or top of spark plug to touch or nearly touch any part of motor, for this is liable to short circuit the current. Then place switch in position and crank motor over to the several points of firing and observe if a spark appears between the points of plug, if no spark is in order throw switch off and substitute another spark plug. If still no spark appears it would indicate that the insulation on the high tension wire is at fault and the current is being short circuited. In regard to this method of testing a spark plug it should be remembered that a good spark will sometimes be in evidence under the natural conditions surrounding the spark plug when exposed but when the plug is replaced in cylinder and is called upon to induce an electric arc under high pressure the function of the plug may be impeded, resulting in a weak spark or lost altogether. This point holds particularly true in regard to spark plugs with cracked porcelains, which may be so slight that a good spark will be in order between the points when the plug is exposed, but when the high pressures of the cylinder are encountered, the current will be induced to take the path of least resistance and consequently will leak through the defective housing of the plug and ground.

On the other hand suppose when you turned your engine over you did not get a buzz from any of the units this would show that any one of the following might be to blame:

1. Weak or run out batteries.
2. Disconnected primary wire.
3. Timer contact points stuck.
4. Internal defect in coil.
5. Vibrator contact points stuck.
6. Vibrator contact points out of adjustment.
7. Open battery switch, loose wire in switch.

But if some of the units prove in order, the rest being inactive, it would indicate one of the following being the cause of the trouble:

1. Contact points of inactive section at fault.
2. Trouble at timer.
3. Wire connecting timer with faulty unit.
4. Internal defects.

In the last case the trouble was narrowed down to the above through the fact that if the trouble could be attributed to any primary defect, why then all the units would prove defective.

Jump spark coils of this type require more or less attention. The contact points are liable to become pitted, which not only militates against efficient operation but induces additional demands to be made upon the battery. The correct adjustment of a coil is very important, especially when a battery is called upon to supply the necessary potential for continued operation.

Since the chemical disintegration of a battery is considerably more than the mechanical depreciation of a magneto or dynamo, it naturally follows that there are two important considerations to bear in mind when regulating vibrating coils: (1) High operating efficiency. (2) Least consumption of battery current. This second consideration does not hold true when operating from the electricity derived from a mechanical generator, for they develop a certain power which might just as well be used up. In order to realize high efficiency from the ignition, its several component parts must be in order and good repair, the battery having ample reserve to supply the necessary current without damaging effect, and last but not least the mechanical and functional features must be in order.

It is not feasible to adjust a coil for the final regulation of the tremblers until the motor is in operation, however an approximate setting will be necessary to supply a spark for starting, which is obtained by increasing the tension on the tremblers until a regular buzzing sound is heard, in most cases this adjustment will suffice to get the machine in operation when the final adjustment can be made by reducing the tension on the tremblers until skipping is in order resultant from a weak spark, the tension should then be increased until uniform firing is had and the lock nut secured. This applies to each unit of a system having several vibrators or to a master vibrator alone.

By carrying out the above suggestions the least battery energy will be expended consistent with steady operation.

Irregular firing is in many cases due to water in the carburetor, and bearing this point in mind it is advisable to open drain under carburetor, at least once a week.

However any one of the following will allow irregular firing:

1. Carburetor out of adjustment.
2. Float in carburetor sticking.
3. Fuel supply not constant.
4. Poor contacts at timer.
5. Dirty spark plugs.
6. Coils out of adjustment.
7. Loose wires.
8. Broken down insulation on wires.
9. Faulty compression.

If the skipping is peculiar to one or more cylinders but not all the cylinders, it is very probable that the trouble is due to loose wires or to dirty spark plugs of the cylinders causing trouble for the reason that if the skipping was due to the carburetor it would take place in all the cylinders.

Some motors operate in a regular way yet generate but little power. This is usually a sign of an over-rich mixture or inefficient lubrication or to any one or more of the following reasons:

1. Reduced lift on exhaust valve.
2. Muffler or exhaust stopped up.
3. Coils out of adjustment.
4. Springs too strong on automatic inlet valves.
5. Valve timing wrong.
6. Ignition out of time.

If a gasoline motor suddenly stops after operating in an efficient manner it is probably due to a loose or broken wire or other derangement of the ignition, such as the sticking of a master vibrator. On the other hand a gradual slowing down accompanied by back firing indicating a weak mixture will in most cases show a stoppage or exhaustion of the fuel supply, but of course there are exceptions to all rules and so this should not be taken as final in this respect, although gas engines are subject to different troubles still these troubles can be prevented in the majority of cases. Take the exhaust valves for instance. They open to allow the by-products of combustion an outlet from the cylinders and in consequence are subject to high temperatures which have a disintegrating effect that is in some instances quite marked and so "grinding in" has to be resorted to in order to maintain a gas tight seat, but instead of allowing months to go by until the compression is quite low a better way would be to grind the valves in at reasonable intervals and thus keep the efficiency of the motor constant.

The same thing applies to the igniter, spark plug and contact points. These should be looked to frequently and cleaned with fine sand paper, instead of letting them go and then resorting to filing after they become badly pitted.

All gas engine troubles have various symptoms, causes and remedies. Therefore as soon as the symptoms are known, the cause of trouble is also known and the best remedy suggests itself and so the first things for an operator to learn are the fundamental features of the motor together with the few simple rules for getting the motor in operation, etc., and when these are acquired, school himself in the various phases of the motor's operation, learning how the several speeds of the motor are best controlled by working spark or throttle or both as the case may be.

The various whims of the motor should not be overlooked, such as difficulty to start on cold damp days, the best ways to overcome this and other drawbacks.

Gasoline is not quite as good as it was a few years ago, but all considered the efficiency that is being derived from its use at present is quite as high if not higher than that realized before the several popular ways of heating it came into existence.

The majority of carburetors in use at present are so constructed that either the float chamber is heated or else hot air or auxiliary hot air is allowed the mixture or both, which greatly increases the value of the liquid as a fuel.

The primary adjustment on a carburetor had by an approximate setting of the needle and air valves should be followed by a thoughtful regulation of the auxiliary air if the highest operating efficiency is to be realized from a low consumption of gasoline.

When a carburetor adjustment is obtained that will enable the motor to operate regularly under a heavy load, this adjustment should be kept constant and any further changes made in the mixture by calling upon the auxiliary air.

Everything considered gas engine troubles are very simple and will not give cause for perplexing research if a general understanding of the why and how of an explosive motor is acquired.

Two Ways of Overhauling.

"There are two ways in which motors can be overhauled," says William H. Stewart, Jr., the New York authority. "The usual way for the average driver to do is to remove the cylinders, clean out the carbon, grind the valves and take up the wrist pin bearings, connecting rod bearings and main engine bearings if they need it.

"This taking up on the bearings is usually done by taking off the caps and removing one or more of the shims until the bearing is again snug. If there is a solid shim between the halves of the bearing this must be filed down sufficiently to allow the play to be taken out of the bearing. The other parts of the motor must be carefully

looked after and replacements made in a similar manner.

"The other way of overhauling a motor does not come under the duties required of the average driver, but rather of experienced and well trained mechanics. No novice should ever attempt to scrape inner bearings. To fit a bearing properly in a motor requires considerable experience. It is somewhat of an art. However, when once properly done the results obtained more than offset the initial expense incurred.

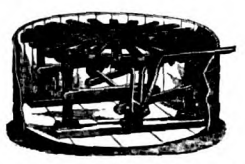
"In overhauling cases of this kind the whole power plant is removed from the chassis and stripped. The crank shaft is removed from the crank case. Before the bearings are fitted the shafts and similar parts are centered and trued up with machinery. After this is done each bearing from the crank shaft up is carefully scraped and fitted.

"It is not unusual for a first-class mechanic to spend a week or more fitting the main engine and connecting rod bearings. This will give the average automobilist an idea as to the care and painstaking necessary in this work and there is no fixed rule to advance which will properly direct an ordinary mechanic in the overhauling of the motor."

K. & W. Blow-out Tire Patch

Illustrated herewith is a blow-out tire patch manufactured by the K. & W. Mfg. Company, of Akron, Ohio. This patch is made under an enormous pressure, making it smooth and neat and squeezing the ends into feather-like soft "rubber" tips. It is said that it will stand much wear and strain. It is made from five to seven plies of very heavy fabric and is from ten to twelve inches long. It is well shaped and can be easily inserted. It cannot creep and will not bulge. See the advertisement of this company on another page and write for their new catalogue just issued. Dealers are requested to write for a proposition of special interest to them.

Bokop Tire Cooler.—For 29 years the Bokop Tire Cooler has stood the test on all classes of work. It is built with the indestructible wrought iron face plate. Over 2,000 of them are in use and the repairs on all these 2,000 have not exceeded $6.00 in the last 29 years. If your dealer does not have this Tire Cooler in stock, write direct to Bokop, Webb & Palm, Defiance, Ohio. This concern also makes auto truck setters.



Sample of Welding Compound Free.—N. D. Doxey, Elmira, N. Y., manufactures the Anchor Welding Compound which he says produces welds of great strength. He wants to send a trial package to every reader of The Blacksmith and Wheelwright. All you have to do is to drop him a postal card or a letter, mentioning this paper, and you will get the sample by return mail. Try it; you might like it. It is said to be good for both big and little jobs.

Champion Horse Shoes.—Our readers who have not yet tested the shoes made by the Champion Horse Shoe Co., of Pawtucket, R. I., are invited to send at once for a sample which will be forwarded free of charge. This company wants to place a sample shoe in the hands of every reader of this paper who shoes horses. Write to them at once, mentioning The Blacksmith and Wheelwright, and you will get the shoe by return mail. And you will also get, they say, the best Horseshoe Pin ever given away by any manufacturer.

Buffalo Mill Exhausters.—We have received from the Buffalo Forge Company, of Buffalo, N. Y., their catalogue No. 256 describing the Buffalo Mill Exhausters with practical data of blow pipe systems. This catalogue is fully illustrated and comprises 60 odd pages, giving full details of the exhaust appliances manufactured by this company.

Kerosene Is Useful.

Kerosene is of great value as a softener of rust—but in four cases out of five it is not given sufficient time to do this work. Kerosene splashed on and immediately rubbed off will do practically no good; it must be given time to penetrate, the longer the better. Several hours at least ought to be allowed, and if the rust is heavy, all day or night, or both, will be found necessary to give the oil an opportunity to do what it is capable of doing. The same principle applies, of course, in cases where kerosene is applied to a nut rusted on a bolt or stud, only in this case the oil has to penetrate between the metal faces in addition to permeating the film of rust.

Purifying Blacksmith's Coal.

Complaints in the smith shop about coals emitting a sulphurous smell are common. In heating iron to a welding heat, or hot enough to be in a state of fusion, the heated portion drops off under the hammer, as if it were burned, and it is difficult to make a weld. All mineral coals, whether bituminous or anthracite, are charged to a greater or less extent with sulphur; sometimes just enough to be perceptible, and at other times with sufficient to produce just such action as is complained of.

Common salt has the effect of dissipating sulphur; calcined lime or lime water sprinkled on the coal before using will also have a fair effect, but the best method to employ is as follows: Take black oxide of manganese, five pounds; sulphuric acid, pure, 2½ pounds; mix and let partly dry by action of the atmosphere; then use two ounces of the mixture in two quarts of water and dissolve by stirring. Use this amount to one-half or one bushel of coal before burning the coal. The forging gases will at once become dissipated, and the fire greatly improved.

Plans for a permanent water supply for the Pacific end of the Panama Canal have been made and approved. It is estimated that in order to provide for all needs a daily supply of 12,000,000 gallons is required, with provision for further extension when required.

Most people don't value advice very much because usually it is free. If, as it is the case with legal advice, they would have to pay for it, they would think more of it.

WANT ADVERTISEMENTS

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

will be inserted under this head at 2 cents a word, including the address for each insertion, payable in advance; but no advertisement will be accepted for less than 50 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.

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H. W. T. Jenner, patent attorney and mechanical expert, 608 F. St., 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.

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.

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.

PATENTS.

C. L. PARKER, attorney-at-law, and solicitor of patents. American and foreign patents secured promptly. Handbook for inventors sent free upon request. 926 G street, Washington, D. C.

BLACKSMITH.

Here is your opportunity to be an expert blacksmith without help. As life is short, get Toy's Modern Methods of doing hard jobs easy, forging and welding all kinds of steel solid. Also tempering all tools to a standard by colored charts. This is real plain information, not theory, all for $1.00. Send for free samples first. W. M. TOY, Sidney, Ohio.

MECHANICS.

Send for a circular describing "Mechanics' Companions," a tri-square, a centering square, a caliper, rule and protractor. Address J. O. HESS, Oran, Mo.

WANTED.

WANTED—Traveling men who visit the carriage, implement and livery trade make big commissions selling our steel and rubber tired wheels, poles and shafts as a side line. Why don't you try it? THE BOOB WHEEL CO., Cincinnati, Ohio.

CASH FOR YOUR BUSINESS OR REAL ESTATE.

I bring buyer and seller together. No. matter where located, if you want to buy or sell, address FRANK P. CLEVELAND, 975 Adams Express Building, Chicago, Ill.

PATENTS

PATENTS secured. Ideas bring wealth. Prompt service. Personal attention. HARRY PATTON CO., McGill Bldg., Washington, D. C.

Carriage painter wishes to hear from carriage or horseshoeing shop that has a paint shop. Good place, rent free. Address W. A. RIGGLEMAN, Jamestown, Ohio.

FOR SALE.

McGovern and West power tire shrinker, Moyer and Defiance hub boring machine. All as good as new at one-third the price of new ones. Address, 554 Freeman Avenue, Cincinnati, Ohio.

DON'T PURCHASE A TRIP HAMMER

Until you have asked for a price from the COLEMAN IRON WORKS, Elmira, N. Y., U. S. A.

WANTED.

To sell half interest in good paying blacksmith shop. Partner must be good general workman and first-class carriage smith and horseshoer and capable man, as I must devote my attention to other business. Address J. J. CLUIN, Las Cruces, New Mexico.

SALE OR TRADE.

Oxy-Acetylene welding machine, new, for sale or trade. Write BAGLEY BROS. Garage, Superior, Neb.

POWER USERS.

Gasoline Engine bargains from 1 to 100 H. P. Get our big list and state your power requirements before you buy. BADGER MOTOR CO., Milwaukee, Wis.

FOR SALE.

General blacksmith and wagon repair shop; new dwelling house and about an acre of land, located in a thriving German Catholic settlement in a good farming community of Central Wisconsin. Fine chance for the right man. For particulars address A. J. MARTIN LBR. CO., Bloomer, Wisconsin.

FOR SALE.

Up-to-date outfit, blacksmith wood work tools. Power, machinery and material, $2,000. Nice home, $1,500. Cheap rent. Plenty of work. Owner broken down. Address A. YOUNG, Stillwell, Oklahoma.

FOR SALE.

All kinds of used and rebuilt iron and woodworking machinery. Two complete shop outfits. Correct prices. One hundred milling cutters, half price. New jointers with extender arbors front and back for saws, cutter heads and boring, $70 up. Combinations $85 up. Felloe rounders, sanders, power hammers and the best hand shear made. BICKNELL MFG. CO., Janesville, Wis.

FOR SALE.

Profitable welding and brazing business. Running $300 to $400 a month. Write at once for particulars and price to FRED BROWN, 532 N. 58th St., Philadelphia, Pa.

FOR SALE.

Blacksmith shop, four lots and house, engine and stock; only shop in town. Address for particulars, J. BROWN, Box 24, Bridgeport, Wash.

FOR SALE.

Two-story concrete 40 by 80 blacksmith, wagon and automobile repair shop and large yard, stock, tools and machinery. Price, $18,000. Address J. C. FISHER, 356 Helen Ave., Detroit, Mich.

FOR SALE.

Blacksmith shop in live town. Fireproof construction. Suitable for garage or blacksmith. Located on well improved business street, next door to livery barn. Property adjacent rapidly advancing in value. Must sell on account of other business. Address CHARLES HAMILTON, Greene, Iowa.

FOR SALE.

Ten set artillery wheels, Severn patterns, 34 and 36 inches high; 1½ inch cushion tires, 10 set 1¼ square arched auto axles, 5 buggy type bodies. T. J. HOOVER, Genoa, Ill.

FOR SALE.

One of the best horseshoeing and blacksmith propositions in the Middle West at a price worth the money. Will sell shop and tools complete or will sell tools and stock and rent shop. For particulars, etc., address JOHN T. KELLEY, Reedsburg, Wis.

FOR SALE OR RENT.

Blacksmith and wagon shop, with all tools, gasoline engine, power saw, drill and emery stand. Work for two men. Also dwelling house; best location known. Sold on account of death of proprietor. Address MRS. GEORGE J. KLEIN, Randolph, O.

WANTED.

General blacksmith or woodworker that can do blacksmith repair work. Address F. O. MARTIN, Berlin Heights, O.

PURE OHIO MAPLE SYRUP FOR SALE.

Guaranteed strictly pure and first class. Put up in one gallon cans, $1.10 per gallon. Special price in larger quantities. Address J. M. OTTERBACHER & SON, Wellington, Ohio.

FOR SALE.

Wagon felloes $1.00 per set, turning lathe $20.00, 6 inch tire bender $5.00. Would exchange for engine, calking machine, concrete block machine or blower. Address E. E. SMITH, R. R. 1, Almo, Ky.

FOR SALE.

Blacksmith and wood shop. Lot 50 by 70. Building 20 by 30. Well stocked with tools and material. Four-roomed dwelling. Lot 100 by 140. Titles good. Plenty of work. Healthy country. Price $800. Railroad town of one thousand. Address for full particulars, G. W. TAYLOR, Calera, Okla.

WANTED.

General blacksmith and plowman. Address M. L. TOBIN, Huron, S. Dak.

FOR SALE.

Blacksmith shop 36 by 55. Reinforced concrete with tools and stock. Good town and prices right. $4,500. Address WALTER TOY, Winlock, Wash.

FOR SALE.

A first-class blacksmith and wagon repair shop in good farming country. Equipped with good power and all the machinery necessary. Also Brooks Cold Tire Setter. Address P. SWANSON, Harcourt, Iowa.

FOR SALE OR RENT CHEAP.

Stock, tools and shop. Best one-man blacksmith business in Wisconsin. Death reason for selling. Address G. STANGL, Trempealeau, Wisconsin.

FOR SALE.

Blacksmith and wagon-maker's shop, 2½ story building, 1 house, 8 rooms, 2 lots, 1 12 horse power gasoline engine, new, 1 No. 4 Brooks cold tire setter, punch and shear, rip saw, horse rack, turning lathe, 1 feed mill, good wood and iron stock and all kinds of tools. Price is right. I must sell on account of my sore back. Good farming country. Lots of work for two men. Address FRANK WACEK, Spruce, Wisconsin.

Hartford Famous Steel Side-Weight Shoes.—These are manufactured by the Side-Weight Horse Shoe Company, Hartford, Conn., and are for sale by jobbers and supply houses throughout the country. They come packed in wooden boxes, 10 pairs in a box; also in 100-lb. kegs, assorted if desired. If you want to know more about these shoes, write to the manufacturers as above for full particulars.

Ratchet Wrenches.—The blacksmith who has never invested in a ratchet wrench has something to learn about a tool which will save him perhaps a good many dollars. These wrenches are for sale by Geo. A. Cutter, Sales Agent, Taunton, Mass. They are made in three sizes and are guaranteed. They are for hex and square nuts. If your dealer does not keep them, he ought to and will get you one if you ask him to, or write to Mr. Cutter direct.

Wilcox Fine Finished Forged Carriage Hardware.—Our readers who may be in want of carriage hardware and gear iron should by all means write to The D. Wilcox Mfg. Company, Mechanicsburg, Pa., for catalog No. 11B, illustrating and describing a great variety of carriage irons. This company has achieved in the last quarter of a century a high reputation for all of its products.

"Pioneer" Shaft Ends.—These are made by Crandal, Stone & Company, Binghamton, N. Y., and have points of superiority in construction and finish. "Pioneer" Shaft Ends may be attached to a broken shaft quickly and easily and produce the strongest possible joint. These ends are for sale by dealers throughout the country. If your dealer does not have them, write direct to the manufacturers as above.

Marsh Horseshoe.—In this issue Suelflohn & Seefeld of Milwaukee, Wis., have an announcement with an illustration of the Beaver Dam Marsh Horseshoe. With these shoes a horse can go anywhere a man can on marshy, boggy or meadow land. It is made of malleable iron and is adjustable. Write for descriptive circular with prices.

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

AN ARTIST IN IRON.

He Makes Handsome Flowers With Hammer and Anvil.

In the town of Plainfield, N. J., a blacksmith is achieving reputation and quite likely profit as well by fashioning flowers of iron. He has become adept at the artistic work and he does the entire work in his shop. By the way, a New York newspaper in referring to Mr. Cran says that "not a great while ago he was actually shoeing horses." Well, why not? If he had not been shoeing horses he might have been selling groceries, or practicing medicine, or preaching, or farming, or something of that sort. The point is, some people imagine that if a man is a horseshoer or a blacksmith that he is incapable of doing anything else, when the exact opposite is true. Quite likely there are as many horseshoers who should be artists as there are artists that should be horseshoers.

The only tools used by Mr. Cran in making the flowers were the ordinary hammer with cross peen, tongs of various sizes, pliers and one or two other simple implements, all of which were made by the smith himself.

Art critics who have seen his work agree that the welds are cleaner and neater than those made by Van Boeckel, the German iron flower artist, and that Cran has gone very much closer to nature in his work. Mr. Cran works entirely from memory, using no model. He studies his object closely, fixes it firmly in his mind and then begins work at the forge. When he began to do this kind of work he used ordinary chain iron; now he has adopted Swedish iron, which is more elastic and malleable. In making a rose he first fashions the core and then forges the smaller petals, hammering out the ends flat and then placing them over an iron block containing holes of various sizes. By hammering them over these holes they are hollowed out until they resemble little spoons.

After hollowing out the four petals he grasps the iron rosebud in a pair of tongs, thrusts it into the fire and heats the stems. He takes it out of the fire and hammers the stems into a solid mass with the flat faced hammer. He forms the larger petals in the same manner and, after having thus made the complete rose, grasps it as in the beginning, with larger tongs, heats it again and finally places it, a red hot glowing mass, forming a beautiful representation of the genuine, natural flower, in a vise.

The smith then takes a device shaped somewhat like a screwdriver and opens the outermost petals first, then in a less degree the inner petals. By an artistic twist of the tweezers he gives these petals the natural looking curl. It is difficult to open out the petals without breaking them off, and to learn to do this required considerable patience and experience on the part of the smith.

It requires about 135 minutes to make a rose such as has been described. An attractive spray of leaves may be made in about half an hour.

All the different parts of the flowers are forged separately, and the veins or radial ribs of the leaves are produced by means of the cross peen of the hammer. The same instrument when slightly tilted and when the blows are directed toward the outside of the leaf produces the serrated edge of the leaf. The piece from which the leaf is made is first held in the tongs by the stem, heated and flattened on the anvil. The centre rib in the leaf is formed by having that part lap over the anvil's edge while the artist is flattening the leaf.

A rose branch thirteen inches high and made of ninety-four separate pieces, which required thirteen hours to make, excites the admiration of all who see it.

Mr. Cran began his apprenticeship as a blacksmith in Scotland when 18 years of age. He came to New York in August, 1896, and was one of the first men to make an iron golf club in this country.

A famous precursor of Mr. Cran in Scotland was Andrew Farrar, a swordsmith, whose tempering of blades is said to have been so well done that the point of the sword could be brought around to the hilt and it would spring back again without breaking.

HARMONY.

Facts About Colors for Automobile Painting for Effectual Combinations.

From M. C. Hillick.—As much as possible the loud and sensational colors should be out of sight or on parts of the surface where they show the least. In a former issue reference has been made to some of the more prominent colors which for the present year and possibly—even let us hope—for succeeding years will reign as favorites in our decorative effects.

In choosing a combination of colors for the car it is a mistake to attempt to introduce too many colors. Two or three are about as far as one should go for the body of the car, while one color, supplemented, of course, by the striping color, should invariably suffice for the chassis.

In making effective combinations of colors for the automobile, it will at times be necessary to ignore the strict letter of the law governing harmony and contrast, and prove a law unto yourself. That is to say, use common sense methods and good judgment, avoiding, to be sure, any combination that approaches an offense to the color instinct possessed by every man who is not color blind. Grays are usually neutral colors, but any one of the popular grays if employed in connection with a combination of colors in which a prominent blue reigns conspicuously should have a bluish tone, or what is perhaps more correctly termed, a cold hue. If a bright red were the conspicuous color in the combination the gray should have a warm, reddish tone.

A neutral gray, or in other words, a gray made out of white and black, will harmonize with any color. Black will do quite the same thing. It is a mistake to suppose that a color that always harmonizes with any color, or any set of colors, will with such colors produce combinations pleasing to the eye. Such is not the case.

Harmony of color, if nothing more is wanted, may be more accurately obtained by varying a certain color to divers shades and tints. Green, for example, if shaded to a darker hue or cast to a lighter tone, will develop harmony through either change. So likewise the blues. In the preparation of gray pigments the most thorough mixing is necessary otherwise there will be streaking out of the various pigments employed. Especially is this true of a gray in which more or less black is used. Black is an assertive color when used in connection with white to make up some one of the various shades of gray. The best practice in making up a soft, neutral gray is to beat the white to a creamy paste, and the black to a light consistency, and then add the black to the white gradually, meanwhile beating the mass vigorously. A very intimate mixture of the two pigments being obtained, proceed to add turpentine until the proper consistency is secured.

Not infrequently a very harmonious combination of colors may be had without getting enough brilliancy into the effect to please the average person. This difficulty is often overcome by the choice of bright striping effects, or by changing some one of the field colors either to a bright or a more subdued shade. Small spaces of green or blue or maroon or brown in contrast to large spaces of black are not pleasing.

In fact, they are in bad taste, and even the novice while perhaps not able to explain the sensation is not indifferent to the offensive color situation. Change the ratio of color, making black play a very small part in contrast to a very large part played by the green and blue, and the combination will pass on as an altogether pleasing and effective one. Blue and green panels on the car body are greatly intensified and rendered more beautiful when the moldings are colored black. Dark green panels are given a contrasting effect by striping with lines of deep red. Finer lines of deep red, like No. 40 carmine, for example, may be used on fields of blue for a contrasting effect, although as a rule either lighter or deeper blue than that employed as the field color, used to line the surface will give more pleasing, and, on the whole, more beautiful color effects. Lines of black on the medium deep blue field give a very handsome and genteel effect.

In making choice of a color for the car or a combination of colors, the owner thereof will find it a wise practice to study the outlines of the surface and the actual conditions of the surface, whether smooth or only moderately so. All dark, elegant colors require a very smooth, finely conditioned surface to hold them forth to the best advantage. Light colors, including the light browns, show surface defects very much less than the dark colors, and for this reason such colors may well be selected for use upon surfaces that cannot for various reasons be worked down to the desired degree of fineness.

Automobiles that have been used for two or three seasons are certain to show surface conditions which require leveling down fine and good in order to display the dark, rich, beautiful toned colors everywhere in such pronounced favor today and unless the owner feels warranted in going to the expense of putting the car in this condition preparatory to giving it the color, it will be more satisfactory to all concerned to choose a lighter tone color. For this purpose almost any one of the grays, or the browns, and medium shade of maroon—the latter a very attractive color, let us say in passing—will answer the purpose nicely without making the car look out of date in any particular. Moreover, the grays and browns and maroons are rightfully classed as exceedingly durable colors.

Liberty Bell.

The Liberty Bell in Independence Hall, Philadelphia, is to be repaired so that the famous crack will not spread any further. An internal structure will be placed in the bell to remove the strain of its dead weight. It is planned to transport the historic bell to the Panama-Pacific Exposition at San Francisco.

The German government is to spend $12,500,000 during the next five years for a naval fleet of dirigibles and aeroplanes. This fleet is apart from that of the army, on which nearly $25,000,000 is to be spent.

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"Absorbine."—A great many of our readers are already familiar with the results obtained by using "Absorbine" in reducing swellings, and soft bunches, as well as inflammation. It is one of the greatest remedies for horse ailments of this character. It does not blister or remove the hair and the horse can be used right along. If your druggist does not keep it, send $2.00 to W. F. Young, P. D. F., 55 Temple street, Springfield, Mass., and he will send you a bottle. Many blacksmiths, we understand, have taken an agency for the sale of "Absorbine" and are making nice little sums each year without hard work.

New Company for the Manufacture of Blacksmiths' Tools.—The Russell Mfg. Company was incorporated under the laws of Massachusetts, May 5th, 1913, for the manufacture of an improved line of Screw Plates, Taps, Dies and other small tools and machinery. The officers of the company are Whitman Russell, President; Chas. C. Russell, Vice-President and Treasurer. Directors are as above and Lucius D. Potter; Superintendent, H. J. Smith. Chas. C. Russell was for many years General Manager and Whitman Russell Superintendent of the Wiley-Russell Mfg. Company. They retired from that company April 1st, 1912, when the controlling interests of the Wiley and Russell Mfg. Company and the Wells Bros. Company, were secured by the Greenfield Tap and Die Corporation. A new factory about 140'x 75' will be built at once at Greenfield, Mass., and the company will begin producing goods at the earliest possible date.

Wolfe Tire Cooler.—This device is manufactured by The Wolfe Tire Cooler Company of West Carrollton, Ohio. It is safe and easy to operate and a most efficient tool in every way. If it cannot be obtained from your regular dealer write direct to the manufacturers as above for descriptive circular and price list.

Laffitte Welding Plates.—These plates are extremely convenient for quick and efficient welding. They will weld at low heat, with perfect results, saving much time, fuel and labor. Get a free sample and be convinced. Address the Phillips-Laffitte Co., Philadelphia, Pa., and mention this magazine.

Advertising Rates in the Blacksmith and Wheelwright made known on application

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

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 principles 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
Pittsburg, 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

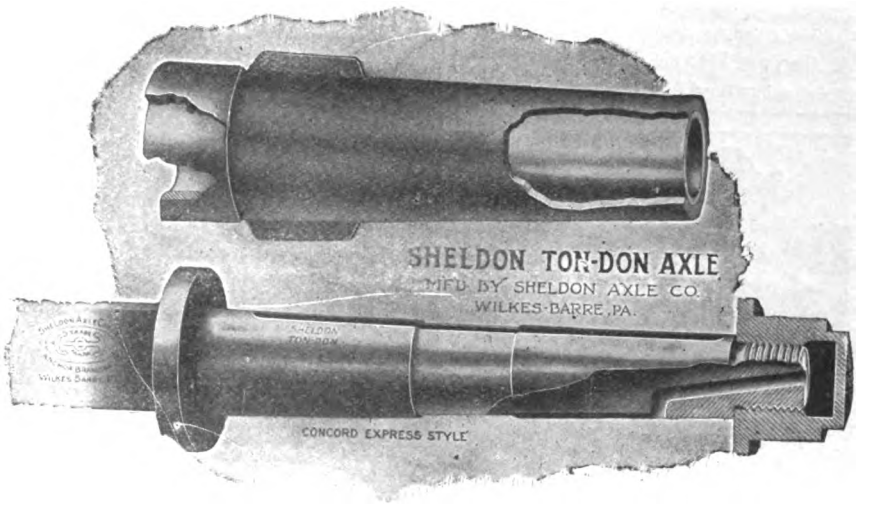
"TON-DON"

CONCORD EXPRESS STYLE

NOT A BALL OR ROLLER BEARING—BUT

ANTI-FRICTION—EVERLASTING—INTERCHANGEABLE

IT WILL NOT CUT, HEAT OR STICK



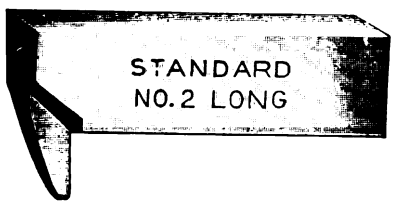
NOTICE THE PATENTED OILING DEVICE
HAS ALL THE ADVANTAGES OF FRICTION AND ANTI-FRICTION AXLES
WITHOUT THEIR DISADVANTAGES
"TON-DON" MEANS KNOWN QUALITY WITHOUT FANCY PRICE
MADE ALSO FOR BUGGIES AND SURRIES

SHELDON AXLE CO.,
WILKES-BARRE, PA

LARGEST AXLE FACTORY IN THE WORLD.

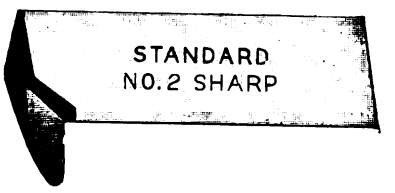
STANDARD TOE CALKS

(HOT FORGED)



Standard Toe Calks are made from the best of Toe Calk steel by experienced men, and both our Joliet and Cambridge factories are thoroughly up-to-date as to equipment.

These are the reasons why **Standard Toe Calks give satisfaction,** why more **Standard Toe Calks** are sold than all other makes combined, and why the man who makes his Calks is becoming as rare as the man who makes his Horse Shoe Nails.

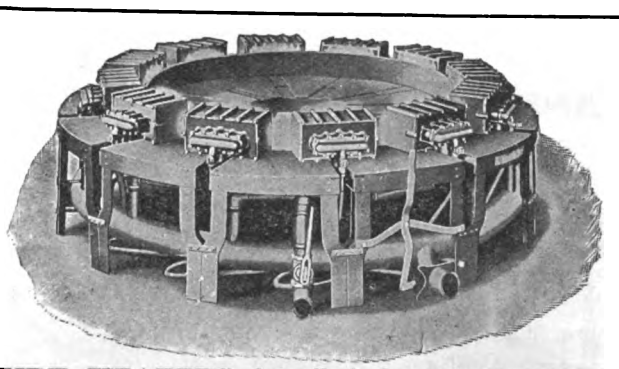


Order a Supply From Your Dealer

FRANKLIN STEEL WORKS

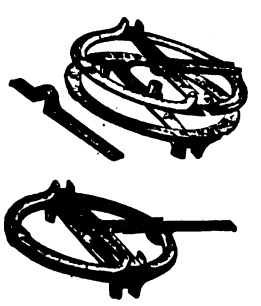
JOLIET, ILL. **CAMBRIDGE, MASS.**

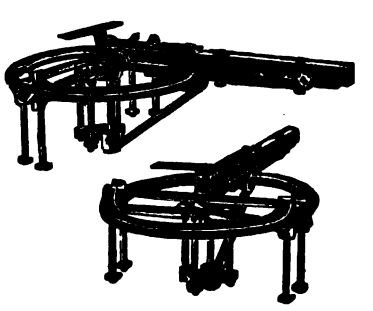
Do you want anything? Is your shop for sale, or do you want to buy a shop or hire a man? If so, a "Want" advertisement in THE BLACKSMITH AND WHEELWRIGHT will bring you good results. See terms at head of the "Want" Department on another page.



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.

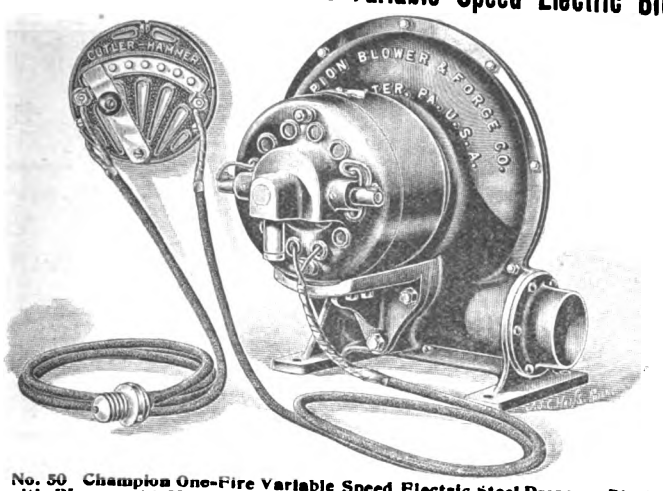




Center and Rear King Bolt Fifth Wheels, End Gate Springs, Flare Board Irons, Body Braces, Heating Furnaces, Blow Pipes, etc.

THE COCEL MFG. CO., TOLEDO OHIO.

THE CHAMPION
"STEEL PRESSURE" One-Fire Variable Speed Electric Blower



No. 50 Champion One-Fire Variable Speed Electric Steel Pressure Blacksmith Blower with Universal Motor for both Direct and Alternating Current, either 110 or 220 volts, with Detached Rheostat for six speeds, with attachment cord and plug to fit any light socket (therefore can be installed without any expense), and Steel Pressure Fan Case, for all kinds of general Blacksmith work.

Champion Motors are all **GIANTS** in strength. They are 40% larger than requirements. Endurance guaranteed.

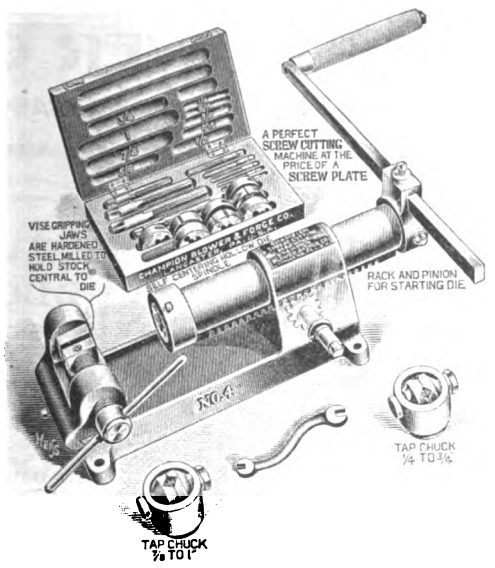
All Champion Motors are designed and built with sufficient units of **power** guaranteed to **run** the **fan** at **highest speed** of **3000 Revolutions per minute,** and at **high pressure** open and away from the fire for **ten hours** without a **single stop.**

Measure your Motor capacity and be certain you get what you are paying for. **The Heart of the Blower is in the Motor.**

All Champion Motors are built from the very highest grade materials, best workmanship, and machinery of the latest up-to-date design employed in winding and manufacturing the Motors.

We manufacture Electric Blowers in eight styles to run from one to nine fires.

THE CHAMPION THREAD CUTTING MACHINE



Furnished with Dies only, or with Dies, Taps and Tap Chucks.

A Thread-Cutter to do quantity jobs equal to machines costing ten times the price.

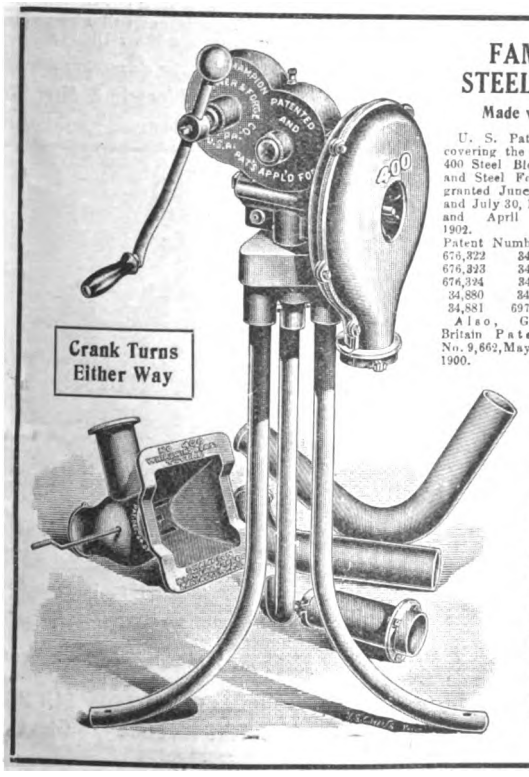
The Champion Thread Cutting Machine represents a **wonder** in its line, as it meets conditions practically equal and sometimes superior to machines costing ten times the price. It will do **better work** and produce **superior threads** at **machine speed;** therefore, no shop cutting threads can afford to do **without this labor saving tool.**

"Costs about the price of a Screw-Plate."

Made in two sizes and several styles from ¼ to 1 inch.

FAMOUS 400 CHAMPION STEEL BLACKSMITH BLOWER

Made with Adjustable Ball Bearings only.



U. S. Patents covering the No. 400 Steel Blower and Steel Forges granted June 11, and July 30, 1901, and April 15, 1902.

Patent Numbers:	
676,322	34,882
676,323	34,883
676,324	34,884
34,880	34,885
34,881	697,629

Also, Great Britain Patent No. 9,662, May 23, 1900.

The 400 Champion Steel Blacksmith Blowers and Forges after twelve years of practical blacksmith work number over 600,000 in use. The 400 Blowers purchased twelve years ago are running to-day as smooth and noiseless as the day they were placed to the fire and without a particle of lost motion to the crank. Therefore, the gearing and the bearings in the 400 Blower are as good as new after twelve years use.

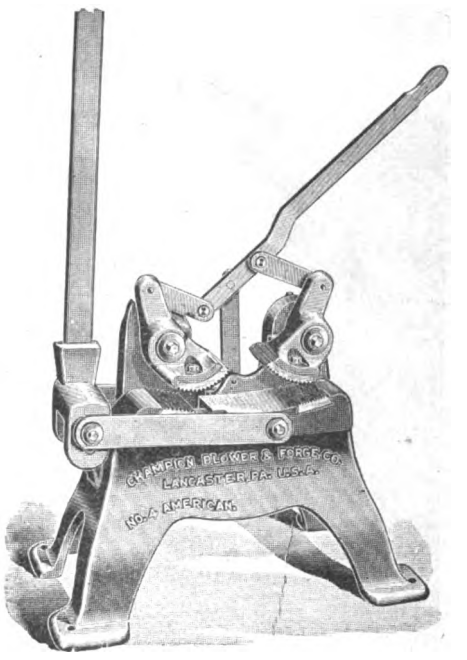
The No. 400 Champion "Whirlwind" Blast Anti-Clinker, Heavy Nest Tuyere Iron is furnished regularly with the 400 Blower **without extra charge.** This is a tuyere iron that is **true to name.** It produces a circular, rotary, "whirlwind" blast and heats iron one-third quicker, as the heat is not blown up through the fire and out of the chimney where it is wasted as in all other tuyere irons. This is not a wild claim. This can be tested and it will be found that less hot air is wasted six inches above the fire than four feet above the fire of any other tuyere iron. Therefore, by the quicker heating and this concentration of all the heating elements in the coal the blower will soon pay for itself in the saving of time and fuel.

No. 4 CHAMPION AMERICAN TIRE AND AXLE SHRINKER

The No. 4 American Shrinker has been manufactured by us for over six years, and is used by over 9,000 smiths.

Quantity manufacturing has enabled us to spend thousands of dollars to **build a special moulding machine to mould this shrinker** with the feet up (or in other words upside down), therefore, the **hot metal** is **poured** in from **the feet,** which cannot possibly be done by hand moulding, thus **saving** all **risk** of the **dirt** in the **metal** combined with **air** to **honeycomb** the **arm holding** the **main eccentric gripping dog,** as the **hot metal** must be **poured** from the **top** of the **arm** when the **mould** is made by **hand.**

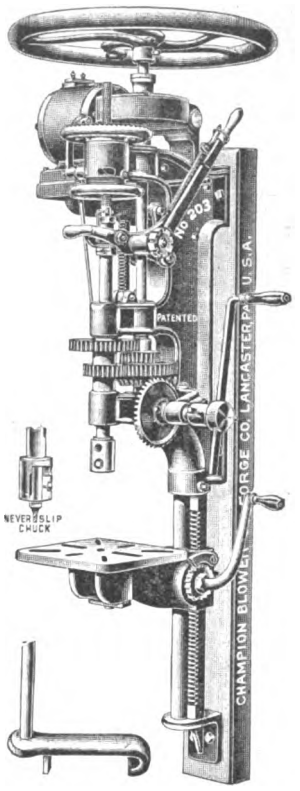
We positively guarantee no **honeycombing** in the **arm holding** the **eccentric gripping dog** or **main body** of this **shrinker** where the **strength** is **required.**



No. 4 Champion American Tire and Axle Shrinker will shrink up to 4x1 inch round edge tire, and axles up to 1¼ inches, with two steel jaws 4x2 inches wide.

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

MADE WITH CUT GEARS AND BALL BEARINGS



No. 203 Electric Driven Self-feed and Double Compound Lever-feed Drill.

The Drill represents simplicity and durability. The Direct Connecting of the Motor is an entirely new invention on Drilling Machines and is worthy of the most careful attention of any smith looking for a Drilling Machine. It represents a Drill to be operated by Motor or Hand Power.

The Double Compound Lever-Feed produces 80% more pressure to the Drill Bit than any drill ever manufactured, therefore, drills holes quicker and with less labor. The Self-Feed or Double Compound Lever-Feed can be changed from one to the other in an instant. There is no turning back of the feed screw to get the bit out of the work.

The wonderful rapidity by which holes can be drilled on this tool places the blacksmith in position to drill holes as quickly and cheaply as the largest machine shop plants.

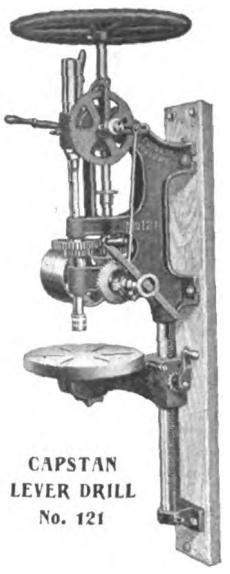
Our 1913 Catalogue can be had upon application, showing the very latest and greatest inventions in the Blacksmith line in the world on Blowers, Forges, Drilling Machines, Tire Benders, Tire Shrinkers, Power Blowers, Power Hammers, Punches and Shears, Screw Plates, Thread Cutters, Etc.

Write For Our 1913 Catalogue
It Is FREE For The Asking

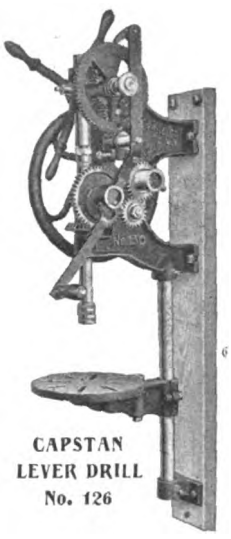
THE CHAMPION BLOWER & FORGE COMPANY, Lancaster, Pa., U. S. A.

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

Drill users have become much interested in our new Capstan Lever Ball Bearing Drills. The four arm capstan lever exerts an extremely powerful leverage on the machine cut rack

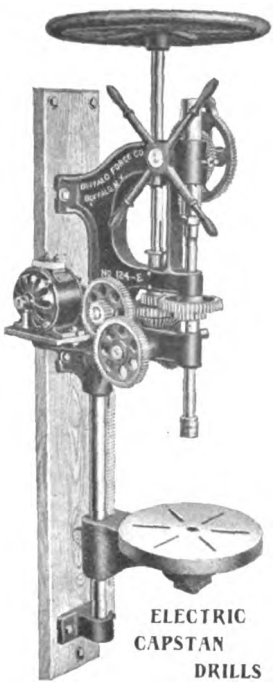


CAPSTAN LEVER DRILL No. 121

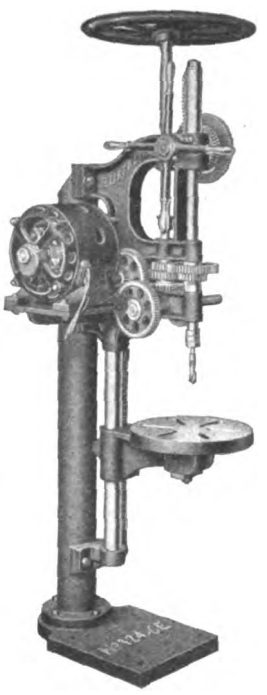


CAPSTAN LEVER DRILL No. 126

which is keyed to the feed spindle. For fast drilling, boring and reaming, this feature is invaluable; it is more convenient, more powerful and simpler than any similar device before known. A novel and very serviceable feature is the "Sliding Collar" for giving, in a second, change from lever to automatic feed, or back, and change of speed, the slow speed being provided for heavy and fast speed for lighter work. We offer these drills in six sizes, for hand, pulley or electric motor drive.



ELECTRIC CAPSTAN DRILLS



THE

BLACKSMITH AND WHEELWRIGHT

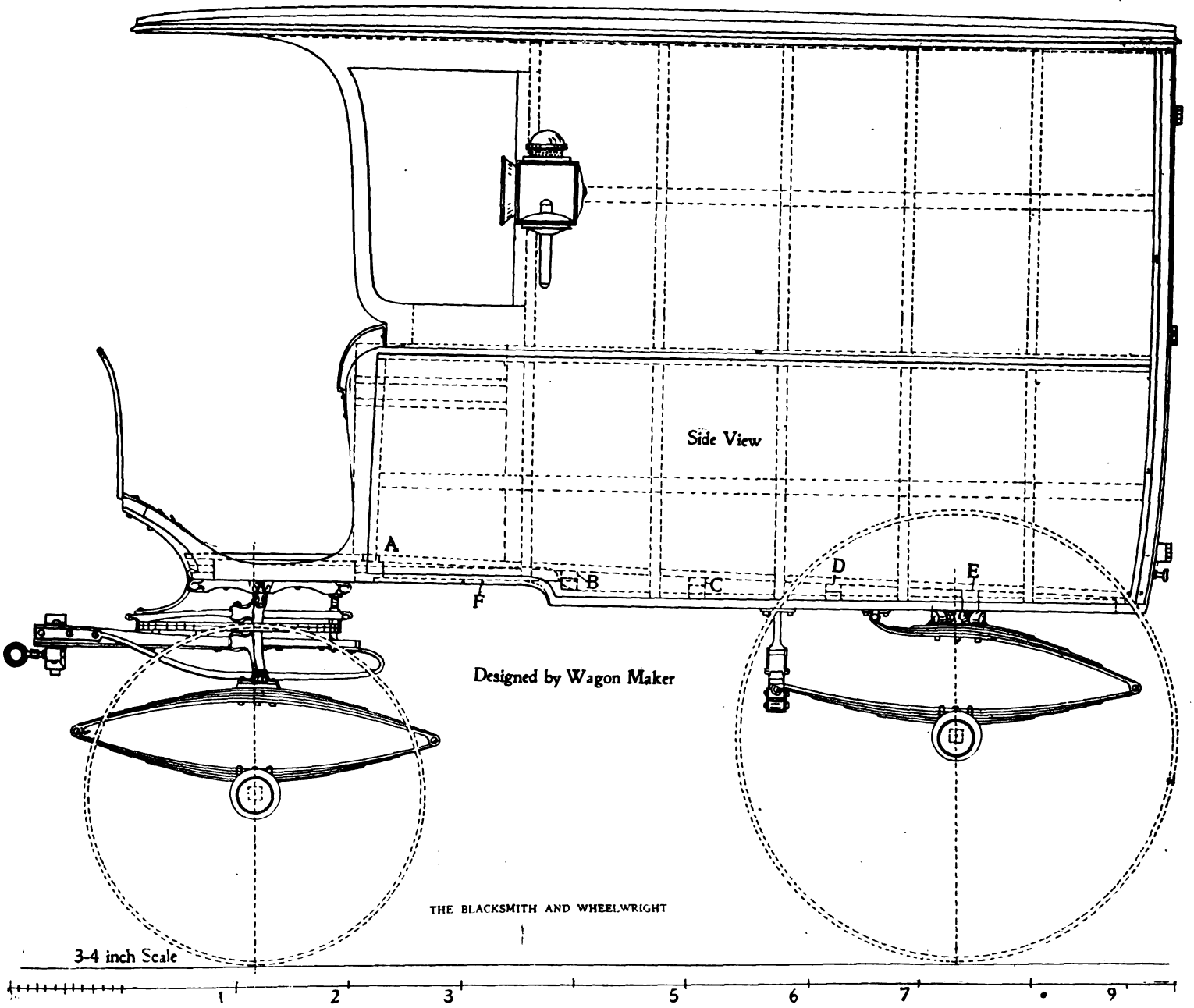
Vol. LXVIII. No. 1. NEW YORK, JULY, 1913. TERMS: ONE DOLLAR A YEAR

A COMBINATION WAGON.

Useful for Undertakers, an Ambulance, or Other Business Service.

BY WAGON MAKER.

Performing two kinds of service when practicable, is of great advantage to the owner, when two separate vehicles are out of the question and when one vehicle may be sufficient for all the work to be done during the entire year. This service is here carried further and three different vehicles are combined and fitted to one chassis. The front part on all three kinds is closed with a door on each side with glass frames to drop and the changes are in the rear part only.



The first is an undertaker's wagon body with heavy molding on top, but the side surfaces are perfectly plain, with hearse doors in the rear. All undertaker's wagons have small rollers distributed over the bottom boards to aid the sliding of boxes in or out of the body. The same rollers are used for the stretcher when used for an ambulance, and if the stretchers are 22 inches wide only across, two can be used, as the door space is 46 inches. If this is not wide enough, less turn under is given, or the body can be made without turn under and contracted toward the front to narrow up the dash. To do service for a hearse also, the side surfaces are imitation and the columns, for hearses, are glued against ½ inch thick poplar boards, and this board, including the columns, is bolted to the sides of the body and can be shifted when needed. Undertakers, since the introduction of motor funeral cars, have been placed in a peculiar position. If the undertaker has no motor hearse or motor undertaker's wagon, he is losing trade, but as he cannot afford to have a wagon for each, the combination idea is resorted to and the bodies are made exchangeable to save expense. The undertakers' business at present is in its transition state, from horse to motor, but lots of people have very decided opinions as to funeral observance and what one wants the other opposes. Therefore, the interchangeable bodies for undertakers have become a necessity, and later this combination will be carried still further to the advantage of the undertakers' trade. There is no difference in width, height or length of the two wagons, they differing only in the application of details.

The front is raised 2 inches to allow more space for a 36 inch wheel, including the tire, to turn under the body, at the same time the body is suspended lower in the rear to make it easier to lift the boxes into the wagon. The front of the body is suspended 41 inches from the floor, while the rear end is 37½ inches from the floor, a difference of 3½ inches, or a drop out of the vertical line 1½ inches. On account of the raised front the bottom boards are slanting as shown on the side view and are indicated by dotted lines. Although the bottom line of the body is out of level, all inside posts are square with the bottom line of the sills.

The length of the body is as follows: From dash to front post 24 inches; from front post to rear end is 7 feet 5 inches, which is considered medium size. The coffin boxes are generally 6 feet 6 inches to 7 feet, and if closed back of the seat the body would not be long enough. To make provision for this, the left side of the seat is raised, as shown by dotted lines on front view, and the coffin boxes are shifted under the seat. On this account the bodies can be made shorter and lighter and therefore less expensive. The width across depends on how many boxes are carried. Generally one is carried at a time, therefore 46 inches across the body outside is considered sufficiently wide, but most of them are built wider for emergency, and sometimes two boxes, or more, may be loaded, and this is especially the case when used for an ambulance where there should be sufficient room for two stretchers, but if made to do service also for a hearse, the body would be too wide and the turn under on the rear and side surfaces should be dispensed with. This holds also good with the height of the body as this design is entirely too high for a hearse body, but only most suitable for an undertaker's wagon or ambulance.

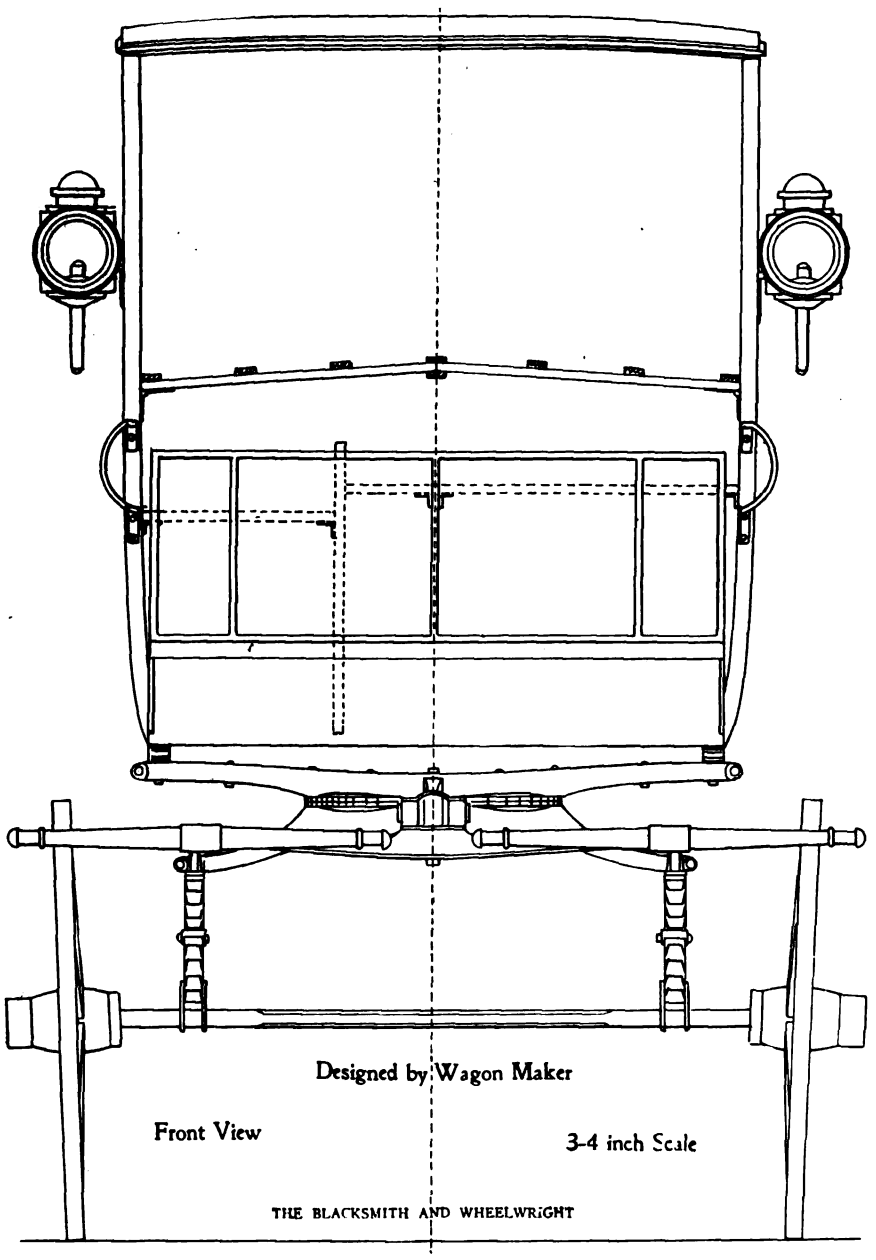
Construction of the Body.

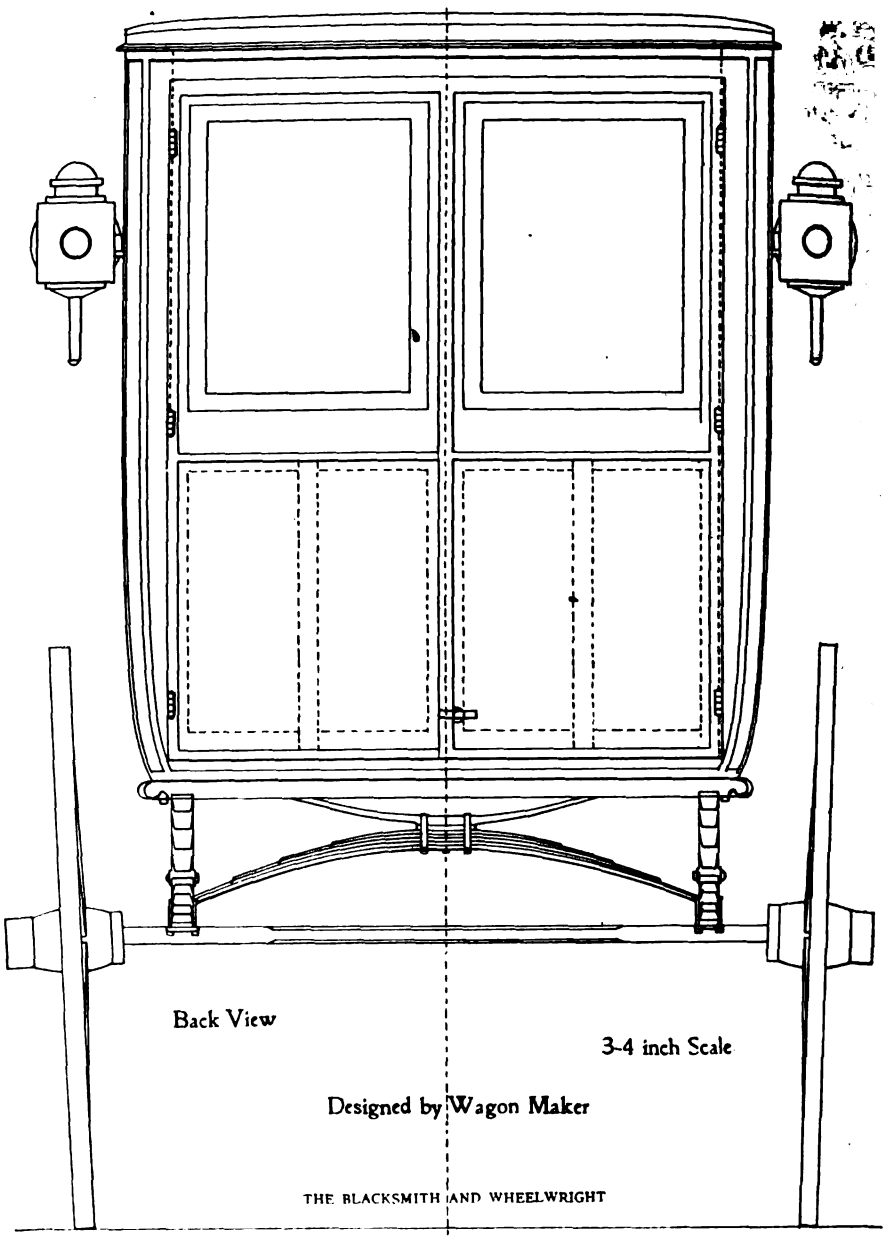
The main and most difficult part is to make the sills as light as possible, and at the same time to carry the load, without injury to the structure. The sills at the rear and across the bottom surface are 1¾ inches thick dressed square on the inside and beveled on the outside after the turn under line.

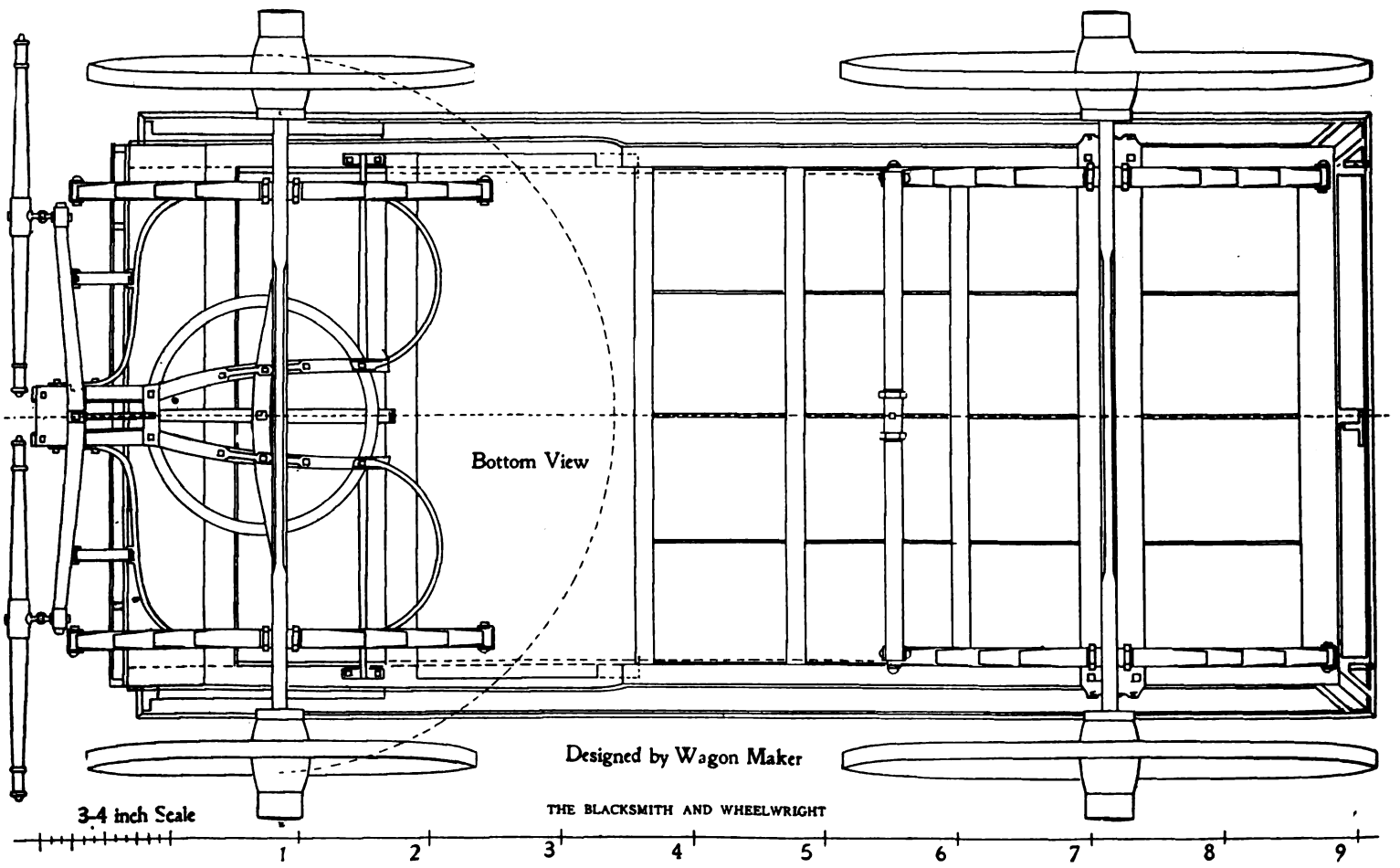
Because the sills are raised in front to give more room for the wheels to turn under, the sills are decidedly thicker further in front. The depth of the sill varies. In front it is 2⅞ inches, and in the rear end 2¼ inches, making a straight line from the front to the rear end; besides this, there is a rocker plate ½ x 1½ inches, starting from the front end on the dash to the rear end cross bar, and into the spaces the cross bars are fitted. At the front end near the dash there is a cross bar level on top, and a heel panel laps over it on the bottom surface. This bar is 2¾ inches wide, with bevel in front and square on the rear end. On the lower front end is another cross bar mortised into the bracket, as shown, and a heel panel lapped over the front surface. The rocker plate passes above this bar as shown by dotted line. There is a cross bar at A; in fact there are two bars, one is let into the bottom surface and into which the bottom panel is routered, and as both cross bars are weak, another bar is fitted between and screwed together from top and bottom surfaces, besides gluing.

Cross bar B is mortised in 5/8 inch below the top surface of the sills and level with the bottom surface of the sills. Around this cross bar the rocker plate is cut but nothing is cut away from the tenon, as shown by dotted lines. Cross bar C is mortised into the sills and rests on rocker plates. Cross bar D is also mortised into the sills, and is 1¾ inches deep, therefore it must be partly cut into the rocker plate and is supported by it. Cross bar E is two inches thick, is mortised into the sills and rests on the bottom cross bar. Cross bars B, C, D and E are all 1¾ inches thick. The rear end cross bar is 3 inches on the bottom surface of sills, without the rear turn under bevel and 2⅜ inches thick. Into this cross bar the bottom boards are routered. The bottom boards are of hard wood, ash or oak, 5/8 inches thick and 11 inches wide, four in number. The bottom panel F is ½ inch thick, 20½ inches wide. On the rear end it is grooved into the cross bar, while at the front this panel is also routered into the cross bar. The cross bars are about 13 inches apart, the bottom boards are 5/8 x 11 inches. Consequently, there is no probability of the boards giving away under the load of heavy boxes. The bottom boards are left open 1/8 inch at each joint to make allowance for the swelling.

The moldings on the sills are solid and the panels are grooved in. All the posts are lapped into the sills, glued and screwed. They are also lapped to the top rails. The three rails are notched into the posts, glued and screwed. The front seat posts are mortised into the sills, and are 1⅜ inches thick from top to bottom. The panels are grooved into these pillars. All panels are glued against the posts and are canvassed between the posts and rails. For ordinary work the canvassed surfaces are painted black; for better work the lower part is lined with ¼ inch thick built-up wood, but for first-class work the entire inside surfaces are lined with built-up panels. Also one single built-up panel is used for the top, and all are filled in and varnished, making a first class finish. The filling in must be done thoroughly to prevent the varnish from sinking in. The side glasses are stationary, but the rear door glass frames are made to drop.







The front carriage part has a full fifth wheel, coach pole futchels, and movable draw-bar.

The coach heads are bent top and bottom 3 inches from center to center; but the rear stay is of iron or wood. The rear of the body is suspended on coach springs and the upper front ends of the springs are extended 9 inches forward with movable heads, making a more durable suspension.

Dimensions for wood hub wheels:
Diameter of wheels without tires, 35 x 47 inches.
Diameter and length of hubs, 5⅞ x 7½ inches.
Diameter of hub bands, front and back, 4 1/16 x 4⅝ inches.
Width of spokes and thickness, 1 9/16 x 1⅛ inches.
Number of spokes front and rear, 12 and 14.
Thickness and depth of rims, 1 9/16 x 1⅝ inches.
Amount of stagger front and back, 5/16 by ⅜ inches.
Round edge steel tires, 1⅜ x ½ inches.

Front Eliptic Springs:
Length from centers of bolts, 38 inches.
Open front out to out, 10½ inches.
Width of plates, 1¾ inches.
Number of plates, 5.
Thickness of main plates, No. 2.
Thickness of other plates, No. 3.
Clipped to axle and bolted top.

Rear Coach Springs:
Length from centers of bolts, 38 inches.
Open out to out, 11 inches.
Width of plates, 1¾ inches.
Number of plates, 5 inches.
Thickness of main plates, No. 2.
Thickness of other plates, Nos. 2, 3, 3, 3.
Clipped to axle and bolted top.

Rear Cross Spring:
Length from centers of bolts, 43 inches.
Open from centers of bolts to outside, 5½ inches.
Width of plates, 1¾ inches.
Number of plates, 6.
Thickness of main plates, No. 2.
Thickness of other plates, No. 3.
Clipped to stay.

Plain Coach Axles:
Sizes of axles front and back, 1⅜ inches.
Length of axle arms for length of hubs, 7½ inches.

Widths of Body:
Across body on top, 54 inches.
Across body and bottom of sills, 49 inches.
Amount of turn under each side, 2½ inches.
Width across dash, 49 inches.
Depth of dash, 16 inches.
Width of track outside of tires, 61½ inches.

HORSESHOEING.

Fitting the Shoe to the Hoof Versus the Hoof to the Shoe.

From E. W. Perrin, Arkansas.—It is difficult to overestimate the importance of the subject, for pricks in shoeing and many ailments of the horse's foot, especially contraction, are greatly accelerated by the pernicious practice of fitting the hoof to the shoe.

Of course it is much easier to fit the hoof to the shoe; it takes less time and requires less skill. However, it is not that the average blacksmith has not the mechanical ability to fit a shoe accurately to the hoof, for any man who has the mechanical ability to make and fit iron work to the body of a carriage, buggy or wagon, can certainly fit a rim of iron to the hoof. Therefore, that so many blacksmiths and horseshoers fit the hoof to the shoe is not because they could not fit the shoe to the hoof but because they do not consider it important to do so. They are not students of the anatomy, physiology and pathology of the horse's foot, and therefore they are not aware of the evil consequences of this pernicious practice. Moreover, they may have been raised, so to speak, in a horseshoeing shop, wherein this very practice was the general rule, for although the distribution of books and literature on the subject and the wide circulation of trade journals have done much to improve the standard of work performed, it is still common, I believe, in the majority of shops, to fit the shoe more or less within the margin of the hoof, nail the shoe on, then rasp off the surplus wall to fit the shoe in the operation of clinching.

If then, my contention is true (that the cause of the trouble is ignorance of anatomy, physiology and pathology of the foot) then the remedy is information on the above subjects. Obviously, if the shoer knew the disastrous consequences of fitting the hoof to the shoe, he would not do it.

I have recently returned from a lecture tour of six of the Western States, in which I visited hundreds of blacksmith shops. I saw one shoer take a set of shoes out of a keg, turn up calks on the heels, pritchel out the holes and cool them off; then he took them to the horse for which he had prepared them. He then proceeded to take off the old shoe, cut down the hoof and nail on the new shoe without dropping the foot. That the shoe was big enough or round enough was none of his business, so long as it was small enough to get in the nails, then he took a piece of an old scythe and the shoeing hammer, with which he chopped off the surplus horn, then rasped it smooth in clinching up. I asked this smith if he read a trade journal and he replied in the negative. In the light of such facts we are driven to the conclusion that what is needed is the study of Elementary Anatomy.

The truth is that we need to combine brains with brawn. To be sure anatomy is a dry subject; nevertheless if you would be a skilled mechanic, a "scientific horseshoer," you must read and study, or your business competitor will leave you behind in the struggle for existence.

The vital and all important difference between the blacksmith and the horseshoer is this, that while they both shape iron—an inanimate object—the shoer nails his iron to a living, vascular, highly organized machine—the foot. If a carpenter makes a mistake, he has spoiled a piece of wood; if a blacksmith makes a mistake he has spoiled a piece of iron, but if a horseshoer pares a sole too thin, fits the hoof to the shoe or drives a nail a little too close, he has done an injury to the foot, perhaps not immediately apparent, for the result may be insidious, impairing the usefulness, perhaps ruining the animal.

So I say to my brother craftsmen, study. Get a dead foot and learn how wonderfully it is made. Most horseshoers have an opportunity to get a dead foot; horses die every day. Bury this foot in the earth for a couple of weeks, or soak it for a week in water, then the contents will come out without tearing the laminae. By

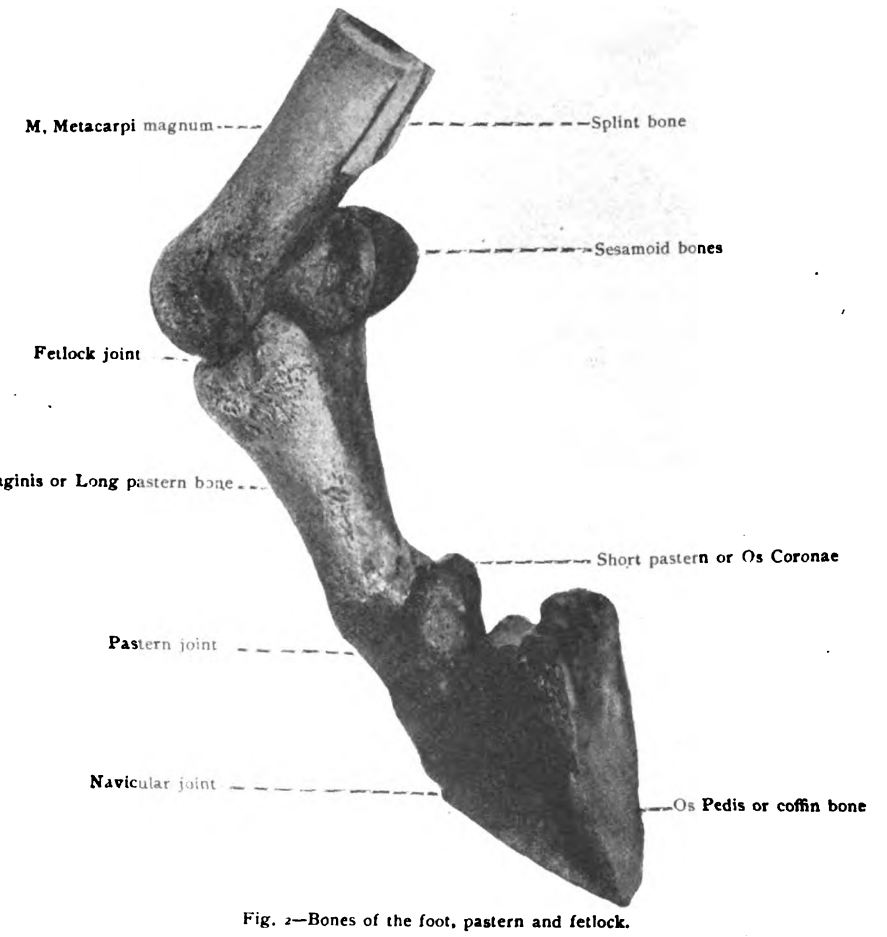


Fig. 2—Bones of the foot, pastern and fetlock.

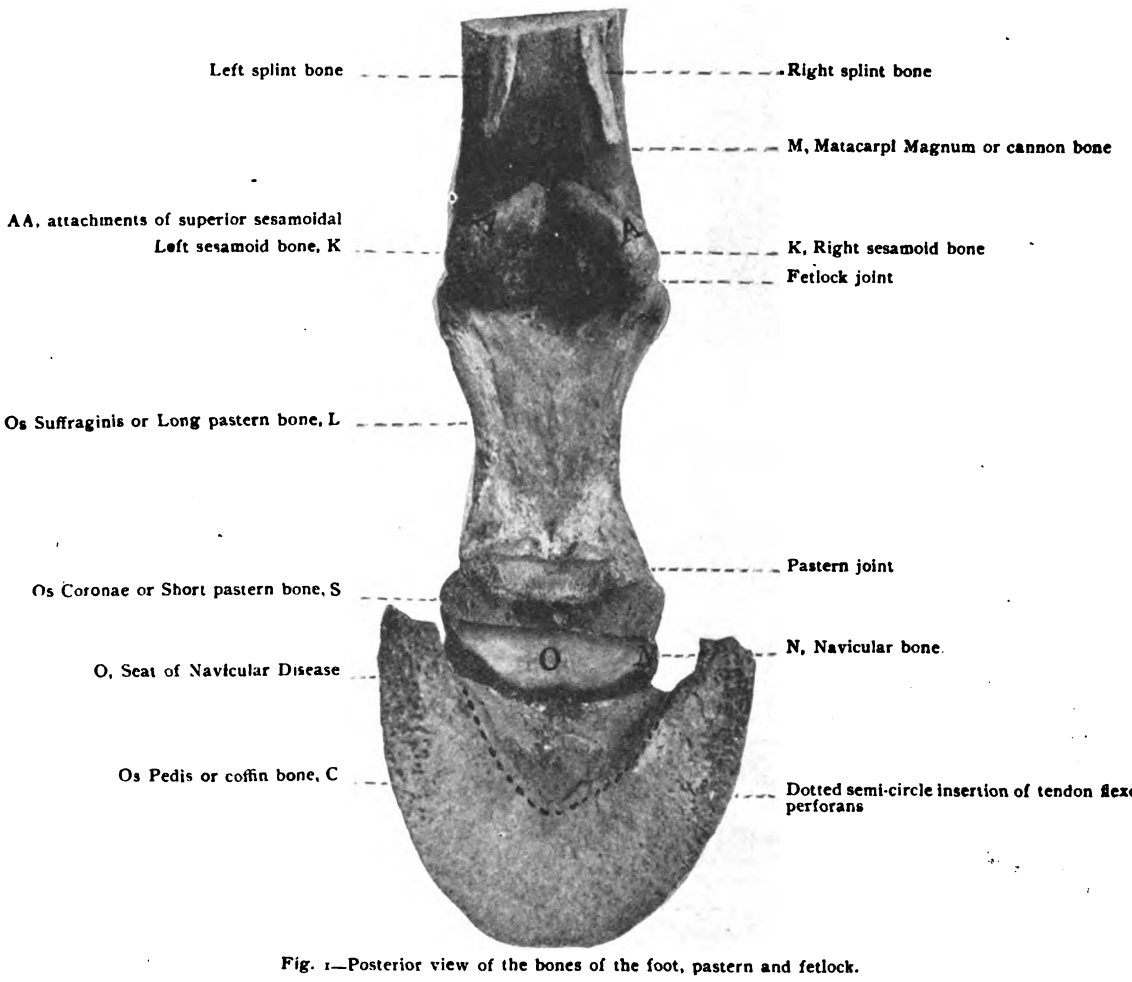


Fig. 1—Posterior view of the bones of the foot, pastern and fetlock.

this means you will be able to study the vascular organs, which I may explain in some subsequent articles. The truth is that anatomy is the foundation study of scientific horseshoeing.

In this article I shall give you a brief outline of the bones of the foot, pastern and fetlock, then back to my subject: Fitting the shoe to the hoof versus the hoof to the shoe.

The bones are the framework upon which the superstructure of the body, muscles, tendons,

Fig. 3—Vertical Cross Section of the Coffin Bone.

ligaments and skin is builded; they also form a casement which carries the internal organs.

C, Figs. 1 and 2, and Figs. 3, 4 and 5, are several aspects of the Os Pedis or coffin bone. The coffin bone is the foundation, the base of the column of bones which forms the leg. Its anterior and solar aspect is the exact shape of the interior of the hoof, into which it accurately fits, the only tissues intervening between it and

Fig. 4—Plantar Surface of the Os Pedis or Coffin Bone.

the hoof being the sensitive laminae and the sensitive sole. Note the V shaped dotted line, Figs. 1 and 4, this depression is the insertion of the tendon flexor perforans. This is the part of the bone to which is attached the lower end of the big sinew which lifts the foot.

This coffin bone is very strong also very porous (see Fig. 3). I sawed this bone into three sections so as to expose its interior, which you ob-

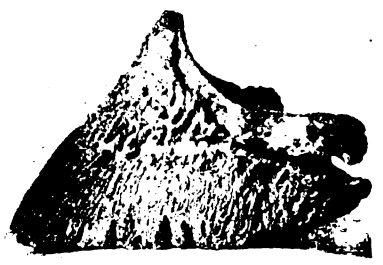


Fig. 5—Side View of the Os Pedis or Coffin Bone

serve is full of caverns and tunnels. The main arteries and veins enter the bone and divide and subdivide into innumerable branches until they ramify every particle of the bone, projecting from hundreds of holes on the surface of the bone so as to feed the sensitive laminae and sole with nutrition.

S, Figs. 1 and 2 is the Os Coronæ or short pastern bone. Fig. 6 shows a front and back view

Front View. Back View.
Fig. 6—Os Coronae.

of the same bone. The lower end of this bone articulates with the coffin bone and navicular bone to make up the coffin joint, or navicular joint, which is situated within the foot.

N, Figs. 1 and 7 is the navicular bone, the anterior face of which lays up close to the lower end of the Os Coronæ to form the coffin joint, while its posterior surface (see N, Fig. 7) forms a pulley over which glides the tendon flexor perforans.

The reader should observe well this little bone, for its surface or the cartilage which covers it, is the seat of an incurable malady—navicular disease.

L, Figs. 1 and 2, is the Os Suffraginis or long pastern bone, the lower end of which articulates with the Os Coronæ to form the pastern joint, while its upper end articulates with the lower end of the metacarpi magnum, cannon or shank bone to form the fetlock joint.

At the back of the fetlock (see K K, Figs. 1 and 2) there are situated two small bones about the size of a walnut. Their anterior surface fits close up to the condyles of the cannon bone, the back part of these bones are joined together and built up with cartilage so as to present a half oval surface, smooth and glistening with joint oil. In this pulley-like surface, glides the back tendons of the leg.

The lateral surfaces of the sesamoid bones

Fig. 7—Left shows Posterior View of the Navicular Bone. Right, Superior Articular of the Os Coronae.

afford attachment (at A A, Fig. 1) to the branches of the tendon superior sesamoidal, formally called the suspensory ligament.

The articulatory surfaces of the bones are covered with a thick layer of cartilage and a synovial membrane which secrets joint oil. The cartilage diminishes concussion; the oil prevents friction. Each of the joints here enumerated are true hinges. They have no rotary motion, and each joint is protected by a capsular ligament, which may be likened to a wide rubber band encircling the joint. Each joint is braced and

Fig. 8—Section of the Hoof with the Vascular Organs Removed.

counter braced with a number of ligaments and tendons, on which I will speak in some subsequent articles.

Now back to my subject. Observe now the structure of the hoof (see Fig. 8). The wall is about ⅝ of an inch thick. It grows from the coronet to the ground surface at the rate of from ⅜ to ¾ of an inch per month. The growth varies greatly in different horses, and at different times even in the same horse. Take notice also,

Fig. 9—The Hoof Fitted to the Shoe

that the wall is as thick at the point R as at the point T. It is the same thickness from top to bottom with the exception of the hollow rim at the top which holds the coronary cushion.

The wall does not grow too thick except where the wall may grow "wingy" from the shoes being too long, or in laminatic feet. If however a hoof is "wingy," any surplus growth that actually needs to be rasped away from the outer wall, should be removed in the operation of preparing the hoof for the shoe; not after the shoe is nailed on. Since the wall does not grow too thick, it should not be rasped from the outside, whatever length of hoof has grown from one shoeing to another, should be reduced from the planter surface of the hoof, before the shoe is fitted.

But it is commonly urged that "it does not hurt the foot to rasp away a little of the wall." This is a grave error. Take notice of the hoof which has never been shod. If it be free from dirt, it will shine as if it had been oiled, simply because it is covered by a thin layer of horn, the coronary frog band, which runs around the hoof

Fig. 10—Shoe Fitted to the Hoof.

from the heels in a transverse direction to the fibres of the wall which descend from the coronet to the ground surface. This top layer is the toughest part of the wall. You cannot rasp the outer wall without destroying it, and thereby exposing the tubular horn of the wall to the drying influence of the air. This pernicious practice not only reduces the thickness of the wall but it is the most prolific cause of brittle hoofs.

Remember, too, that the wall of the hoof is but ⅝ of an inch thick, and grows, say at the

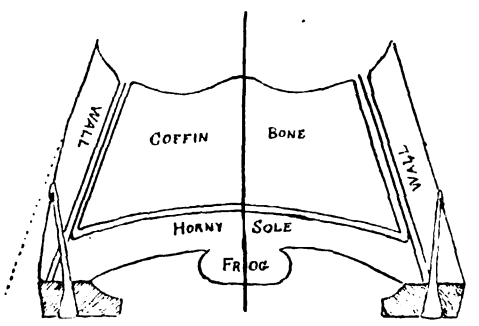


Fig. 11—Composite diagram of a vertical cross section of foot and shoe. At the left the hoof is fitted to the shoe At the right the shoe is fitted to the hoof. The dotted line shows the amount of wall rasped away. Note the difference in position of the nails.

rate of ½ inch per month. There are 10/16 in ⅝ of an inch, so, if you only rasp off 1/16 of an inch at each shoeing and shoe the horse once a month, then in ten months you would have rasped away the entire substance of the wall. If it grows from coronet to ground at the rate of ½ inch per month, then in ten months it would have produced 5 inches of new horn, which continual growth partly counterbalances the monthly destruction of the horseshoer who fits the hoof to the shoe; but it leaves millions of feet in the condition of Fig. 9, which is a photo of a dead foot cut off a horse which had only been shod a day before he died.

Most of the pricks in shoeing are attributable to this cause. When we examine a lame foot and locate a prick, the first thing to attract the intelligent observer will be, "How thin the wall is," and if it had been thicker, of course it would not have been pricked. Right there a question suggests itself;—Who made that wall so thin? In eight cases out of ten the horseshoer, by fitting the hoof to the shoe, as in Fig. 9, instead of fitting the shoe to the hoof as in Fig. 10. Also see Fig. 11 to which I now ask my brother craftsmen to give special attention. Note the direction of the nails, get some dead feet and saw them into vertical cross sections, as shown in Fig. 11, and you'll soon discover why you should not fit the hoof to the shoe. The truth is that every time you rasp away the outer wall, you are rasping away solid sound hoof which you will need to nail to at subsequent shoeings.

There are other reasons, such as the reduction of the size of the foot bearing, the drying out and contraction of the hoof, etc., which could be added, but I believe every horseshoer will agree with me that the above are ample reasons why he should show the horse owner that he is mechanic enough to fit the shoe to the hoof, not the hoof to the shoe.

The war against the fly, that dangerous carrier of germs and disease, is to be carried on with renewed vigor this coming season,

WORK HORSE PARADE.

A Great Event in Boston and What It Disclosed.

The statistics of the recent work-horse parade in Boston disclose some interesting facts. There were 1,231 entries, and of these only 89 failed to appear, a much smaller percentage of absentees than is usual. There were 1,519 horses actually present. In the Boston parade every entry that deserves a ribbon receives one, and the ribbons were awarded as follows: 1st (blue), 765; 2d (red), 235; 3d (yellow), 51.

No horse that was lame, thin, or badly groomed received a ribbon, but the number thus disqualified was astonishingly small, being as follows: 17 for lameness, 16 for being thin, 6 for being badly groomed. These results show how much the horses in Boston have improved in quality and condition since the first annual parade ten years ago.

Owners of horses everywhere might, by a little encouragement, by awakening the pride of their drivers, and perhaps by offering them occasional slight rewards greatly improve the condition and treatment of their horses, and save thousands of dollars a year in the wear and tear of horseflesh. These are the stable rules prepared by the Boston Work Horse Association:

1. The best order in feeding is: Water, hay, water again, grain.

2. Never give grain to a tired horse. Let him rest and nibble hay for an hour or two first. Grain in the manger before the horse comes in looks bad.

3. Water the horses as often as possible; but let the horse that comes in hot drink a few swallows only, until he is cool.

4. Always water the horse after he has eaten his hay at night. Do not go to bed leaving him thirsty all night.

5. Do not forget to salt the horse once a week; or, better yet, keep salt always before him. He knows best how much he needs.

6. Give a bran mash Saturday night or Sunday noon; and on Wednesday night also, if work is slack. After a long day in very cold or wet weather, a hot mash, half bran and half oats, with a tablespoonful of ginger, will do the horse good. Put very little salt, if any, in the mash.

7. If the horse does not eat well, or slobbers, examine his teeth.

8. Keep a good, deep, dry bed under the horse while he is in the stable, day or night, on Sundays especially. The more he lies down, the longer his legs and feet will last.

9. In order to do well, the horse must be kept warm. Give him a blanket on cool nights in late summer or early fall, and an extra blanket on an extra cold night in winter.

10. In cold rains do not tie up the horse's tail. The long tail prevents the water from running down the inside of his legs, and keeps off a current of air from his belly.

11. Take off the harness, collar and all, when the horse comes in to feed. He will rest better without it.

12. Never put a horse up dirty or muddy for the night. At least brush his legs and belly, and straighten his hair.

13. In hot weather, and in all weathers if the horse is hot, sponge his eyes, nose, dock, the harness marks, and the inside of his hind-quarters when he first comes in.

14. When the horse comes in wet with rain, first scrape him, then blanket him, and rub his head, neck, loins and legs. If the weather is cold put on an extra blanket in 20 minutes. Change the wet blanket when the horse dries. Do not wash the legs. Rub them dry, or bandage loosely with thick bandages. It is far more important to have the legs warm and dry than clean.

15. To prevent scratches, dry the horse's fetlocks and heels when he comes in, especially in winter; and rub on a little glycerine or vaseline before he goes out in snow or mud.

16. Examine the horse's feet when he comes in, and wash them if he does not wear pads. If a horse in the city is not shod in front with pads, tar and oakum, which is the best way, it is absolutely necessary to keep his feet soft by packing them, or by wrapping a wet piece of old blanket or carpet around the foot, or by applying some hoof dressing or axle oil, inside and out, at least three times a week.

17. Let the horse have a chance to roll as often as possible; it will rest and refresh him. Give him a little clean earth or a piece of sod to eat now and then; he craves it, and it is good for his stomach and blood.

18. Speak gently to the horse, and do not swear or yell at him. He is a gentleman by instinct, and should be treated as such. The stable is the horse's home, and it is your privilege to make it a happy one.

HORSE COLIC.

What Causes It and How It Should Be Treated.

From a Practical Horseman, New York.—Symptoms are often misleading, and sickness deceives the medical profession both for human and animal practice. Consider "Colic" and its symptoms which are indicative of bowel congestion. Yet I believe that the real trouble is in the bladder, which becoming filled with water too cold and the temperature of the weather or the stable also suddenly lowering, as in the Fall months, when the ailment is most sudden and fatal amongst draft horses. It often causes temporary paralysis of that organ, with subsequent expansion; and this expansion pressing against the large intestine, shuts off the arterial circulation throughout the viscera and bowel region.

The desire to "ball," with veterinarians, is to counteract the bowel distress and without suspecting the bladder at all. I saw two first class express horses die of the disease or complaint and the trembling of one—a large young sorrel in fine form—was painful to see. The trembling and half going down and rising again in pain was evidence enough of acute bladder distress in extremely abnormal condition.

Another victim—a big bay horse named Blindy (blind of one eye)—strove pitifully after he was down to rise again, but going back head and neck three times and striking the head with a heavy thud as if the neck would break.

Now, if we apply external remedies to the loins say, turpentine for one thing, and a hot compress to the lower belly and fasten it at the top tightly over the loins, the relief will reach the distended bladder quicker than by "balling" through the mouth or by other bowel treatment. Never mind the swelling or distention; that is a delusive symptom. The "Blindy" horse was "balled" three times, to my personal knowledge, by a first class veterinarian belonging to a well known office of professionals subject to instant calls by telephone to any part of the city. The horse died just the same and in a few hours after drinking too much cold water in November, when he came in at night and before feeding.

It is a fact that the bigger and stronger the horse the quicker he gives out and dies of heart failure due to obstinate circulation, the bladder wedging the large lower bowel relentlessly and shutting off the return blood that flows back from that organ to the lungs.

The body over the region of the bladder is tender and sensitive in both animal and mankind; while the bowels are protected safely on all sides and not at all likely to become quickly affected by sudden changes of temperature, like the vascular system, with which the bladder, the lungs and the heart are involved. The chest, lower belly and loins are the vulnerable places; hence the decided utility of the "apron," or "chest protector," and the short, light weight and close woven blanket over the loins, which are guaranteed against lung disease, rheumatism in the shoulders and inflammation of the kidneys; especially with the horses of milkmen and bakers, out in the early cold of winter and that stand at intervals or travel slowly in going the rounds. They need the protection more than any other class of horses in large cities.

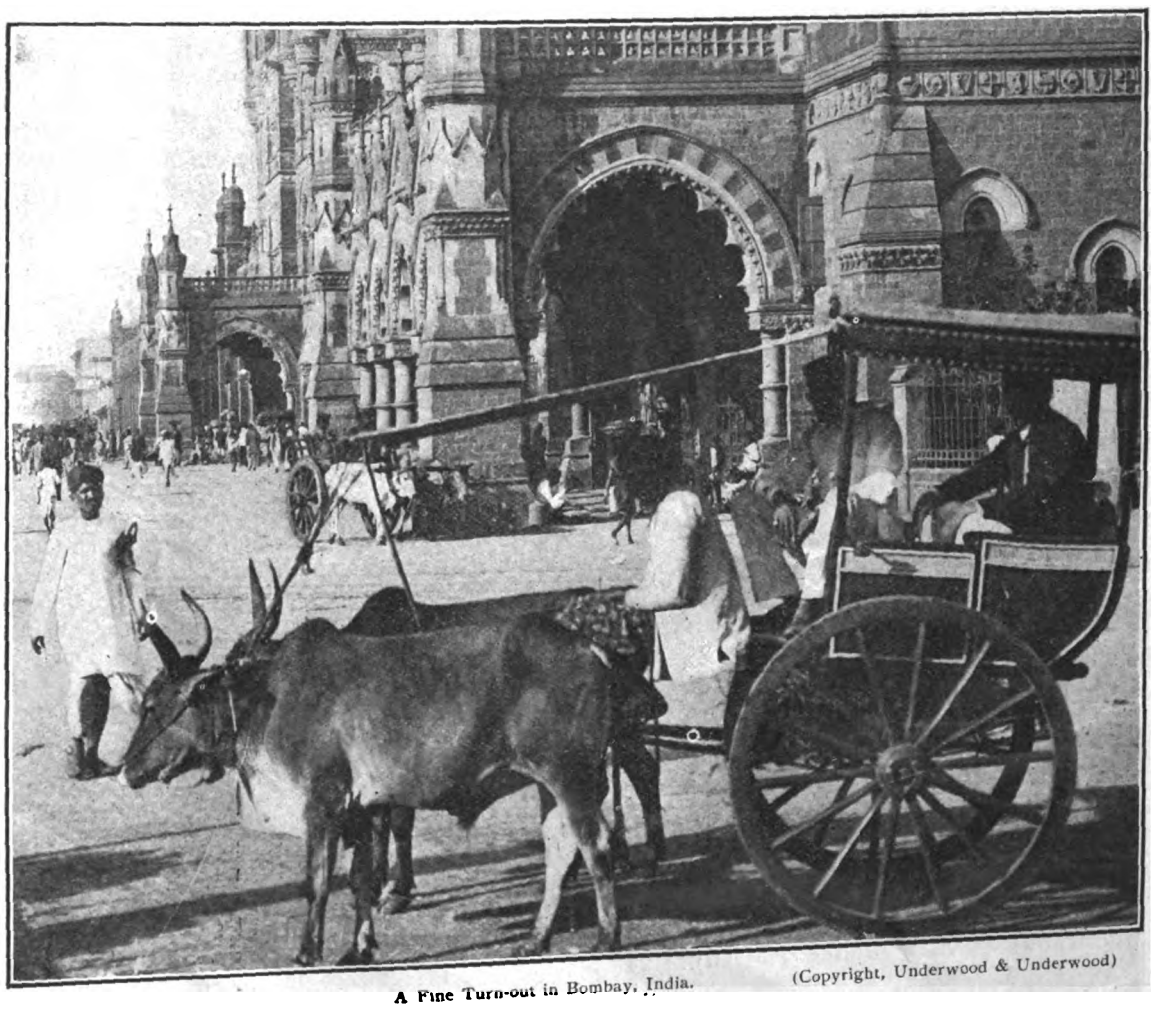
The remedy of two quarts of fresh milk fed to a horse with the "colic" and said by farmers to act favorably, does so because it is quickly digested and absorbed or assimilated into the circulation, thereby increasing the power of the blood to overcome the temporary cold and its paralyzing effects upon the bladder and urethra.

The remedy of beer and ale—one or both—with black pepper, commonly resorted to in some stables and especially with car horses, is often effective—the horse being blanketed and kept moving, for the reason that the stimulant of the beer and the heat of the pepper affect the circulation favorably, bringing on the needed reaction and often saving horses.

This treatment for "colic" requires a stall with harness gear for pulling up the head of the horse and holding it in order to insert a long bottle into the throat and emptying the contents. Every stable should have such a stall and rig for quick relief in these sudden cases.

In Hungary, among the farmers and stock-raisers, "colic" is treated by moving a large rolling-pin along the spine from shoulders to hips; an operator on each side slowly pressing the round piece of wood upon the backbone and repeating. This would seem an intelligent way of acting on the cranial nerves and starting up or renewing the suspended circulation, as before described.

Bronze powders are made by hammering thin sheet brass or bronze under steam hammers until the right degree of fineness has been obtained. The chief uses of bronze powders are in the manufacture of wall-papers and in printing.



A Fine Turn-out in Bombay, India. (Copyright, Underwood & Underwood)

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JULY, 1913.

PARTIAL CONTENTS.

WORK FOR BETTER PRICES.

It is gratifying to note that at last the blacksmiths of the country seem to be awakening to the importance of working together for trade betterment. In view of the fact that they are an unusually independent class that this movement is somewhat belated is not remarkable. And we remark with assurance that they are an unusually independent class and with no idea of either bestowing praise or blame. All men who start out in the world with a willingness to earn every penny they get are independent. And, per contra, those who start out in life with the idea of getting wealth by some other means than by honestly earning it are always willing to sacrifice their independence to gain that end.

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 or plans they desired. Now this is what most of us would like to do. But unfortunately, if all adopt such methods, where there is competition, finally none is doing as he likes and all are running their business about as some one else says.

Some years ago competition was the exception and not the rule. Then with man or hand power only, and before machine methods were much in vogue, the great difficulty in business was to do the work; now the difficulty is more to get the work than to do it, and where there are several competing to get the work price-cutting and its sure result, inferior work, follow as the night follows day.

As we have many times stated, the blacksmith or wheelwright business is just what those engaged in it make it. If prices be kept up to a living basis and the quality of work be maintained, not only will the trade prosper but the public itself will be the gainer. Low prices never help individuals nor communities, and where they get down to the bankruptcy basis they are as blighting as a drought or an epidemic of disease.

AUTOMOBILE WORK.

Blacksmiths are fast getting in line for automobile work, but activity in this direction would be still more general if the short life of some of the parts of an automobile were better understood.

There is more repair work demanded on an automobile in a year than is required on a carriage in ten years. Not only is the automobile speeded three or four times as fast as a horse-drawn vehicle, but it carries its own propulsive power and that power is a most complicated and high speeded machine that is subject to the roughest usage.

Consequently, parts wear out rapidly or get broken. It is generally understood that the larger parts, such as the crankshaft, the change gear bearings, pistons, etc., wear and get loose so that they must be adjusted or replaced; and ample provision is usually made for this. But many do not seem to realize that every working part is necessarily wearing, and that even parts which seem to have little or no motion wear rapidly.

A good deal of wear is caused by sand and dust, by fresh or salt water, gasoline vapor, etc. It is difficult to protect many bearing surfaces completely. In spite of felt washers and various other devices water and grit usually reach them in considerable quantities and they wear rapidly. The wear can be minimized if the owner will keep the hubs filled with grease, but usually he does not do this. The small parts of all anti-friction bearings give more or less trouble. Poor alignment, improper lubrication and the presence of foreign substances are no doubt to blame for much of this wear.

Among the smaller bearings which commonly give trouble may be mentioned the fan bearings. It appears to be customary to save as much as possible on these bearings; consequently they are often overloaded. Frequently they are not properly protected from the blast of dirt which comes through the radiator.

Valve stems and guides wear considerably, but this wear generally is not recognized until long after the carburetion has become faulty through air leaks, and frequently not until the leak is noticeable.

Wear on the bottom and sides of valve tappets, on valve stem ends and adjusting screws is generally recognized, and more or less thorough provisions are now made so they can be adjusted before the efficiency of the car is materially lowered.

Starting cranks, shafts and grips are much exposed to the elements, owing to their position, and they soon wear enough to be noisy unless especial care is taken in their design.

The gear shifting mechanism is another part which needs attention and frequent repair. Insufficient bearing surfaces, poor bushing material, or no bushings at all, are the more usual faults.

Universal and slip joints give considerable trouble from rapid wear, but they have been greatly improved in bearing surface, in lubricant retaining means and in provisions for excluding dirt and water.

Possibly there is no greater source of annoyance to the owner from rapid wear than the spring bolts. Great improvement has been effected by increasing their sizes, hardening them, providing grease cups and bushing the spring eyes. Even now the dirt gets in and causes more rapid wear than is agreeable.

Brake connections are another common source of trouble. There are few, if any, cars with rod ends large enough to wear well. They are seldom bushed and seldom oiled, so it is little wonder that they wear loose and rattle.

There are numerous other small parts which give trouble from wear. We might mention magneto breakers, coil vibrators, carburetor air valves and springs, wiring and switches, door locks and hinges, mud guard fastenings, mufflers and muffler pipes, lamp brackets and piping and wiring, windshield joints, etc.

In addition to the foregoing, there is of course more or less repair work on the motor and the car frame itself. In fact, an automobile should be given an overhauling about every year if it is used much, and the smith who can have about ten automobiles to put in tune has a business that will pay well by itself considered.

The repair of automobiles is something that it will pay to cultivate. Repair work prices are at present very high, and a good many car owners who have high-priced cars do not care to trust them to every Tom, Dick or Harry who sets himself up to be a repair man and who yet is liable to do a car several hundred dollars damage just by his carelessness or ignorance.

COMPETITION AND ITS RESULTS.

One of our readers says he has a customer that sends him word that he will call at a certain time—often during the evening—to have his span of horses shod, not taking the trouble to find out whether the shop is supposed to be open at night or not. He says if he refuses to do the work after hours the work goes to another shop.

Anything of that sort is obviously unreasonable. It is quite as much so as if the blacksmith were to order the man who owns the span of horses to bring them to be shod at a certain time. We want to repeat right here a certain business principle that if violated will sooner or later ruin the one who has been subject to its dictation. The principle is this: The purchaser must never have the power to dictate terms to the seller.

In this case the purchaser is the owner of the pair of horses; he purchases their shoeing from the smith. He not only does this but he further dictates upon what conditions the horseshoeing shall be done. It is like dictating to a physician his office hours or to a grocer the hours he shall keep open; and the next step—and it is not far removed—is to dictate the price that the owner shall charge for that which he owns and sells. In the case of the horseshoer, he owns the labor and stock he puts into the shoeing of the horses, and if a customer can dictate to him what hours he shall keep open, the power to dictate the price at which he shall sell this horseshoeing work will easily follow.

But such a situation is abnormal and should not exist. Nor would it if the smiths had an understanding among themselves as to the hours their shops were to be kept open. And failing to have this understanding, they are clearly and wholly under the domination of their customers and consequently cannot prosper.

We again repeat: When the owner of anything—the owner of groceries, of manufactured articles, of lawyer's or physician's advice, of labor of any sort, or of the work that blacksmiths or wheelwrights do—have less to say than the purchaser as to what they shall charge for it or under what conditions it shall be sold, then we have the first rudiments of injustice in such a sale

or exchange. Carried just a step further, it amounts to nothing less than human slavery.

When a man who has blacksmithing to sell can be confronted by a customer with the situation that practically amounts to the same as if he were to say: "These are my terms; take them or reject them, it is nothing to me," and knowing that some competitor will do the work at such terms if he does not, the smith must accept them or do no work, he may as well be a slave. He, of course, has the power of rejecting these terms, but when this rejection is equivalent to having no work to do, that power is worth little or nothing.

We have thus gone into matters a little more in detail than would otherwise be the case, because we desire to have our readers fully understand how important it is to their welfare that they themselves fix the prices and terms of sale for the work they do, and this, of course, comprises the hours they choose to keep their shops open. They can do this if they work together; they cannot do it if they compete among themselves.

PRICE FIXING.

The recent decision of the United States Supreme Court that in case of patented articles, as for instance, cameras, gramophones, and things of that sort, manufacturers cannot control the prices that they shall be sold for after they themselves have disposed of them, is just what we had expected it would be, and indeed, it is difficult to see how it could have been otherwise.

The idea that any one can fix a price for something which he has disposed of and no longer owns, is rather absurd. Yet on the other hand, we are inclined to the belief that the public welfare would be served better on the whole by allowing this price control to be carried along to subsequent owners, without any cutting.

Already the effect is being felt. Take the case of cameras, or of a certain kind of safety razor, for illustration. Prices for them have already been much reduced since this Supreme Court ruling. In a single instance a safety razor has been sold for $1.95 that sold for $5 before this decision, and there has also been in some cases a deep cut in the price of cameras.

Nothing so quickly ruins a business as price-cutting. It ruins the manufacturer, it ruins the middle man and the retailer, and taking into account the indirect injury to the consumer by this blight on the others and the tendency to inferior and a constantly deteriorating quality, it is of general injury to the public welfare.

Furthermore, the wise manufacturer is aware that if he fixes too high a retail price on his product it will militate against sales and be a constant temptation on the part of consumers to accept some substitute. His best interests in the long run are subserved by fixing a fair price only to consumers through the retailer.

Yet, despite all this, the decision of the Supreme Court was what might have been expected. To give control of anything after the producer has disposed of it—to allow one who does not own a given thing to fix a price upon it, whether such price meets the views of the owner or not—is sanctioning something that cannot be justified according to the rules of equity and justice.

MONOPOLY ABROAD.

Let no one get the idea that the United States is the only great country that suffers or is menaced by monopoly. Business and industrial monopolies exist to a far greater extent in most foreign countries. In some cases the markets are controlled by the government and in others by private concerns, but everywhere the tendency is strong to combine and give up competition, and this of course applies as much to labor as to capital.

We in this country complain a good deal about the Steel Trust, and probably there is reason for it. But there is a steel trust in the great Kingdom of Austro-Hungary that has so much less consideration for consumers than our steel trust has, that it is not in the same class. Most of the plants that comprise this combination pay from 35 to 40 per cent dividends, and the duty on imports is so high that foreign competition is kept out, although quite likely foreign competion would be futile, provided the Austro-Hungary trust were forced to sell their product at a fair profit.

The trust also keeps its production just at the point of consumption, and until recently all "went merry as a marriage bell" for the trust stockholders, who are mostly bankers.

But extremes always beget extremes. One combination compels another. No business man can prosper who is obliged to buy at the price fixed by the seller and also sell at the price fixed by the purchaser. For illustration, if the blacksmith is obliged to pay trust prices for his stock and tools—that is, prices fixed by monopoly—and is at the same time obliged to shoe horses or do other kinds of work under the sharpest kind of competition, he cannot prosper.

This the blacksmiths, locksmiths and wagonmakers of Austro-Hungary finally learned. So they formed a combination so strong and complete that an independent tradesman cannot well conduct his business without its support. And recently there was held at Vienna a congress of users of iron and steel, when it was decided to get a foreign company to make contracts to furnish them iron and steel for a number of years.

Of course this can have but one result—such a reduction of the profits of the home trust that it will soon sell out to the foreign company, which will thus control the entire Austro-Hungarian iron and steel market. And thus the consumers will find themselves in the grasp of a still wider and more powerful trust than now besets them.

The situation is interesting as showing modern business tendency abroad as well as at home. How will it all end? someone asks. Well, we don't know. The world moves forward, not backward. Matters will finally become adjusted, and let us hope peacefully and justly. It is gratifying to know that in the long run "right makes might."

AFTER NEARLY 84 YEARS.

The photographs of the venerable G. W. Bigelow of California, which appear elsewhere in this issue, are not as distinct as we would like to have them. When taken inside a blacksmith shop, where the light is seldom good, clear and sharp photographs cannot be expected.

But we like to look at these pictures of Mr. Bigelow, just the same. We like the one showing him at work at the anvil, for where can there be found proof of a better, a more honorable, a more vigorous old age? And we likewise take pleasure in seeing him at leisure, sitting calmly and easily, reading The Blacksmith and Wheelwright, of which he has been a most valued patron for many years.

What an honored and useful life he has led! "Toiling, rejoicing, sorrowing," for some seventy years at the forge, and yet hale and hearty at near his eighty-fourth birthday. Our heart goes out to him in good wishes and affection. May he live for many years in the enjoyment of health and vigor. And when the call does come—that fulfillment of the common lot which is just as natural and no less a calamity than birth—may he simply fall asleep as if "lying down to pleasant dreams."

USELESS LIVES.

Isaac Watts is best known as a hymn writer, and many of us have heard his hymns sung in the church of long ago even if we do not find them in the fashionable churches of to-day. But he wrote poems of a general character, and some of them are full of quaint sound sense and are examples of the clearest and simplest English. Here is one we ran across the other day that is surely worth repeating and preserving:

There are a number of us creep
Into this world to eat and sleep,
And know no reason why we're born,
But only to consume the corn,
Devour the cattle, fowl and fish,
And leave behind an empty dish;
The crows and ravens do the same,
Unlucky birds of hateful name.
Ravens or crows might fill their places
And swallow corn and carcasses.
Then if their tombstones, when they die,
Ben't taught to flatter and to lie,
There's nothing better will be said,
Than that "They've eat up all their bread,
Drank up their drink and gone to bed."

AN ENORMOUS DIVIDEND.

No one will begrude the ten million dollar dividend recently declared by the Ford Motor Company, automobile manufacturers. Nor will any one envy Mr. Ford himself because of the fact that he got $5,800,000 of this vast sum, he owning 51 per cent. of the stock of the company. Judging by the prevailing reports, few business men are held in such general high esteem as this hero of modern industry. His high reputation bears out the gratifying thought that few indeed are envious of the wealth or signal success a man achieves, provided he has secured that wealth only in proportion to his contribution to the general stock.

On the other hand, this tremendous industry, the success of which Mr. Ford would be the last man to claim as due to his sole talent and industry, has entailed a tremendous responsibility, and possibly he may be no more happy than a dozen years ago when he was a poor mechanic.

That wealth is the supremely valuable thing so many imagine, is denied by almost every one who has achieved it. Were it otherwise, we are inclined to think that Providence would not permit so many rascals to gain it who do not deserve it.

One of our subscribers the other day wrote that he had been taking The Blacksmith and Wheelwright for twenty-one years and had every copy for all that time carefully filed away where he could refer to them any time he wanted and he said that the back numbers had often been of great value to him. Can any reader point to a better record than this?

Legal Department

All legal questions answered free of charge. Address Communications to Editor "Legal Department," THE BLACKSMITH AND WHEELWRIGHT, P. O. Box 654, New York City.

Mortgage and Executor.

Question.—I bought a home and lot last year from a widow. She had two sons and one daughter. The daughter is married and lives here in town. One of the sons is in California and the whereabouts of the other is not known. Last fall the son came from California and took his mother and went back. There she died. She did not let me know before she went to whom to pay the interest and the principal next fall. The daughter made a hint to my wife that the mother left all to the son in California but that it would be all right to pay the money to her, although the matter would all have to be settled in court. She said she would see that we would not have any trouble, but suppose the court decides against her? What I would like to know is, what I shall do, hold the money until I hear from the son, or must I hire a lawyer and get him to look after it? Must I go to extra expense on their account?—A. K., New York.

Answer.—When the widow died all her rights to receive the interest and principal of the mortgage passed to her executor or administrator and he is the only one to whom you should pay any money. By no means pay it to any of the children. The proper thing for you to do is to write to the son in California, where I understand the widow died, and find out definitely who is the executor or administrator of the widow's estate, state the facts regarding your readiness to pay off the mortgage and tell the son that you will pay the amount of the mortgage to the executor or administrator of the estate upon receiving from the court which appointed the said executor or administrator, a certificate under seal of the court showing such appointment. When it comes to paying the amount of principal and interest due under the mortgage, draw your check payable to "Estate of (widow's name)." Do not draw your check payable in any other way and of course upon paying the full amount of principal and interest on the mortgage, insist upon receiving a Satisfaction Piece and do not pay the money until they have the Satisfaction ready to give to you. In the meantime you need not worry about your property being foreclosed.

The Carriage Builders' Convention.

The forty-first annual meeting of the Carriage Builders' National Association will be held in St. Louis, Mo., during the week commencing October 12th, 1913.

At the same time and place the annual exhibition of parts of vehicles, automobiles, models, new inventions, harness, horse equipment and

materials pertaining to the carriage, wagon, automobile and accessory industries, will be held.

For the exhibition purposes the committee have secured the Coliseum, one of the finest buildings for such purposes, and large enough to accommodate all who wish to exhibit.

Exhibitors must be either active or associate members of the Association.

The exhibits must be confined to models, parts of vehicles or automobiles, and to materials used in the construction of the same, or to coachmen's outfits, harness and horse furnishings. No finished vehicle will be admitted.

This exhibition is the members' own exhibition. They can take what space they may wish, from 8 x 8 feet to 20 x 100, or larger, if they desire.

At a meeting of the Executive Committee it was unanimously resolved that all members applying for space at the exhibition be requested to exhibit the goods they manufacture or deal in, and not merely maintain an office. The exhibition is designed for the information and benefit of the vehicle trade. It is hoped that all who participate in the exhibition will comply with this request.

Applications for space should be made to the Secretary, now, and should state the nature of the exhibits, as well as the space required. As far as it is possible, the space will be assigned in the numerical order of receipt of application. The sure and only method of securing the best locations is to make early application.

Payment for the space taken can be made with the application, or, if the exhibitor prefers, can be made on receipt of notice early in October. Receipts for same will be returned by the Secretary, and said receipts will be received as voucher for space, when presented to the Superintendent at the hall.

For further information address Henry C. McLear, Secretary, Mount Vernon, N. Y.

BOILER REPAIR.

One Job and the Way It Was Done, Together With Other Kinks and Thoughts.

BY JAMES F. HOBART, M. E.

The blacksmith shop seems a queer place in which to do a job of boiler making, but recently one came into the shop to have new tubes inserted. It was a small 20 H. P. locomotive type of boiler on skids, semi-portable with an engine bolted to one side of shell. The power shaft and a winding drum were fastened in front of the boiler.

This boiler had the gauge cocks broken off, the feed pipe was also smashed and the tubes were so badly corroded that it was necessary to remove them. In fact, after cleaning out the tubes they were found to be very thin at the ends, so much so that it was not safe to try to use the boiler without new tubes. A little handhole at the lower side of each head was the only opening for getting inside the boiler to do work. When the handhole plate was removed the bottom of the boiler was found filled with sediment, which had to be loosened up and dug out with a small scraper which was made for that purpose from a bit of flat iron.

Being of the locomotive type, the boiler of course had water legs around the furnace. These were cleaned out and found in good shape. There were no leaks either in the bottom of the legs or around the furnace door, but the tubes were found so badly pitted and corroded that they had to be condemned.

In order to get these tubes out, one man went inside the furnace with a cold chisel. Another man went to the other end of the boiler and commenced to drive the ends of the tubes inward, not in towards the center of the boiler, but inward towards the center of each tube. The fire box ends of the tubes were beaded over, but the smoke box ends were simply expanded and left projecting ¼ in. or so. Placing a cold chisel against the side of the tube, it was easy to drive a portion of it inward clear of the shell. By working all around the tube in this manner the ends were soon puckered inward and entirely loosened from the tube sheet. In order to get the tubes out, it was necessary to remove the handhole plates as stated above, and it was also found necessary to clean out a lot of mud and loose scale in the bottom of the shell which had filled in completely between the lower tubes.

The manner in which the tubes were arranged in the boiler is shown by Fig. 1. The handhole plate is also shown, which, being removed, permitted tubes 19 and 20 to be juggled around and pulled out of the handhole. These tubes being out of the way, the others were loosened one at a time, 15 and 16 first, and pulled out of the handhole. Then all the other tubes were loosened and pulled out, those nearest the handhole being taken out first.

It was found that the tube sheet at the smoke box end of the boiler was in very bad shape. It was quite thin and weak, but it was decided that the head would stand for one more set of tubes, which were 3 in. in diameter and 5 ft. 4¾ in. long between heads. Owing to the deflection of the heads, the tubes were found to vary considerably in lengths. Therefore the openings were marked as shown by Fig. 1, being numbered from 1 up to 20 inclusive as shown. In order to determine the exact length of each tube, a tube stick was made as shown by Fig. 2. This was merely a piece of hardwood with a small lag screw A through it, close to one end, that end being pointed in order to easily enter one of the tube openings in the boiler head. To use this stick the pointed end was pushed into the boiler through both heads; then the stick was turned upside down until A, being under, would engage the farther head when the tube stick was pulled backwards. In this position a mark was made on the outside of the other head, and a separate mark was made for each tube, as shown on the right hand end of the tube stick. This edge of the stick marked the length of tube 1 in Fig. 1; marks 10 and 15 gives the lengths of tubes numbers 10 and 15, and marks 13 and 18 on the other side of the stick show respectively the

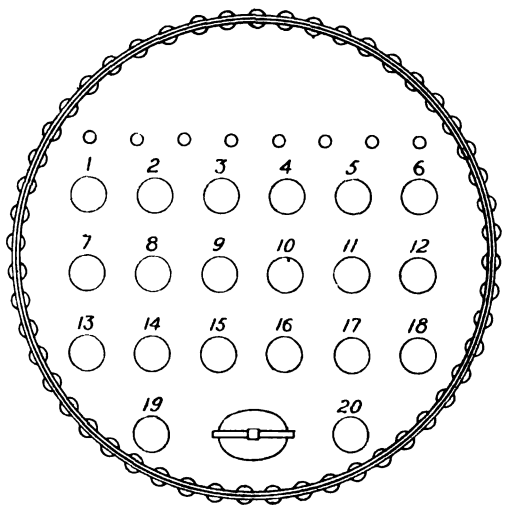


Fig. 1—Marking Tube Sheet.

lengths of tubes 13 and 18 in Fig. 1. In this way the exact length of each tube was ascertained and marked. Then an allowance was made of ⅞ in. in order that each tube might project 7/16 in. through the head to supply the metal necessary for expanding, beading, etc.

Against the wishes of the writer, the owners of the boiler determined to use second hand tubes. Accordingly twenty tubes each 5½ ft. long were ordered, but the dealer sent twenty second-hand tubes 12 ft. long, enough to make forty of the short tubes necessary. The writer selected thirteen of the best tubes and sent the others back, and then cut off the tubes to the right length in a lathe. The second-hand tubes were found to be pretty bad, and three were rejected while cutting them off. These tubes were inserted, but two were split while they were being fastened into the boiler heads. Two more ends failed during the expanding, although each tube end was heated in the smith's fire and allowed to anneal before putting them into the boiler. The boiler was then filled with water and two more tubes failed to hold, even under very little water pressure.

The writer decided then and there that he would never put second-hand tubes in a boiler again under any consideration. Therefore, two more tubes, new ones this time, were ordered to replace those which failed during expanding. A bad leak developed in No. 13 (not because it was No. 13 but because there was a hole in the tube) and the tube sheets played outward during the expanding of tube No. 13. After expanding tube No. 13 still leaked. Even after it had been beaded over the leakage continued, and it was not possible to make this tube tight owing to the weakness of the head, which would give first one way and then another, accordingly as pressure was put upon it by driving, calking, and beading the tube ends. It was then decided to put in a new boiler head. Accordingly the tubes which had just been put in were taken out again and the rivets which held the head in place cut off.

To cut off a boiler rivet, simply make up a tool something like the cutter which is used on a handle and struck with a sledge when heavy cutting operations must be done at the forge or elsewhere. It only required a few minutes work to break off the rivets which held the head in place. Afterwards the head was driven out of the boiler by means of a piece of shaft used as a battering ram. The boiler head was then sent away to a boiler manufacturer with instructions to make a new head exactly like the old one and return the new head P. D. Q.

In order to make an easy job of riveting in the new head it was ordered that the holes in the flange be countersunk inside, so that the driving of the rivets could be done on the outside of the shell. The rivets, of course, had countersunk heads to fit the countersunk holes. The rivets were heated in the forge, and a sort of hook made whereby a sledge hammer could be held underneath or against each rivet while the rivet was securely headed down on the outside of the boiler.

But a boilermaker, or any other man, cannot work all the time at one and the same thing, without getting tired—yes, more than tired, and unless he makes a change, he will eventually go "bug-house" or else fall into a general physical decline. After a man has hammered iron all day, be it horseshoes or boiler rivets, he needs a change of work—recreation—the "wise guys" call it, therefore the usual man goes afishing, to the saloon, or loafs on the corner for a few hours until his nervous and muscular systems have recovered from the strain—equalized themselves, if you please, and then the man feels like tackling his old job again.

But there is a much better way of recovering from fatigue, than sitting in a barroom and playing cards or otherwise passing time thus. All a man needs, in order to become rested, is to change his work—his occupation, or whatever you may call what he was doing. And a profitable form of work, provided it be totally different, will rest a man, under certain conditions, as quickly as will actual play of any kind—worthless horse play or regular boy's play, either or both.

A man wouldn't care about chopping wood for an hour or two, after doing a hard day's work! In fact, the writer is dead sore against cutting wood at any time—but a little bookkeeping wouldn't go amiss and it would rest the muscles while being a profitable bit of work.

Writing a short letter to The Blacksmith and Wheelwright is also another very desirable bit of recreation, and it rests the bodily-weary very much. Working out ways and means for improving one's business, is another bit of work of different character, which will be profitable "play" for the tired worker.

I know of one man who spends his resting time in working up odd and attractive signs and notices, and, being a bit of a card writer as well, this smith takes in quite a number of dollars by selling the signs, mottoes and maxims which he has studied out and painted upon cloth or paper. Among the signs which this man has made and sold, during the past few years, are the following, which are but a very few, selected

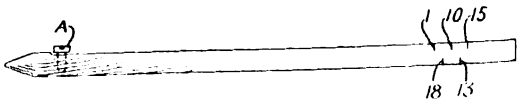


Fig. 2—Tube Stick

from almost innumerable examples of his work—or play:

X.....X
: RENT is HIGH :
: PRICES ARE LOW :
: ASK for CREDIT :
: OUT you GO! :
X.....X

There is a smith away up in New Hampshire who, being alive to the necessity for catching the lively penny as well as the nimble dollar, has added to the business a small general store. Being necessarily alone a considerable portion of the time, and not being able to be in two places at once, the "store" is left unattended for different lengths of time, and the smith evidently has been troubled by "brethren of the road" or others, who slip in the store and carry away goods without bothering to pay for them. The follow-

ing sign or notice is prominently displayed in the "store":

X.....X
: The Lord helps the man :
: Who helps himself, but— :
: Lord help the man caught :
: Helping himself here! :
X.....X

That's all for notices, but there is a bit more to be said about the man who wants to get done all the work he is capable of turning out without injuring his body or mind. To such a man I give the advice of one who has tried it: "Don't try to do all you can at any one kind of work. Have two kinds at least, and three kinds is better; then change off from one to the other as the body or mind becomes wearied from long continued application to any one of the several kinds of work."

The above is the real reason why the farmer-smith can get away with so much more work than the man who tries to stick to the forge 12 hours a day. If the latter mechanic could have an entirely different kind of work to do during the excess portion of time he must labor, then he would do more and last longer. In the same manner, though to a lesser degree, it can be done by two men in the shop. One at the forge, the other on the floor. If these two men can change work occasionally, they can both do much more than if they both stuck to the same thing all the time.

Some of the "Efficiency Engineers" will doubtless dispute the above—provided they ever see it. By the way, an "Efficiency Engineer" is a chap who is employed by big manufacturers to save all the time possible in doing certain kinds of manufacturing work. They figure out exactly the best motions, cut out all the useless ones and reduce the operator of the machine to a mere attachment thereto, holding the stop watch over him until he becomes a mere automaton, performing certain prescribed motions at certain times and keeping the machine at work all the time possible. That is what the efficiency engineer is expected to do, and the smith can apply a little in his own business, particularly when he makes foolish motions around the anvil and in some other places. But even the efficiency engineers have found that the human laborer or human machine is capable of only going just so far without making a change—or doing some "play-work" to rest the tired muscles and nerves. And as "play" is only a change of work it is up to the smith to make his play useful when necessary, instead of spending both time and money in forms of "play" which don't rest the man half as much as some other, and very profitable kinds of play.

There is just one more notice which I want to bring to the smith's notice, and as it is a boilermaker's maxim, it is fittingly a closing line for this story. It is this:

"When you work, work like thunder," same as a boilermaker.

"When you play, play like thunder, and keep your tools in a nail-keg" same as a boilermaker!

As "play" is only a change of work the above is mighty good advice.

The Nebraska Lien Law.

The following are the provisions of the new artisan's lien law, recently passed in Nebraska:

Section 1.—A person who makes, alters, repairs, or in way enhances the value of any vehicle, automobile, farm implement or tool, or shoes a horse or horses at the request or with the consent of the owner, shall have a lien on such vehicle, automobile, farm implement or tool, or horse or horses whether in his possession or not, for his reasonable or agreed charge for the work done or material furnished; provided that the person making such repair or furnishing such material file in the office of the clerk of the county in which such work is done or material furnished within 60 days a verified statement and description of the work done or the material furnished and a description of the article so repaired, altered or furnished, or the horse or horses shod.

Sec. 2.—Such lien, so filed, shall become paramount to all other liens except those of like nature and shall be treated in all respects as a chattel mortgage and be foreclosed in manner and form as provided by law; provided however that such foreclosure proceedings be instituted within six months of the filing of such lien.

Sec. 3.—Whereas, an emergency exists and this act shall be in force upon and after its passage and approval according to law.

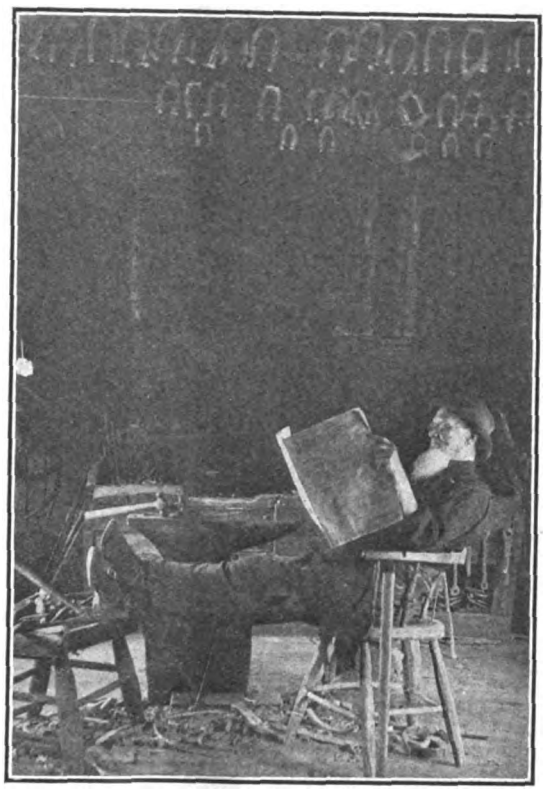
Correspondence

After 71 Years at the Forge.

From G. W. Bigelow, California.—As Brother Galisbe has written how long he has worked at blacksmithing, I will give a short sketch of myself. I was born in 1829, and in 1841 my parents moved to Wisconsin. My father was a blacksmith and I being 12 years old, worked at odd

Mr. Bigelow at the Forge.

times making mink and fox traps and used to blow and strike for father. At the age of 14 I shod my first span of horses and from that time I did all the shoeing. We had a good deal of repair work, and made good breaking plows and ironed wagons and carriages. At that time we made all our own bolts and carriage springs. At



Reading The Blacksmith and Wheelwright.

the age of 20 I rented my father's shop and began on my own hook and am still at it. I was 83 years of age October 4, 1912, and have worked 71 years at the forge, although the first two years at odd times. I find a good many interesting things in the Blacksmith and Wheelwright, but I don't ever expect to finish my education at the trade, and when a brother says he learned it in three years I would like to sit down and ask him a few questions.

Good Shoeing Information.

From J. E. Justus, North Carolina.—There are very few blacksmiths who ever think what a piece of machinery a horse's foot is, and by careless blows they frequently stop the working of the machine. Some smiths, as soon as they pick up a horse's foot, go to paring the heel (because it is the most convenient part of the foot) destroying the best brace of the foot, and in many cases causing contracted heels. A horse's heel should be kept up and the toe down. By lowering the heel you throw the entire weight of the horse upon the back tendon of the legs, producing lameness by overtaxing a very important set of tendons. By keeping up the heel you throw the weight upon the wall of the foot, and this position prevents stumbling, clicking, etc. You must not pare away the sole of the foot until you can spring it, and you must not pare the bar from the foot, which acts as a brace, or you will ruin the horse's foot. Never cut the frog of the foot. All cutting of the bar and frog of the foot is an injury to the horse as well as to the owner of the horse. Corns are caused by this process of cutting. The frog has been placed in the foot by nature to expand the wall of the foot, and when you begin to cut it out the oily substance begins to run out, making the hoof hard and brittle. The nerves of the foot are very sensitive, and smiths should be careful not to prick the foot, as it requires quite a time to relieve them. If you keep a horse well shod, with the feet in good condition, you can then manage the balance very nicely.

Another source of great injury to horses is the practice of cheap blacksmithing. A man who has not spent any time or money properly learning his trade can shoe a horse for a few shillings cheaper than a well-informed smith, but the patrons of such cheap shoeing are the losers.

It is of the greatest importance that the frog should never be pared down. If the frog hits the ground before the shoe does, it does not hurt the horse, it keeps his heels spread wide. You might let the whole weight of a horse come on the frogs of his feet, and it would not lame him.

Don't burn the horse's foot when fitting the shoe, as it is a great injury to the foot.

Don't whip horses to make them stand, for nine times out of ten it will make them worse.

It is natural that horses should dislike to be shod. They don't like the hammering on the feet which shocks their nerves. They should be taught at home by the owner how to handle their feet. It will save the smith a great deal of trouble and labor that he never gets any pay for.

No man ever thinks of paying anything extra for shoeing a bad horse, but I always charge more. The wall of the foot should never be rasped above the nail and very little below the clincher. The nails should be countersunk in the shoe and the clincher will not rise.

No horse interferes with the heel or toe. It is always with the side of the foot. The habit of turning the inside of the shoe under causes a number of horses to interfere that would not if they were shod straight on the inside. Spread the heel as wide as possible, set the outside a little under, and keep the toe full.

For clicking horses pare the heel high and cut the toe short. Don't use too heavy shoes on small feet or you will ruin them.

A Good Business Policy.

From F. A. Speak, Indiana.—I have read many articles on methods of conducting business and regulating prices, but have never read one on the plan that I follow. I have been engaged in the general carriage repair business in this little city of 6,000 inhabitants for eleven years and I have all the work I can handle almost throughout the year. I build a new job only when ordered. I set my own prices for doing work regardless of competition, and there is no individual that can get his work done for one cent less than the first price I ask him. I have one price to everybody. I do exactly as I agree to do, and my customers know that when they bring a job to my shop the work will be done right and without fear or favor. My motto is "Honest toil for your worthy dollar." I trust only the people I know will pay, and I have always money in the bank to discount my bills. Now, I think if some of the fellows that are always complaining about prices and competition would adopt a system of their own and and run their business on a business basis, and are me-

chanics enough to command a fair price for their services, they would not have so much time to complain about the other fellow. I do not claim to know it all, but I do claim to know my own business better than I know somebody's business that is not my own, and I don't spend any time running around to see what the other fellows are doing. I spend ten hours a day with my sleeves rolled up working at my own business.

The English Blacksmith.

From Charles Barker, Massachusetts.—When a boy is indentured in England as an apprentice to a master blacksmith, he has a long term of hard labor as well as small wages. The term of apprenticeship is usually five years. His allowance for spending money is for the first year about 3 pence—6 cents—per week, and each year being doubled, the fifth year he is earning 4 shillings per week, or about one dollar. This sometimes varies according to the terms of the original agreement, which is drawn up on a legal indenture document. In addition to the financial consideration, the master agrees to provide food, lodgings, and washing. Each blacksmith or fireman is entitled to two apprentices, but usually there is but one, and the first duty taught the apprentice is to strike for the fireman. Besides this, he is taught to pull horseshoes, which constitutes his education for the first year. By the end of the second year he is able to be a nailer, or driver. From this on his work advances until he has mastered the forge, and takes his examination.

During his term of service, a representative of the Worshipful Company of Farriers, congregates all the apprentice boys within a given district, at a central point on a designated Saturday afternoon, using the closed shop of some local farrier. Here the boys are given instructions in anatomy, besides mechanical and constructive knowledge. These gatherings are held several times a year, attendance being compulsory. A preliminary or floorman's examination occurs before the board of examiners of the Worshipful Company of Farriers, and the final or fireman's examination cannot be taken until the apprentice is twenty-one years of age. When his final examination is finished he is in due time in possession of a coveted diploma, stating he is a "registered master," officially signed and sealed with the common seal of the Worshipful Company of Farriers. The certificate states that the Worshipful Company was established in 1356, incorporated by Charles II, 1674. This certificate entitles the holder to work in any shop in England at full wages. The wages of a fireman is 2 pounds sterling or about ten dollars per week. In some shops drivers are employed who work piece work, or about 36 cents per horse.

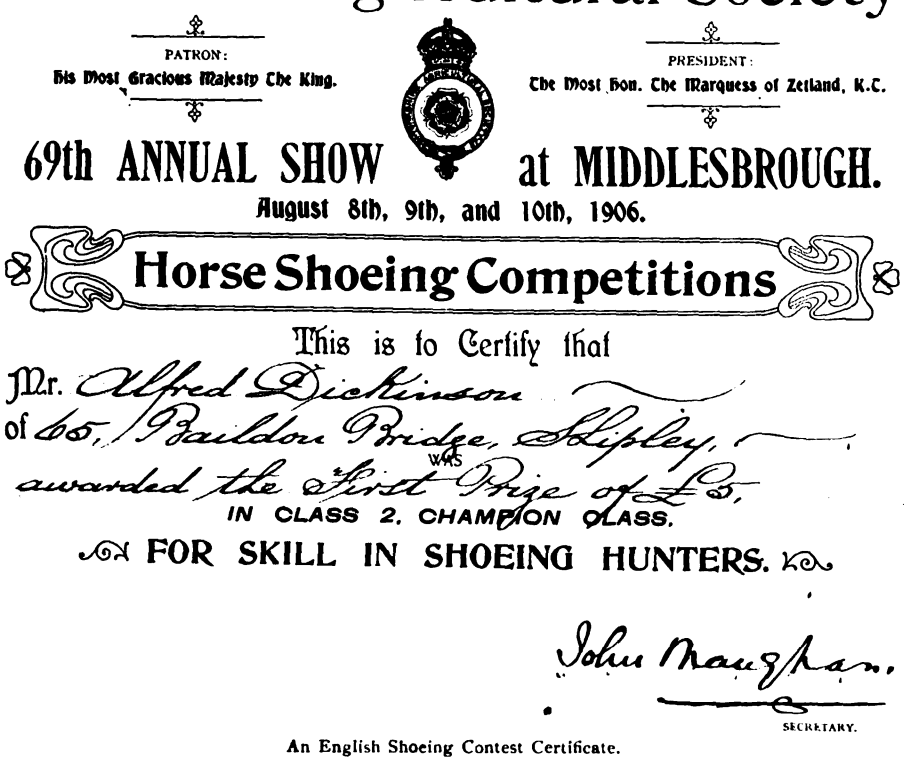
The Employees' Union feature a sick benefit of $2.50 per week, also when members are out of work they are entitled to half pay for a limited time. An assessment of about 50 cents per month is levied for this purpose. Master shoers' prices are in large cities, 6 shillings or about $1.50; smaller places, 4.6 or about $1.10. Fancy driving horses 8 shillings, or $2.00.

An event eagerly looked forward to each year is the "Royal Show of England," which is patronized by royalty and operated in a different county each year, and is similar in character to the agricultural fairs of the United States. At each of these Royal Shows occurs the annual horseshoers' contest. The entries number from 75 to 150, divided into three classes. Six forges and anvils are used. Each contestant is entitled to one helper whose duty is simply to strike and nothing else. The contestant is required to make one front and one hind shoe, besides nailing and finishing one of them. Time limit, 35 minutes—apprentices being allowed 45 minutes. The scoring consists of 40 points:

10 points, removing shoe and dressing hoof.
10 points, making two shoes and fitting one.
10 points, nailing and finishing.
10 points, time inside 35 minutes.

The prizes consist of six cash prizes ranging from $5 to $25, also one reserve cash prize, together with two very high commends.

Each winner receives a diploma, which eventually finds its way into his shop to become blackened, as might be expected. Thousands of onlookers applaud their favorite, urging him on to success, only to cause him more nervousness and loss of a winning prize, as is often the case. On the occasion of the contest represented by the illustration, King Edward, who was patron of the day, after keenly viewing the contest addressed the gathering: "Men," he said, "you are a lot of good rugged fellows, and I am glad to meet you. Blacksmiths like a glass of beer, and if there is anything they like better than one, it is two, but don't take too much of it. I like one myself. Good bye, boys."



An English Shoeing Contest Certificate.

Up-to-Date Kansas Blacksmiths.

Mr. G. W. Wilson, president of the Blacksmith, Horseshoers' and Wagonmakers' Association of Kansas, with secretary Austin English, and Messrs. Ed. Boherer and Perry Buckley, recently took a trip to Salina, of that State, where they helped form a live local association which is to be joined with the State association. Mr. Wilson says he found a live town and a live set of mechanics. By the way, it was largely through the efforts of Mr. Wilson that the Kansas lien law was passed by the legislature last March. The following are its provisions:

Section 1. That a first and prior lien is hereby created in favor of any blacksmith, horseshoer or wagonmaker upon any goods, chattels, horses, mules, wagons, buggies or other vehicles or automobiles and any farm implements of whatsoever kind, which shall have come into the possession of such blacksmith, horseshoer or wagonmaker for the purpose of having work on said property, or repairs, or improvements in anywise appertaining thereto, and said lien shall amount to the full amount and reasonable value of the services performed. And shall extend to, and include the reasonable value of all material used in the performance of such services.

Section 2. That said lien shall be filed for record with the recorder of the county in which said services were rendered within sixty days thereafter.

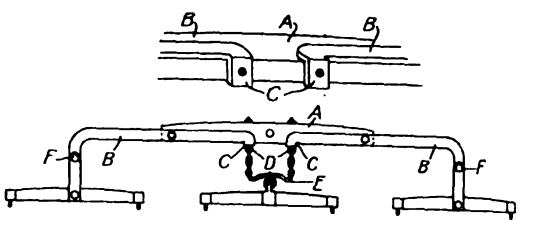
Section 3. That said lien may be enforced and foreclosed as chattel mortgages are now enforced and foreclosed.

Section 4. This act to take effect and be in force from and after its publication in the official state paper.

A Three Horse Evener.

From B. Batzner, Oregon.—I am sending you a sketch of a three horse evener for a side hill plow that I made last summer which may interest some of the readers, as I have never seen anything just like it. A is a common hickory double-tree 2 x 4 inches. B is two irons 29 x 2 x ½ inches. At CC the end is turned down to fit against the edge of double-tree A, with holes drilled in center to take eye-bolts D, which consists of the 2 eye-bolts with two links and a double hook, E, and by shifting the center of the single-tree from one side to the other, you make the change that is necessary for a side plow. The outside single-trees are fastened on at FF with strap devices. It is best to have plenty of room in the center of the double-tree, or the single-trees will strike when in use. These dimensions are for 28 inch single-trees.

I live on the Nehalem River, seven miles from the river bar. I came here five years ago this coming August. At that time this was a new country with very few horses here, but now I have considerable shoeing to do and am busy at something all my time, as I own a general repair shop.



Mr. Batzner's Evener.

I see quite a few of our brothers think we should have different laws in regard to horseshoeing, and I think they are right. But what we need here the most of all is a law to compel the owners of horses to have their horses shod oftener, as some (and most) of them leave the shoes on as long as they will hold, and if I tell them to come in at least every six weeks to have their teams shod they will only think that I want the job oftener. Just think, I shod a stallion on October 24 and he was not brought back to have his shoes reset until March 6, and this stallion is worth at least $750.

I have considerable work on motor boats, as there are about 75 on this river, mostly fishing boats, this being quite a stream for salmon. I could give a good sketch for a cage, or basket as it is usually called, to keep the fishermen's nets out of the propeller wheel, as I think I have the best model I have ever seen. If any of the brothers have any call for it I could help them out.

Wood Filling for Coach Builders.

From Robert Lubman, Ireland.—I read with much interest the article in a recent issue on wood filling, as I am a coach-builder and have tried different fillers. The one I now use perhaps others would condemn, although I find it does my work fine and is very cheap and simple. I use it chiefly on elm as it is very porous. I mix together equal parts of linseed oil and turpentine and apply it with a brush over the panels. I then take common whiting and color to any shade with umber or senna, or any dry coloring matter you wish, and dust it over the wood (still wet) plentifully, and then take a coarse cloth or a lump of waste and rub well into the pores until all is dried off. Let it stand for a day and then you can apply size and varnish. This gives a good solid surface for I have proved it.

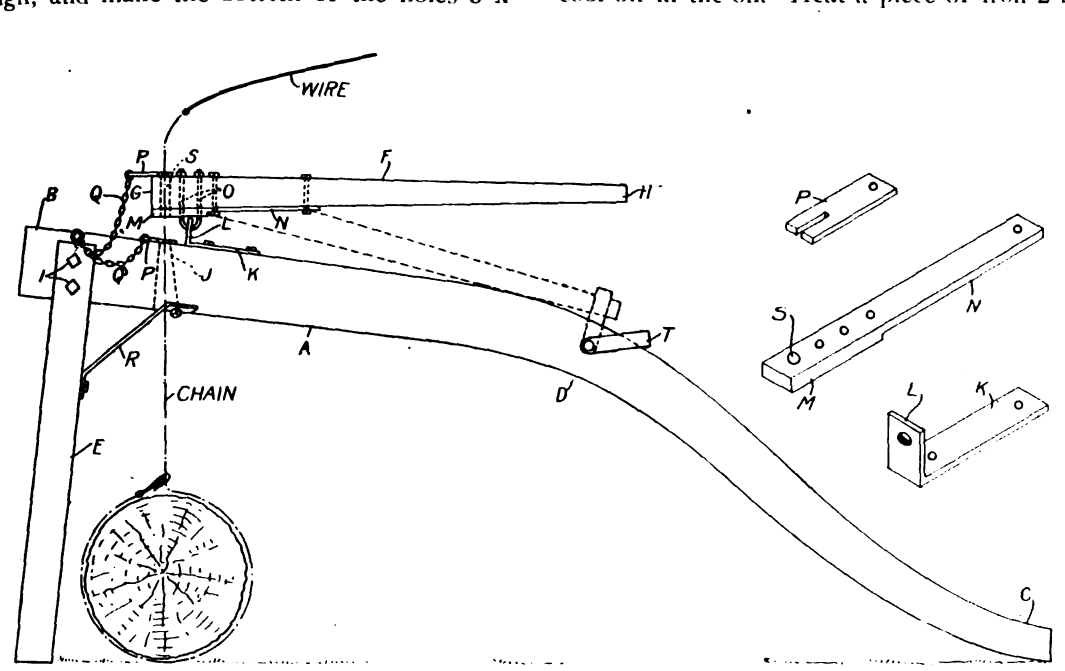
Good Advice to Those Who Retire.

From J. F. Arndt, California.—It has been nearly two years since I retired from blacksmithing, but still I am always glad to receive and read your journal. I made a success in blacksmithing. Now I am happy and contented on my

little five acre fruit farm. I have three acres in Gravenstein apples, two acres in all kinds of peaches, cherries, apricots and some good winter apples. I would advise all brother smiths when they are ready to retire from the business to go and live on a farm and be happy.

A Powerful Log Lifter.

From Thomas Kirk, Washington.—I will show how to make a powerful log lifter. It will lift a green log 2 feet thick and 16 feet long with ease. When a man once has one he will never get along again without one. He can raise a log up to saw it, and when clearing land, he can raise old trees that are half buried in the ground. If made of light timber, such as dry cedar or poplar, a man can carry it on his shoulders, as it balances well. First we have to get a pole, A, 12 feet long, and 9 or 10 inches thick at the big end and 4 inches at the top, C. It must have a crook in it like D. Then we get two legs, E, 4 feet 5 inches and 5 inches thick. Then we get a pole, F, 5 feet long and 4 inches at the big end, G, and 2 inches at the small end, H, for the lever. We now fasten the two legs on the pole with two ½ inch bolts at I. Then bore holes in the large pole for the chain to pass through, and make the bottom of the holes 3 x



Mr. Kirk's Log Lifter. The details at the right are some of the parts.

¼ inch, so the chain can have some play. Make the lever bearing of a piece of soft steel, 2½ x ⅝, and 12 inches long using it as shown at L. Punch a hole ¾ x 1 inch in three inch end, near the top as shown, and two ½ inch holes near the long part to bolt it on with. The iron for the lever piece, M, and the longer piece, N, should be 5 inches and 14 inches long, respectively. The piece M should be welded on the piece N, as shown, and the four holes bored as shown, the hole S being for the chain to pass through, the other half inch holes being for a staple to pass through. The hole at the end of the piece N, being for a bolt also. The pieces P, are made of flat pieces of steel, 3 inches long with a slot cut in as shown. This when in position is to grab the chain with. The chain is shown—or rather the chains—in the complete device so that there should be no difficulty in knowing how it works. The construction of the device can perhaps be better understood by the drawings of the device and of the parts than by further explanation, which is rather difficult to express clearly.

For Hard Putty.

Hard putty may be softened by means of a paste of equal parts of caustic potash and powdered fresh quicklime mixed with water and a little soft soap. The paste is applied over the hard putty. A similar paste is composed of three parts quicklime slaked in water and one part pearl ash reduced to the consistency of paint. Soft soap is also efficient for the same purpose. It requires about twelve hours.

A Linseed Oil Test.

A simple practical test for linseed oil is to mix the sample with three times its weight of genuine white lead, and cover a perfectly clean glass or metal surface with the paint. If the linseed oil is impure the drying will be slow.

ANSWERS TO CORRESPONDENTS

Under this head will be found each month replies to questions asked in previous issues. Our readers will appreciate the importance to inquirers of furnishing the desired information as promptly as possible.

Temper for Rock Chisels.

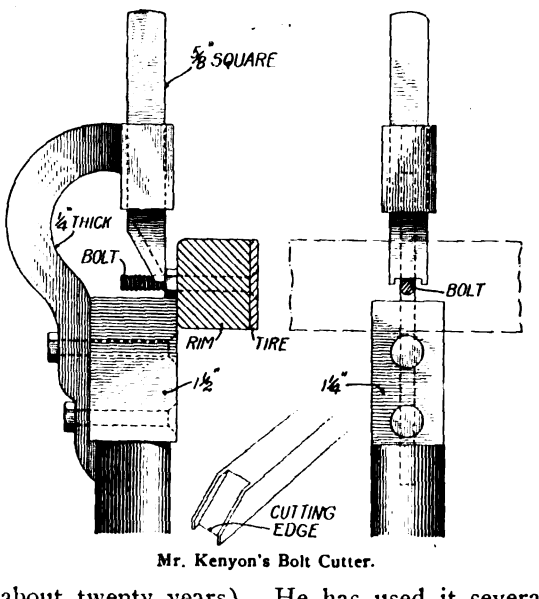
From Frank Lyall, Washington.—A reader in the May number wants to know how to temper chisels for cutting rock. Also how to temper knives and axes. When dressing chisels for rock use, never overheat the steel. Work it with as low heat as possible. Temper in water and draw to a sky blue color. If the rock is unusually hard, draw to a copper color. Never cool the bit off more than one-fourth of an inch from the cutting edge after the color has appeared. In tempering knives and all edge tools, I use linseed oil. First, warm the oil over the fire. Heat the knives or all to be tempered to a red heat and cool off in the oil. Heat a piece of iron 2 by ¾ inch red hot. Take the knives out of the oil; dry and polish the sides bright. Hold over the hot iron, continuously moving it back and forth, so as to get an even heat, until the red and blue mixed color appears. Then plunge in water. In case the object should be warped, straighten on the anvils before plunging.

A Tempering Bath.

From G. E. Stuart, Montana.—In answer to H. E. Wiechert, Illinois, I will say that I am using what is called here fuel oil and salt with good results. I have no trouble in taking the fire from a plowshare, but I was foolish enough to try and temper a six-inch well drill in it, and then I had fireworks that came near burning the shop down. I have not been successful in getting a wood tank to hold oil after it gets hot. Ten pounds of salt to five gallons of oil are what I use.

For Cutting Tire Bolts.

From Charles Barker, Massachusetts.—This handy tool was made by J. F. Kenyon, Attleboro, Massachusetts, one of your oldest subscribers



Mr. Kenyon's Bolt Cutter.

(about twenty years). He has used it several years for cutting tire bolts. I saw it demonstrated and it works fine, being quicker than with shears and cutting the bolt more closely and very smoothly against the nut. The measurements given in the illustration will show the size and it is also fairly clear in detail.

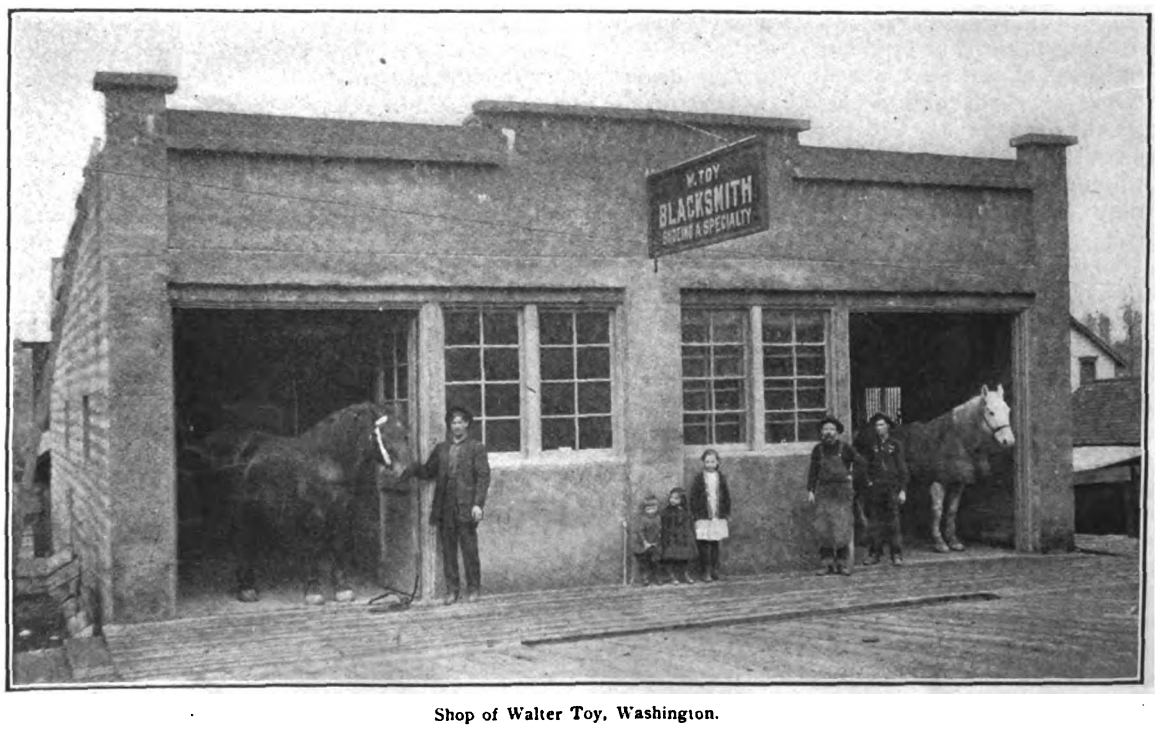
QUESTIONS FOR OUR READERS

You are invited to ask questions freely on all points pertaining to your work. Our subscribers who have solved successfully the problems which confront you will take pleasure in imparting the results of their experience for the benefit of their fellow-craftsmen.

Remedy for Forging.

From Thomas J. Locklin, Missouri.—Could you give me a remedy through your paper for a bad case of forging? If you can it will oblige me.

Note by the Editor.—A good many articles, first and last, have been published in The Blacksmith and Wheelwright in relation to forging, and for that reason, fearing that none of our readers may think it worth while to reply to Brother Locklin's request, we give one way that is often taken to cure forging, although it may not be infallible: Use weighted shoes behind, and make the front shoes narrow and slope the toe off slightly. Also, slightly slope off the heels of the hind feet. This, we believe, is supposed to rather help the front feet to make a longer and quicker stride and at the same time rather retard the hind feet. We do not claim any originality for this remedy, or guarantee its efficacy. It is



Shop of Walter Toy, Washington.

merely given on the endorsement of an old reader. We should be glad to have others answer Mr. Locklin.—Editor.

Weight and Strength.

From E. E. Brubaker, Ohio.—I have a question which I wish correctly answered either by the editor or some of the craft. If a 100 pound man pitches a 10 pound weight 10 feet, what size weight and how far should a 90 pound man pitch to be in proportion to the 100 pound man?

Reply by the editor.—If a 100 pound man can pitch a 10 pound weight 10 feet, a 90 pound man can pitch a 9 pound weight 10 feet or a 10 pound weight 9 feet, if he has the same relative strength.

Retempering Taps and Dies.

From E. E. Otis, New Mexico.—My shop was burned last month and I had a bolt machine and pipe taps and numerous other taps and dies in the fire, and would like to know if I could temper them. If I could it would make a great saving to me. I should like to hear from some brother smith on this question with full particulars how to do the tempering.

Springing In a Spoke.

From W. T. Dunn, Canada.—I want to ask through your columns how to spring in a spoke in a wagon wheel. I mean without taking off the tire or felloe.

(Note.—This is rather an interesting question. We don't recall that it has ever been asked before and we hope our practical readers will respond promptly.—Editor.)

Engine Plowing Outfits.

From G. E. Stuart, Montana.—I would like to know what success the brother smiths have in collecting for work done and material furnished upon engine plowing outfits. I have found them very slow pay.

Welding Flat Iron.

From C. W. Morgan, Texas.—I have no trouble in welding round iron, but I sometimes burn flat iron and get no weld. Will some one tell me the trouble?

Short and Long Profits.

What is a merchant's profit on a buggy? That depends upon the cost of doing business, but, in general, it may be laid down that 25 per cent above delivered cost is about the right figure in the average locality. This should not be difficult to get, for not a few men in the buggy business get more. Their right to a larger figure is to be seriously challenged.

It is this sort of merchandising that helps drive the farmer to the mail-order house. When he learns that in some isolated instances the merchant is making nearly 50 per cent above delivered cost on the sale of a single buggy, it makes him mad. Can anybody blame him?

One dealer in the Missouri Valley handles a line of vehicles that cost him, delivered, $72 per job. He sells them at $105—making a profit of a little more than 45 per cent. In spite of the fact that his gain is excessive he has been in business a number of years. His experience, at any rate, is useful to the trade in that it shows what can be done. Just such methods of "piling on the price," however, are doing more than all else to encourage direct selling.

But most of the fault with the average dealer is on the other side. He demands too little profit rather than too much. The dealer who gets more than his share is so rare that he is only to be cited as a living example of how not to do business.—Weekly Implement Trade Journal.

Soldering Aluminum.

In soldering aluminum difficulty is encountered in getting beneath the slight film of oxide which forms over the surface of the metal and which is caused by exposure to the air. The oxide is the same color as the metal and cannot be distinguished easily. The object sought is to get underneath this oxide while the surface is covered with molten solder. Remove all dirt and grease with benzine, apply the solder with a copper bit, and when the molten solder is covering the surface of the metal, scratch through it with a steel wire scratch brush. This will break up the oxide underneath the solder, which containing its own flux, takes up the oxide and enables the surface of the aluminum to be tinned properly.

THE VILLAGE BLACKSMITH NO MORE.

Under the brilliant electric sign
  The village garage stands,
The building towers large and fine,
  With great and mighty spans;
And the owner of this modern shop
  Sits 'neath his electric fans.

His hair is parted in the middle;
  His face serene and fair
As ancient Nero with the fiddle;
  He knows no earthly care;
While others toil and work and sweat,
  He sits his easy chair.

His victims come in one by one,
  He takes their coin galore;
Says to himself: "Now this is fun,
  I'll sit and wait for more."
He diagnoses troubles fast,
  Points out about a score.

What cares he for Sabbath morn,
  The sweetness of the choir?
This day he rises at the dawn,
  To let his cars for hire;
To remonstrate with such a cuss
  Is pouring oil on fire.

When you run in just for gas
  (Your car's been running fine),
This garage man exclaims, "Alas!
  I see an ugly sign.
Your carburetor's out of fix."
  It costs you eight or nine.

Thanks, thanks to thee, thou grafting prince,
  The lesson thou dost teach:
If you get me in your place again,
  You smooth and oily leech,
You'll simply pour in oil and gas,
  Nor touch a single screw;
Fictitious troubles in the past
  Have put me wise to you.

C. G. Hill, Thomasville, N. C.

A SMALL IRON FOUNDRY.

How to Build One and How to Lay Out and Do the Work.

Many of us have found difficulty in getting castings when we thought we ought to have them, and still more difficulty in getting castings that will meet the requirements of smoothness and freedom from other defects. It is with this consideration that the following from a paper read before the British Foundrymen's Association may have some interest to readers who not only would like to know something about the business but possibly for some others who might like to go into a business that requires more care than capital and more industry than technical knowledge:

At the commencement there ought to be a very definite plan of business. The iron foundry has a very wide range, and the writer would suggest that it is best to confine attention to one class of work if possible. There is a great future for specialization in the supply of single articles for various trades, such as cylinders, propellers, condensers, bed plates, or even firebars, for marine and similar work. A foundry specializing in the supply of single articles in this way, if established on right lines and well equipped, would be much more profitable than the present all-round establishments. There is also the jobbing foundry, for which there will always be a place, and it is the commencing in a small way in this class of foundry with which the writer particularly wishes to deal. It is important to understand thoroughly that the business exists to meet the customers' requirements and convenience. The time is past when engineers would take anything from the foundry so long as it was a casting; they are becoming more and more exacting, and the foundry must strive continually to raise the standard of its work. The founder must also be strictly upright in all transactions, keep faith, and no matter what it may cost must never in any circumstances cover up a vital defect in a casting. The location of the foundry will be governed by the customers' convenience, and the possibility of delivering the goods conveniently and economically, and also by ready access to its own supplies. Heavy carriage or cartage for supplies coming in or goods despatched will be a serious handicap in a business which at the best has a rather meagre margin of profit.

Organization is a matter of great importance, and may easily be the factor that will make or mar a business. Ideal organization will take human nature fully into consideration in finding out what particular work each worker likes and is best fitted for, and will place them under conditions as far as ever possible conducive to good health and mental and physical fitness. Consideration of the health and fitness of his employees will repay an employer in any business.

An expert should be at the head of each department. It is not generally necessary to have a staff of experts that is costly, but there should be one at the head of each department, with an interested ambitious understudy who can be trained to take the place of the one above him when required. Hands trained in one's own works are generally much better than newcomers, and it is good for the one below to know that if he will qualify he will be pushed on as soon as there is an opening for him.

The cost of labor is generally the heaviest cost in the foundry, and great care must be exercised to keep it down to a reasonable minimum; but it is not sound economy to employ inefficient labor because it is cheap for in the foundry perhaps sooner than any other trade the fallacy of such a policy will be demonstrated in the form of rough and unsightly castings and a large waste pile. On the other hand, it is very wasteful to pay high-priced labor to do work which less-skilled hands can do equally well. A proper proportion of skilled and less-skilled labor should be in each department. The various departments must be equally balanced. The coremaking and cleaning department must be proportioned to the molding-floor requirements and output, all departments being carefully adjusted to each other.

Personally, the writer believes that all-round better results are obtained by the piecework system than by any other system. It is a just system, the man with the most ability getting his worth, and the others in ratio. It is also economical, and the hands require a minimum of supervision. Then, above all, and whatever system is adopted, is the very important matter of "atmosphere"—i. e., the feeling existing between the employer and employees, and between the employees themselves. This will be governed most largely by the head of the firm. Whatever example he shows, whatever character he displays, will be reproduced throughout the establishment.

The location of the business has already been touched upon. The site itself should be carefully chosen on ground at a reasonable rental, and with security of tenure. It is seldom satisfactory to rent a building and adapt it to a foundry's requirements. It is far more economical to put up a new place exactly to the requirements. Here the man of small capital will meet a grave problem, but the writer would strongly urge that a new place be put up rather than a good deal of money be spent in adapting some place which, when it has been made the most of, will probably be little better than a makeshift.

If one does not feel justified in going to the cost of a brick building, corrugated sheet iron can be used, in which case care should be taken to have the iron thoroughly coated with a good protective material over the galvanizing before being put up, as the steam and gases in the foundry very severely attack the iron. But if a strong gauge, say No. 18, be used and be well protected, it should last about ten years. All girders should be of steel.

A useful type of building is one with a centre bay with lean-to on one or on both sides. The centre bay, for making the heavier work, will require the installation of the crane; the lean-to will be used for handwork. The building should be as high as possible, and have ample ventilation. The old-fashioned roof swing-shutter ventilator is difficult to beat for the foundry. Ample overhead light is essential to good and economical working. Men can do more work, and do it better with plenty of light. For artificial light some form of incandescent gas light will be found best.

As far as possible means should be taken to have the shop warm and dry in winter, airy and cool in summer. The writer would also like to see a dressing-room in every foundry, so that the men can come to work with decent clothes, and change them or put on overalls on starting or leaving work; and a lavatory with wash-basins for use before leaving the place, and a comfortable dining-room provided with some good

literature for the use of those bringing their meals to their work. This will probably be somewhat advanced for the man starting in a small way; but it is good to have a clear ideal and press towards it. The charge upon the capital to supply these items mentioned would not be a heavy matter to any works of considerable size.

The next thing to be considered is the cupola, which will be best placed at the end of the shop, nearest the railway or nearest the stocks of iron and coke. It is not necessary to go to the comparatively heavy cost of a patent furnace of any kind; a good stout old ship's funnel will make a good shell for a cupola. It ought to be of ¼ to ⅜ in. plate, and a little larger in diameter than will be required at the first, say 3 ft. 6 in. to 4 ft. It is easy to line up to any internal diameter required, and afterwards, when business increases, to build back to the shell. The lining should be 9 in. up to the charging door; afterwards 4½ in. will be sufficient. The writer is not convinced of any distinct advantage to be gained from special shapes in cupola linings.

The funnel mentioned will require holes for breast and charging doors, and holes for the tuyères in suitable positions. It is not necessary to go to great expense for a wind belt and two rows of tuyères. Good results can be obtained by the old-fashioned two tuyère furnace. Builders' smoke-pipes will make very good tuyères. They should be of ample size. The writer is not convinced of the utility of narrowing the pipes to get blast pressure in the furnace. This appears rather a mistake, especially where a fan is used. Ordinary clay drain pipes will be found excellent for blast pipes from the fan to the bottom of the furnace; but if they are laid under a cart road or anywhere where loads or weights are to be taken over them they should be strengthened by having a few inches of concrete over them.

The cupola will then be plain, straight, solid-bottomed, 2 ft. internal diameter, with two 8 in. tuyères entering 2 ft. from the bottom, and with blast pipes from the fan 12 in. diameter. The fan should be 2 ft. diameter with a 9 in. outlet, and running at 3000 revolutions per minute. The cupola will melt about two tons per hour, with a coke consumption 1 to 10, not including the bed. The charges would be 5 cwt. of pig and heavy machinery scrap, and would give good hot iron suitable for any thin castings ¼ in. thick, that have to be machined. The cupola will give 17 to 18 cwt. per tap.

The fan still holds a high place in the judgment of many good foundrymen, and as the first cost is considerably less than that of a blower, the beginner will probably decide in its favor. It should be borne in mind that for small work it is absolutely essential to have hot metal. Everything possible should be done to ensure this, for mistakes in this direction have to be paid for dearly. All that part of the plant which may be expected to last for several years should be put in with a view to future increased requirements.

The next item calling for attention is the power to be installed. Here there is a choice of three: steam, gas or electricity. Probably in the light of simplicity, reliability, economy, and first cost, the preference will fall on the gas engine. At the present there are almost any number of good second-hand gas engines to be obtained, which would easily carry the beginner over the first five or ten years of his business. He could then decide whether a change was desirable or not.

Every foundry doing a good deal of small work should have a tumbling barrel and emery grinder. These should be of strong heavy type, to stand the characteristic heavy usage of the foundry. A small mill and a machine riddle will be very valuable, but a little contrivance in connection with riddling apparatus and a judicious use of artificial binders will enable one to do without these until more capital is available.

The foundry should be laid out and equipped to deal with castings at least up to two tons, since it is often from the heavy castings the foundry may expect to recoup for the small profit usually made on small work. Accordingly a crane will be required to handle cores and boxes, etc., and the writer would advise an overhead traveling crane of suitable strength.

A suitable stove would be one 15 ft. long, 8 ft. wide and 8 ft. high, built of 9 in. brick, with cast-iron girders across the roof, 2 ft. apart, and ½ in. thick, cast-iron plates between the girders, the whole covered with about 4 in. of concrete.

Two good-sized grate fires on the floor, one at each side of the stove, will be found sufficient to dry a stove full of cores. Two H-section steel girders laid on cast-iron sleepers make a very convenient and handy bogey road. If the stove is too large at first the doors may be placed inside the stove, just leaving the space required for the fire chamber. The other part of the stove could then be utilized as core stores for stock cores, and cores not required at the moment. A cast-iron frame for core-grate bed should be put in the floor at some handy spot.

Many jobbing founders appear to handicap themselves greatly by adopting the bedding-in system of work. Work bedded in the floor costs more to make, is not so true to the pattern and the casting is not so sound; and although the rolling-over system may require considerable outlay in a good stock of boxes, it will amply repay itself in quicker and better work and will also ensure a longer life of the pattern.

The molding boxes should be made as strong and as light as practicable in regular standard sizes. The series may begin with a box 14 in. square, with cast-iron pins, the next sizes being 18 in. square, 2 ft. square, and so on in 6 in. sizes up to 5 ft. square. Then there should be an oblong series beginning at 18 by 9 in., 2 by 1 ft., 3 ft. by 18 in., 4 by 2 ft., and so on, while a few boxes 5 ft. by 18 in., 7 ft. by 20 in., 9 ft. by 22 in., would be useful. The smaller-sized boxes should be about 3½ in. deep, and those from 2 ft. upwards should be 5 in. deep. It will not be necessary to make any of the sizes named more than 6 in. deep. They should be made tops, drags and middles, with box-bars so arranged to leave a good-sized square hole in the middle of the box, to allow for cores and vents that have to be brought through the box. The middles should be made of L-section, the bottom of the L being a stout internal flange around the box 1 in. square, to give it great additional strength, and form a bearing on which cast-iron bars may be placed when required to hold up the mold.

Strong wrought-iron handles are indispensable in boxes of this kind, as a section of the mold 3 or 4 ft. deep may have to be lifted together, all the weight having to be carried by the handles on the bottom box. Larger boxes will be required than the sizes given, but the same system should be adopted throughout. It is never really necessary to make any size of box deeper than 6 in. Large boxes can be lifted by hand, which is a great consideration where there is no yard crane. This system also is better than boxes made in plates and bolted together. These are very clumsy. The handles are also used to cramp the mold together, by means of simple rectangular cast-iron loops made in a series of sizes to fit molds requiring two, three or any number of boxes, and slipped on the handles and secured with a cast-iron wedge.

For expeditious handling of moulding boxes no doubt the best system is a stout steel beam slung on the crane hook, with notches beginning from the centre, 18 in. apart, to take the smallest boxes, and then notched every 3 in. right along the beam to take the largest box; then a pair of shackles with a chain pulley and endless chains passing over the pulleys in each of them to move along the notches of the beam. This is an extremely handy and safe device where the work is rolled over. Four cast-iron pins cast on the sides of the smaller boxes will be found sufficient, but the boxes from 2 ft. up should have lugs cast on them to take suitable pins where there is a deep lift or a deep core in the mould. It greatly simplifies matters if only one size of pin is used in all boxes. Of course, boxes drilled to a templet are best, but with a little care good-fitting boxes can be made with holes cast in, and a suitable cast-iron pin made to fit snugly in the holes. A simple system of foundry boxes like this will quickly be found to be far and away better than the inadaptable style of making special boxes for each job.

Some type of moulding machine to handle small work will be found useful. Custom requiring large quantities of small castings will generally be found willing to bear some part of the expense of having pattern plates fitted up.

No doubt the best way to get a floor in the foundry is to get used sand from another foundry's cleaning shop (many foundries would be glad to have someone to take a few loads away). This, when riddled and mixed with a little new loam and wetted with weak clay water, will be found excellent floor sand.

With regard to facings, it is much the best to have someone to mix all facing sand to ensure uniformity. Two kinds can be regularly mixed; one for the light work up to ½ in. thick, another for work from ½ in. to 1 in. If sand is required for heavier work, it is easy for the moulder to mix in a further quantity of coal dust to suit the job in hand. For castings requiring a smooth skin the coal dust should be very fine. and the sand used as dry as possible.

With regard to the quantity of new sand required in the facings, there is undoubtedly a great deal of waste in many foundries. It is necessary to replace only the elements destroyed in casting to keep the facing up to the standard. In light work. say, from ¼ in. thickness up to 1 in., not more than one-tenth of new sand is required. It is often difficult to maintain a uniformly clean, smooth surface on the castings in jobbing work, where there is often considerable variation in the thicknesses of the casting, and also in the temperature of the iron. It is therefore good to have all moulds heavily coated with good plumbago, and carefully sleeked; this will put a good skin on the casting, independent of the quantity of coal dust, varying thicknesses, or casting temperature of the iron.

Where there is no mill, loam for swept cores can be made by mixing the sand and new loam as required with a little hair, and chopping or cutting down with an iron by hand. A little core gum is beneficial. Sweeping loam to carry ¾ in. can also be made in this way.

Core sands may be made with half rock sand, half sand from the foundry floor, and a little core gum (about one handful to about one pail of sand). This will make a good strong core that will handle well.

The founder of small work will require iron that will run very fluid, and not chill.

The New York Horse Parade.

Friday, May 30, from 10 o'clock a. m. until noon, Fifth Avenue, New York, from Washington Square to Madison Square, was turned over to the lover of horses. The seventh annual work horse parade, held under the auspices of the New York Women's League for Animals, had the right of way. Scores of policemen ordered all drivers of automobiles to seek the side streets. Mrs. James Speyer, president of the league, estimated the number of horses in the parade at 2,500. There were 1,075 entries, but several of the entries were teams or great trucks drawn by three or four horses. Horse owners and horse lovers pointed to this parade as the best illustration that it will be a long time before automobiles will entirely replace the horse in New York.

Several of the horses wore the ribbons won in former parades and these animals received generous applause when they were driven by. There were so many ribbons and prizes awarded that a complete list was not obtainable. Most of the prizes consisted of ribbons and ornaments. The money prizes in certain classes were $25, $20, $15, $10 and $5. In the veteran drivers' class the first cash prize went to Carman Seaman, who had been in service thirty-five years, eight months and twenty days as a driver for his firm. Whenever Mrs. Speyer personally gave the prizes to the drivers she thanked them in the name of the league for the splendid condition of their horses. Mrs. Speyer said that she considered it the most successful parade which had been held under the auspices of the league.

Curing a Kicker.

A Western paper is responsible for an item which may probably appeal to horse owners troubled by the kicking propensities of their animals. Noah Spears, a farmer, has dicovered a way to break a horse of kicking. Spears tells the following story: "I filled a stout gunny sack with sand and suspended it from the ceiling in the rear of the stall by a rope in such a position behind the horse that its heels could have good play upon it. This large pendulum, needing only a strong power to start it, would swing with clocklike precision as soon as the horse began to play its acrobatic stunts upon it. At the first kick the bag swung away, only to return with more force, giving the animal much more than it had sent. This unexpected return on the part of the bag caused the horse to kick harder, but each time the bag returned harder and paid the animal with interest. Finally the horse, realizing that further kicking would be fruitless, stopped the kicking. The bag was allowed to hang in the same position for an entire week, but no more use for it was seen."

NEWLY VARNISHED VEHICLES.

Preserving the Finish—Practical Data on An Important Subject.

From M. C. Hillick, Pennsylvania.—During the next two or three months the finish on the automobile or other vehicle should have especial attention. The newly varnished vehicle will need frequent water baths. These, during the heat of summer, should be given in the shade and never in the bright sunlight. The water should be clean and cool. The manner of washing an automobile has probably been described before in these columns, but this much is pertinent at this time: Use plenty of water, but never from a hose at strong pressure. A gentle flow of water is all sufficient. Soften up all the accumulations and under an easy flow of water let as much of the dirt as possible run away. After proceeding to get the surface as clean as it can be washed with the hose alone, take a soft, fleece wool sponge and, using plenty of water, give the surface a very thorough sponge bath, cleaning off all the sediment and fine dirt. When the water becomes stained change to a clean supply at once, thus insuring a clean surface. Complete the washing operation by going over the surface with a fine rinsing volume of water. Dry off lightly with a nice, lint-free wash leather. Do not attempt to rub the surface with the leather under the impression that all the water drops and moisture must be removed, for no such need exists. Catch off the bulk of the water adhering to the surface with the leather, leaving the mist and water drops to dissipate. Use the wash leather as sparingly as possible on the finished surface. The varnish will be all the better for it, and have a richer, deeper lustre.

Concerning the storage of the automobile when not in use, practically every car owner is a law unto himself. However, this much we may rest assured of: Fairly light quarters, if possible, should be had. The greater the volume of light from the north will result in lighter maintenance cost. Ventilation is a factor that must not be overlooked. Good ventilation should be arranged for in every garage. Good, pure air keeps the lustre of the varnish full and fine, and adds to its life, as every varnish maker and every chemist specializing in paint and varnish supplies will tell you.

Pure, soft, clean water will sharpen the brilliancy of varnish up to a certain stage of wear, and the frequent water baths will develop its wearing properties, but when the gloss of the varnish refuses to respond to the treatment here advised, something more substantial is in order.

This after treatment comes in the form of renovators, cleaners, polishes and so on, some of which are very good and some very bad. Whatever is applied to the varnished surface should contain something to feed and nourish the varnish—give it renewed force and vitality, in fact—and while, of course, it may not, and probably will not, restore the lost lustre, it will give it suppleness and delay the day of revarnishing to the maximum limit.

Anything applied to the surface of varnish to better its condition and lengthen its days of service should be in the nature of a non-drying material. For example, raw linseed oil is a drying oil, and under no circumstances should it be used as a renewer or polisher for the automobile finish. Best of all, perhaps, is the material which when applied and wiped up to-day remains in condition to be wiped again another day. Such a medium which cannot be wiped actually dry, although the surface to the eye may so appear, gives the varnish something to feed upon. Varnish renovators and renewers, etc., are necessary and useful mediums to be employed in the upkeep of the finished surface, but they should be used discreetly and their quality should be above reproach.

Some varnishes respond promptly, and for a long term of service, to the effects of the renewing or renovating medium, while others go to a swift decline, once started on the way, despite the best available treatment with the renewing medium. These latter varnishes are usually devoid of the necessary elasticity or oily nature, and consequently reach the high tide of wear early in life, whereas the varnish containing a high percentage of elasticity has enough of the oil in its composition to respond again and again, and so on through many days, to the renewing and re-vitalizing material.

Occasionally the surface becomes saturated with grease and oily substances to such an extent that it becomes necessary to remove this foreign matter before proceeding to apply the renewing material. In all such cases make a scuttle of suds of castile soap, or of some equally harmless soap, and after flicking the grease off with a spray of turpentine, wash off carefully with the soap solution, following at once with an application of the renewing material.

The main thing to be observed is the essential need of painstaking methods of cleaning and renewing the finish. This finish is by nature sensitive, and to produce it has cost a formidable sum of money. Whatever, therefore, is applied to it to increase its efficiency and improve its appearance should in the strictest sense of the term be both suitable and especially adapted to the surface.

A highly varnished vehicle should under no circumstances be stored or quartered in any stable or barn, or in quarters adjacent to such premises, for any length of time. Ammonia fumes are almost always present in and about such surroundings, and ammonia is fatal to the life of any varnish.

POWER

In this department an expert will reply to any questions our readers may propound as the result of their experience, or inspired by a desire to become acquainted with the value of power in the shop. All inquiries should be addressed to the Editor of THE BLACKSMITH AND WHEELWRIGHT, P. O. Box 654, New York City

NOT EASY AS SEEMS.

Some of the Difficulties of Using Kerosene as Fuel for Engines.

The following notes are based on several years' experience an English reader has had with running stationary kerosene engines chiefly for electric lighting work. They may be of assistance to those who are trying to solve the fuel question as it applies to carburetors and engine design in connection with the use of kerosene or perhaps a combination of kerosene and gasoline.

The engines in question ran continuously at a fairly high speed (800 to 1,000 revolutions per minute), and in their design bore considerable more resemblance to a motor car engine than to any other type, being, for instance, entirely enclosed as to their rotating and reciprocating parts, and lubricated by pump feed through drilled crankshaft, fitted with float feed carburetor and high-tension ignition.

It is well to remember, right at the start, that kerosene can never by any stretch of imagination be called an ideal fuel for motor car use, or perhaps one had better say an ideal liquid to carry on a touring car, and any motorist who makes up his mind that it is worth putting up with slight inconveniences to save paying the extra cost for gasoline, should at the outset take all precautions to minimize these inconveniences as far as possible.

Taps, unions, etc., that appear to be quite gasoline tight will be found to be anything but kerosene tight; probably not because kerosene can find its way where gasoline cannot, but because any slight gasoline leakage at once evaporates as soon as it comes into contact with the air. With kerosene, however, this ready evaporation does not take place, and, instead, any leakage creeps over the surrounding surfaces and remains there, while the ensuing smell, rendered worse when the surfaces become warm with running, cannot be said to be pleasant. This can be easily noticed on a kerosene driven boat, and is probably one of the greatest drawbacks to the use of this fuel. It is necessary, therefore, thoroughly to overahul all tanks and pipes before trying a kerosene mixture, and to make sure everything is tight; also to take care when filling the tanks not to allow any of the mixture to spill over, especially if the tank be on the dashboard or under the front seat.

The actual proportions of the fuel will be a matter for experiment in every case, depending very largely upon the compression of the engine. The higher the compression the lower ought to be the kerosene content for satisfactory running, although as a starting point a mixture of one part kerosene to two parts gasoline (both by volume) can be tried; a mixture of equal parts ought, however, to cause no trouble in a moderate compression engine with an efficiency warmed carburetor or air pipe.

Since the variety of carburetors is so great no hard and fast rules can be laid down as to the actual procedure to be adopted, but the two following points will need attention to a greater or less degree in well nigh every case:

Efficient warming of the mixture.

Smaller fuel volume per charge.

To deal with mixture warming, if the carburetor has either an exhaust or hot water jacket, this, and all the pipes, should be well cleaned out and put in good order; if no jacket be fitted it is a matter that can hardly be altered.

Whether jacketing is present or not, great care should be taken thoroughly to heat all, if possible, of the air taken into the carburetor. This should not present much difficulty as to the main air intake, but in the case of carburetors fitted with automatic extra air valves a certain amount of ingenuity may have to be exercised in heating the air that they take in. It is well worth while, however, taking a little trouble on this point, since the introduction of cold air into an already heated and partially gasified mixture can only result in the heavier components being condensed into liquid form again. This air heating can nearly always be arranged by fitting to the air intake a pipe with a flared end which laps round the exhaust pipe and draws its air over the surface thereof. The pipe should, if possible, be of greater internal bore than the air inlet orifice of the carburetor, and the end which laps round the exhaust pipe should be flared out to as large an amount as possible, so as to provide the necssary area for air intake when set at the minimum distance from the exhaust pipe, for the smaller this distance the hotter will be the air drawn in.

If the inlet pipe from the carburetor to the engine be at all long this should be wrapped with asbestos cord to prevent heat radiation from the mixture; it is best to use the plaited cord in preference to the more usual twisted string, for the former does not tend to fray like the latter, and can be bound on much tighter. The most convenient size is about ¼ inch diameter, and it is easy to make a neat job when securing it by unfraying an inch or two at each end and binding these loose ends under the two coils immediately adjacent. A coat of good varnish paint over all will be found to bind the whole together and prevent the asbestos from crumbling off when handled, on becoming disintegrated by vibration.

To come to the proportion of fuel to air will entirely depend on the design of the carburetor, and the actual fuel in use, and must, therefore, be a matter for individual experiment. It will nearly always be found that a smaller ratio of fuel to air will give a better mixture than is the case with the lighter spirits. This modification can be carried out in either of two ways: (1) By decreasing the size of the jet, and (2) by increasing the size of air passage round it, which creates less negative pressure or less vacuum, and so causes less fuel to be drawn in per stroke. The writer prefers the second method, and his experience has led him to the opinion that it is best, when possible, to take the whole of the air supply past the jet and obtain control of the mixture by varying the total quantity of air admitted, which can be done by a hand-operated throttle in the air inlet pipe, or by passing the whole of the air through a spring-controlled valve, the tension of the spring being adjustable by hand.

In any case, it is very advisable to have some method of controlling the mixture by hand, as kerosene is notoriously susceptible to varying conditions of temperature and load.

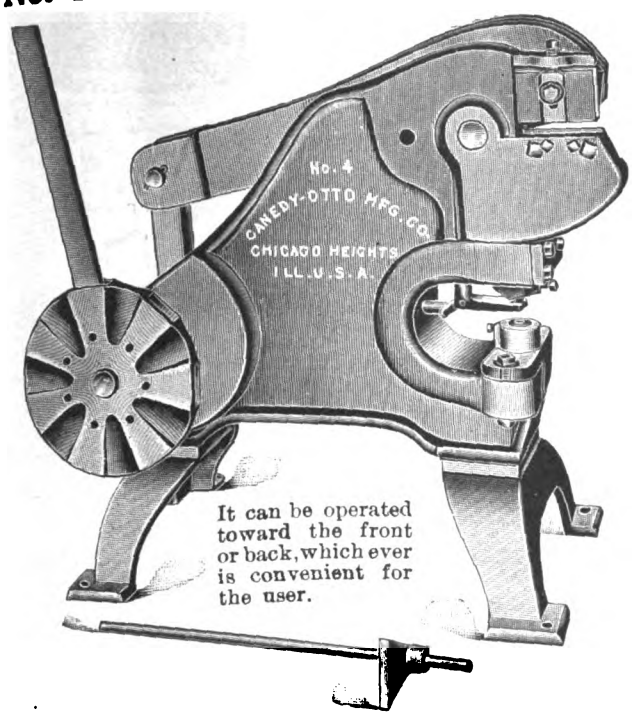
A Plowing Automobile.

Badger Brothers, Logan County, Ohio, farmers, are using an old automobile to till the soil on their large farm. The brothers are successful farmers and also inventors. They invented a patent milking machine recently. They confine their ingenuity to inventions which will prove helpful in farm work.

The automobile was nearly worn out and was unfit for riding purposes. It was proposed that it be sent to the junk pile. However, it was converted into a gasoline plow and not only have the Badger brothers plowed their own farms with it, but they also have broken many acres for their neighbors. The machine does the work of eight ordinary plows, it is claimed.

Other farmers are preparing to press their discarded touring cars into service as motor plows.

No. 4 Combination Punch and Shear



Will shear ¼x4-in. flat bars.
Will shear 1-in. round bars.
Will punch ⅝-in. hole in ½-in. plate.
Depth of throat 6 inches.

This machine is furnished with ¼-in., ⅜-in. and ½-in. punches and dies, also a lever bar.

When choosing your blacksmith shop equipment why not get the best—

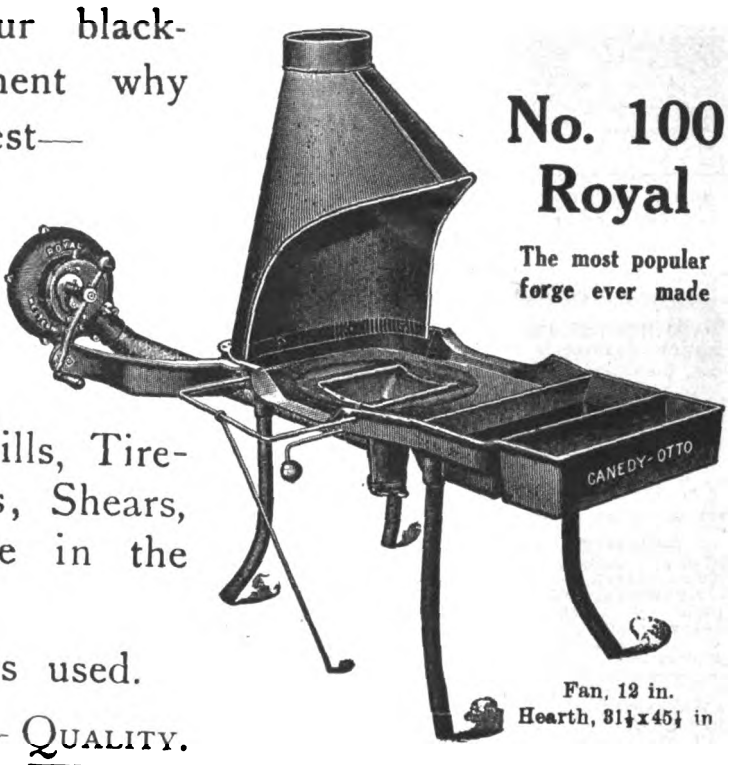
CANEDY-OTTO

It costs no more.

Manufacturers of the finest line of Forges, Blowers, Drills, Tire-Shrinkers, Punches, Shears, produced anywhere in the WORLD.

Once tried, always used.

There's a reason — QUALITY.



No. 100 Royal

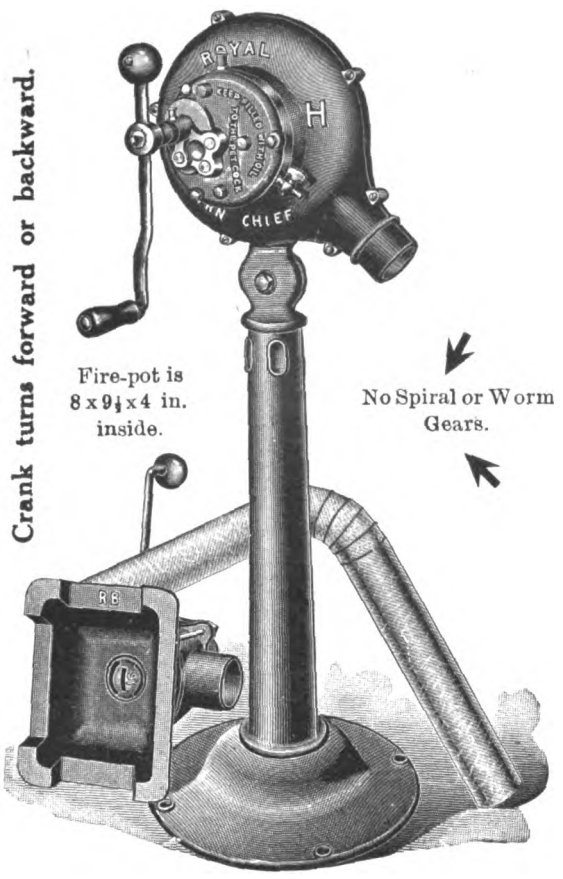
The most popular forge ever made

Fan, 12 in.
Hearth, 31½x45½ in

FORGES BLOWERS

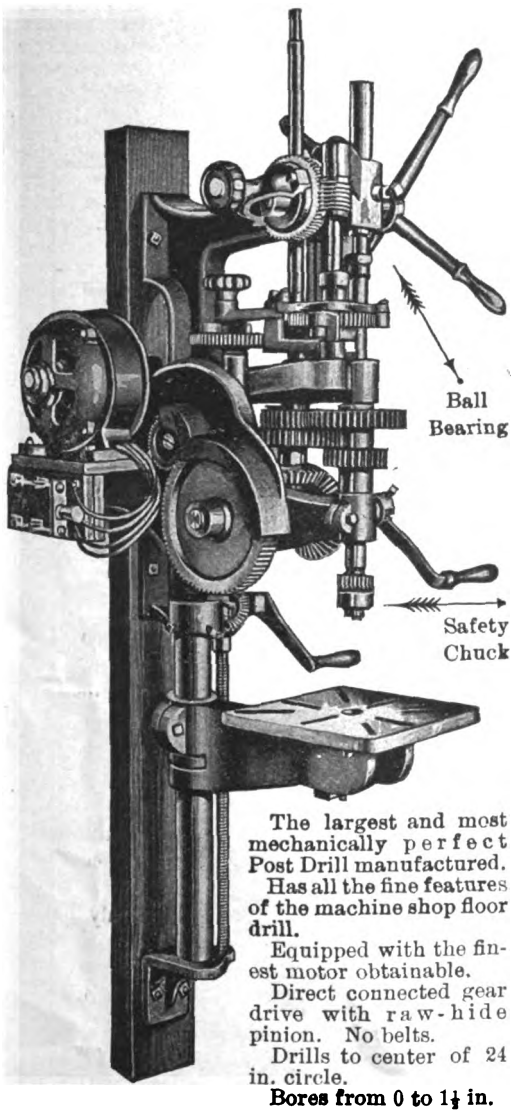
Royal Blower

(Ask the man who owns one)



PUNCHES SHEARS

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 raw-hide pinion. No belts.
Drills to center of 24 in. circle.
Bores from 0 to 1¼ in.

DRILLS
TIRE-SHRINKERS

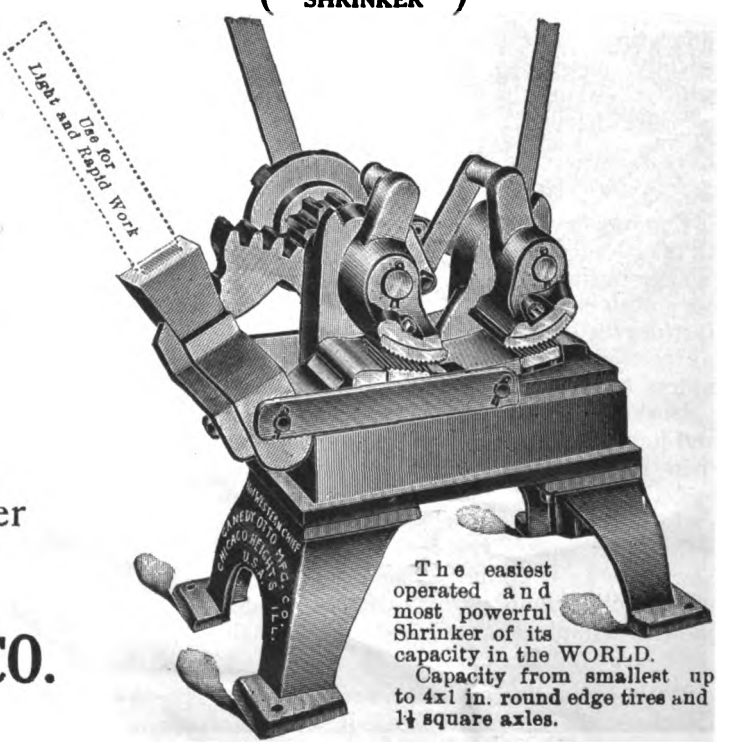
Over 200 different styles of TOOLS. We can suit every need.

Send for Catalogue

Give name of supply dealer or jobber.

No. 1½ Western Chief

(TIRE and AXLE SHRINKER)



The easiest operated and most powerful Shrinker of its capacity in the WORLD.
Capacity from smallest up to 4x1 in. round edge tires and 1¼ square axles.

CANEDY-OTTO MFG. CO.

CHICAGO HEIGHTS, ILL.

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Remittances may be made in postage stamps where the amount to be sent is less than $1.00. Address

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PUBLISHERS OF THE BLACKSMITH AND WHEELWRIGHT.

PATENTS FOR INVENTIONS.

H. W. T. Jenner, patent attorney and mechanical expert, 608 F. St., 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.

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.

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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.

PATENTS.

C. L. PARKER, attorney-at-law, and solicitor of patents. American and foreign patents secured promptly. Handbook for inventors sent free upon request. 926 G street, Washington, D. C.

BLACKSMITH.

Here is your opportunity to be an expert blacksmith without help. As life is short, get Toy's Modern Methods of doing hard jobs easy, forging and welding all kinds of steel solid. Also tempering all tools to a standard by colored charts. This is real plain information, not theory, all for $1.00. Send for free samples first. W. M. TOY, Sidney, Ohio.

MECHANICS.

Send for a circular describing "Mechanics' Companions," a tri-square, a centering square, a caliper, rule and protractor. Address J. O. HESS, Oran, Mo.

WANTED.

WANTED—Traveling men who visit the carriage, implement and livery trade make big commissions selling our steel and rubber tired wheels, poles and shafts as a side line. Why don't you try it? THE BOOB WHEEL CO., Cincinnati, Ohio.

CASH FOR YOUR BUSINESS OR REAL ESTATE.

I bring buyer and seller together. No matter where located, if you want to buy or sell, address FRANK P. CLEVELAND, 975 Adams Express Building, Chicago, Ill.

Carriage painter wishes to hear from carriage or horseshoeing shop that has a paint shop. Good place, rent free. Address W. A. RIGGLEMAN, Jamestown, Ohio.

FOR SALE.

McGovern and West power tire shrinker, Moyer and Defiance hub boring machine. All as good as new at one-third the price of new ones. Address, 554 Freeman Avenue, Cincinnati, Ohio.

DON'T PURCHASE A TRIP HAMMER

Until you have asked for a price from the COLEMAN IRON WORKS, Elmira, N. Y., U. S. A.

SALE OR TRADE.

Oxy-Acetylene welding machine, new, for sale or trade. Write BAGLEY BROS. Garage, Superior, Neb.

POWER USERS.

Gasoline Engine bargains from 1 to 100 H. P. Get our big list and state your power requirements before you buy. BADGER MOTOR CO., Milwaukee, Wis.

FOR SALE.

General blacksmith and wagon repair shop; new dwelling house and about an acre of land, located in a thriving German Catholic settlement in a good farming community of Central Wisconsin. Fine chance for the right man. For particulars address A. J. MARTIN LBR. CO., Bloomer, Wisconsin.

FOR SALE.

Up-to-date outfit, blacksmith wood work tools. Power, machinery and material, $2,000. Nice home, $1,500. Cheap rent. Plenty of work. Owner broken down. Address A. YOUNG, Stillwell, Oklahoma.

FOR SALE.

Blacksmith shop, four lots and house, engine and stock; only shop in town. Address for particulars, J. BROWN, Box 24, Bridgeport, Wash.

FOR SALE.

Lathes, 13" to 50" swing; drills, 10" to 36"; planers, 16" to 30"; shapers; millers; milling cutters; lathe tool holders; high speed steel; imported chisel steel; farriers' knives; Bicknell's jointers, $71 up; combination machines, $85 up. BICKNELL MFG. CO., Janesville, Wis.

FOR SALE.

Al shoeing shop in a town of three thousand population in Northwestern Ohio. For full particulars and price address B. F. B. c/o The Blacksmith and Wheelwright, P. O. Box 654, New York City.

FOR RENT.

Blacksmith shop and dwelling on same lot, near center of town. Good railroad facilities, good place for automobile work, rent cheap. Address, H. S. BYNES, Box 25, Gibson, Ga.

FOR SALE.

Brooks Tire Setter No. 2, good as new. Set of blacksmith tools, blower, drill press, anvil, and vise. Will sell cheap. Address, H. S. BYNES, Box 25, Gibson, Ga.

FOR SALE OR RENT.

Blacksmithing and wood working shop. Will sell tools and stock at invoice and rent shop. Shop 30x90. Work for two men and helper the year around. Snap for some one. 54 miles from Chicago. Two railroads, town of 1,200. Stone roads, fine farming country. Established 14 years. For particulars, address, O. G. HAYES, Kouts, Indiana.

FOR SALE

In the Tungsten district of Colorado, blacksmith shop and tools. No competition. Healthiest climate in the world. Altitude 8,200 feet. Bargain at $450.00 cash. Good reason for selling. Address, P. O. Box 21, Nederland, Colorado.

FOR SALE OR RENT.

Blacksmith shop for rent in good location, or will sell. Terms moderate. Apply or write to JOHN MARTIN, Sea Cliff, N. Y.

FOR SALE.

General repair shop. Horseshoeing. Rubber tire machine. Two buildings. Lot 100x65 feet. Write for particulars to Lock Box 446, Gibson City, Ills.

WANTED.

To trade a farm of one hundred acres for a blacksmith shop and tools in good location. Address for further particulars, C. MORRISON, R.F.D., No. 1, Worcester, N. Y.

FOR SALE.

Beautifully imported black German Coach Stallion, weighing 1,480 pounds. Perfectly sound and right in every way. Sold for no particular fault. Gentle driver and will work in all harness. Extra good roadster. My time is all taken up in business and therefore will sell at a low figure for cash. Or I can use a cheap driver weighing not less than 1,200 pounds. Will give bank reference. Address, E. J. PERRON, Ontonagon, Michigan.

FOR SALE.

80 acres of school land in Cass Co., Northern Minnesota. This is a splendid location, partly timbered and clay loam soil. Price $25 per acre. R. PLANK, 624 S 4th St., Minneapolis, Minn.

FOR SALE.

Up-to-date power blacksmith and wagon shop. Only shop in town of 900. Two railroads. Mostly cash business. Reason for selling, sciatic rheumatism. Address, CHAS. REUTER, Enterprise, Kansas.

FOR SALE.

Blacksmith shop, dwelling, tools and machinery. One of the best locations in southeast Kansas. Reason for selling, poor health. Address for particulars, J. H. STOLL, Rose, Kansas.

FOR SALE.

Up-to-date woodwork and blacksmith outfit. Electric power. Leading location and business in city of 6,000 population in rich farming community. Three men kept busy. Will sell or rent real estate. Owner in bad health. Address, RIVERSIDE REPAIR SHOP, Bluffton, Indiana.

FOR SALE OR RENT.

I will sell outright or will sell stock and rent my shop and tools. Location second to none. Reason for selling, want to quit the business. Address, CLEM STEVENS, Clifton, Colorado.

FOR SALE.

Blacksmith stand, stock and tools. Four men employed. Good prices. Will sell for $1,500.00. Address, BALCER WRIGHT, Ambridge, Penn.

FOR SALE.

Little Giant Trip Hammer; Skow Disc Sharpener; Fairbanks-Morse 4 Horse Power Engine; Emery Stand; Line Shafting; Belting; Stock, etc. W. O. WRIGHT, Box 71, Hyannis, Neb.

Common Sense Tire Remover.—Our readers who have not yet investigated the Common Sense Tire Remover manufactured by the Common Sense Tire Remover Company, Dowagiac, Mich., should do so at once. We understand that Geo. Cook of Buchanan & Cook, Blacksmiths of Dowagiac, Mich., recently declared that he could take off more wagon tires from wheels three to six inches wide that were old and worn very thin on their edges, than any ten men could remove with block and sledge and would leave the felloe in better condition, provided he used a Common Sense Tire Remover. Now such a handy tool as this should be found in every blacksmith shop.

Corona Wool Fat.—If any reader has failed yet to notice the advertisement of the Corona Mfg. Company, 102 Corona Bldg., Kenton, Ohio, he ought to turn to our back cover and look it over. Blacksmiths everywhere, we understand, are making money handling this preparation for horses' feet and you can make some too if you are an agent for its sale. Write the company for its special proposition mentioning this paper.

Crescent Wood Working Machine.—Those of our readers who have power should by all means consult the announcement of the Crescent Machine Co., 203 Main St., Leetonia, Ohio, on another page. Write for their catalog of band saws, disk grinders, planer and matchers, variety wood workers, Universal wood workers, etc. These machines may help you in the business you already have and help you to expand your business and to do more.

A Coach and Six.

At the recent convention in Buffalo, the Rhode Island Perkins Horseshoe Company took out various parties through the parks and interesting places of the city in the six horse coaching rig shown in the illustration. Not only was an outfit of this kind far more pleasing to the eye than automobiles would have been, but it gave the passengers far greater pleasure and sense of exhilaration. The time will come when the unwieldly, misshapen and ill-smelling automobile will be swept altogether from our parks and pleasure drives.

Horse Vehicle Trade.

Reports from manufacturers, dealers and traveling salesmen are to the effect that the horse vehicle business is on an upward trend. Accessory people who supply the horse vehicle manufacturers with their materials say that the majority of their customers are favoring them with orders of steadily increasing size.

In the West and central sections more buggies and light carriages are being sold to the consumer than for several years past. This feeling has had the effect of encouraging dealers to order more freely for the spring trade which is already well under way. The indications are for a renewed interest in horse vehicles during 1913, which will include not only carriages but wagons as well.—Implement and Vehicle Journal.

With some men work is merely a habit, while to others, the successful kind, it becomes a continuous round of pleasure.

The Rhode Island Perkins Horseshoe Coach.

Band Saw Filing.

W. E. Shallow in the Woodworker.—One—Be on friendly terms with sawyer and mill foreman; co-operate with them in order to get good results.

Two—Have certain saws on bench every day, regardless of how well they are running. You might find two or three small lumps or one or two tight places. If sawyer should happen to knock one out do not neglect your daily (regular) saw on bench; go over it first, and then work on cripples.

Three—Look your band mill over closely, often, and see that there is nothing loose, to get out of alignment. Watch your guides and keep them set in alignment with saw line every day.

Four—Watch your teeth closely; see that swage is working properly; always try side gauge when swaging. See that emery wheel is always same shape; do not let it wear more in one place than another, as it will change hook as well as shape of tooth.

Five—Always keep your saws the same length on back. Do not let them get uneven, as it will cause them to oscillate on wheels and cause sawyer to slow up on his feed by not having confidence in the saws.

Six—Be certain that your roll is not dishing saws, as it will make considerable more work on account of having to level after putting in tension.

Seven—Keep your roll well oiled and all lost motion out of it.

Eight—If saws get to running badly, first satisfy yourself that the blade is O. K., then that the teeth are in proper shape. If this does not remedy the trouble, do not start to experiment by changing your saws. You will find your trouble in the band mill or carriage track, and possibly in carriage.

Nine—Never accuse any one in the mill of doing you wrong until you have set a trap for him and caught him with his hands in the fire.

Ten—Do not get neglectful with your work. Keep your filing room in good order at all times and your tools where you can find the one you want, at any time.

Substitute for Paint.

A fireproof and waterproof substitute for paint, for use in boiler and engine rooms, consists of six quarts of freshly slaked lime, well sifted, to which is added one quart of rock salt and a gallon of water, the mixture being then well boiled and skimmed clean. To five gallons of this mixture are added a pound of alum, half a pound of copperas (stirred in slowly), three-quarters of a pound of potash, and four quarts of fine sand or hardwood ashes, well sifted. To this may be added any coloring material desired. It is said to be as durable as slate, and to be especially applicable to brick work and similar surfaces.

If you are honestly convinced that you have a kick coming, then put your whole sole in it.

You will find a good deal of profitable reading in the advertising pages of this magazine.

Tire Vulcanizing.

The repairing of automobile tires is a new and profitable business which may be taken up to advantage as a side line by any blacksmith, horseshoer or carriage and wagon repairman. The Auto Tire Vulcanizing Company of Lowell not only furnishes complete machinery and equipment for this work, but they will also give the blacksmith full instructions how to do it. The repairing of tires is not difficult to learn and can be done by any intelligent mechanic.

One of the Auto Tire Vulcanizers.

The introduction of high powered cars has made the matter of repairs serious, both as to cases and inner tubes, and this company, being pioneers in the construction of vulcanizers, naturally are in a much better position to take up the matter of vulcanizers. The machines, each and every one, are made to be self-contained, and can be handled by a novice as well as an experienced workman. Send for price list showing illustrations of vulcanizers for every variety of work. Address Auto-Tire Vulcanizing Co., Lawrence street, near Andrews street, Lowell, Mass.

Beecher Draught Springs.—It is unnecessary to explain to most blacksmiths the advantages of these springs. They act as a cushion to the horse's shoulders; they help horses start heavy loads; they assist in drawing the load after it is in motion, and prevent collar wounds. Every man who has much teaming to do should have these springs, and here is another little side line which blacksmiths can take hold of to advantage and be conferring a distinct favor upon every man to whom they sell such a set of these springs as well as making a little profit for themselves. But write for terms at once to the Beecher Draught Spring Co., New Haven, Conn.

The Improved Falkenhainer Auxiliary Vehicle Spring.—Blacksmiths generally do not avail themselves of so many opportunities that they might to add a little profit to their business by side lines of one kind or another. For instance, Falkenhainer's Improved Vehicle Springs can be used to advantage on large numbers of vehicles; their cost is not great, and of course, any blacksmith can apply them easily. Write to Falkenhainer & Co., 313 Carr St., St. Louis, Mo., for special terms, or see their advertisement on another page. A few dollars made in handling these Auxiliary Springs will be made easily.

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(Continued from page 740.)

Buy Witte Engines Now at Wholesale.—Every power user can now buy the famous Witte Gas Gasoline and Kerosene engines at wholesale prices. For 26 years these engines were sold through dealers. Some time ago, however, the manufacturers changed their method of selling and now sell direct to engine users for the same prices the dealers used to pay. Through the inventions of that master engine builder, Ed H. Witte, thousands of power users, in all parts of the United States and in foreign countries, have profited to the extent of hundreds of thousands of dollars per year in money saved on fuel and repairs. And all the while they have had steady continuous power—no shut downs, no delays, no troubles in starting or stopping. In thousands of shops, factories. and power houses, everywhere Witte engines are proving their superior worth, over and over again, year after year. A striking feature of the Witte construction is that all wearing parts are made in small units, so any needed repair is available by fast mail or express train. Besides that, it makes the repair cost a very small item. It is not uncommon to find Witte engines that have been in continuous service for 20 years, that have not had five dollars worth of repairs in that time. A new book, "Witte Power," is just off the presses. It contains vital engine information not before published. A copy can be had by merely writing to ask for it, to the Witte Iron Works Co., 2449 Oakland Ave., Kansas City, Mo.

Jointers and Combination Machines.—The Bicknell Mfg. and Supply Co., of Janesville, Wis., manufacture jointers and combination machines for wheel and wagon shops and would like to send their catalog to any one who may be interested. They have been in business successfully with their various machines for twelve years.

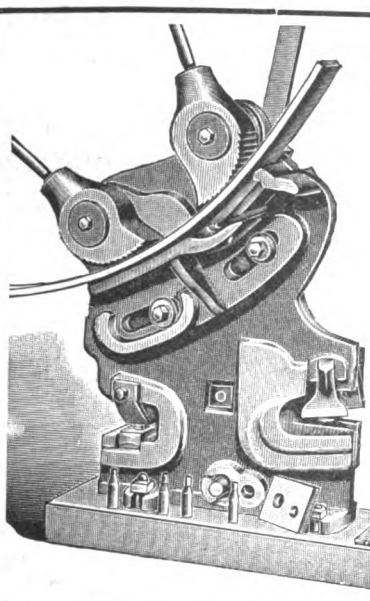
Dayton Fifth Wheel.—This Fifth Wheel is designed for two and four passenger pleasure vehicles and is sold by dealers in wagon maker supplies everywhere. If your dealer does not keep them he ought to. L. B. Goble & Son of Kentucky say they have been in the blacksmith business for twenty years and have repaired all kinds of buggies and fifth wheels, but have never found anything that comes up with the Dayton Fifth Wheel. But ask you dealer to show them to you and then you will be able to comprehend their merits.

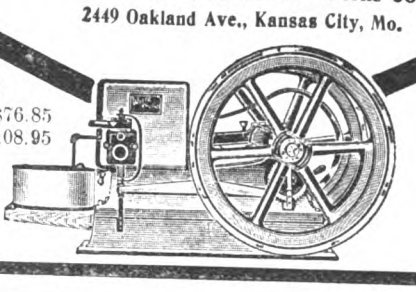
Phoenix Horse and Mule Shoes.—Probably most of our readers have seen more than once the various striking announcements of the Phoenix Horse Shoe Company which have been appearing in the Blacksmith and Wheelwright. The Shoes and Bull Dog Toe Calks of this company are for sale by dealers everywhere. Of course your dealer keeps them or ought to. The rolling mills of this company are located in Joliet, Ill., and Poughkeepsie, N. Y., but the headquarters of the company and offices are in Chicago.

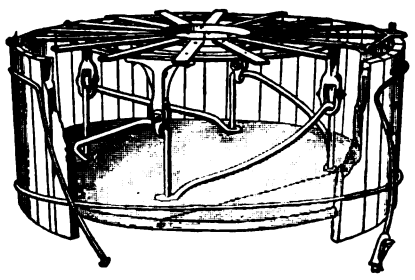
Carriage and Auto Supplies and Tools.—Cray Bros., 1117 W. 11th St., Cleveland, Ohio, would like to send their 480-page catalog which they call the "Repairers' Guide & Price Maker" to every reader who may be interested enough to write for it. See their advertisement on another page.

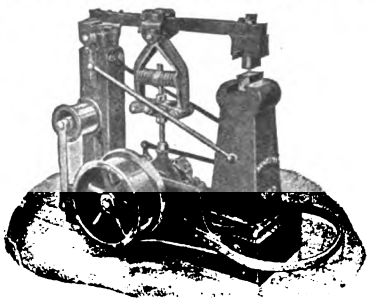
The Beaver Dam Marsh Horse Shoe.—If any of our readers own marshy lands, they will want marsh shoes for their horses. Write at once to the manufacturers of the Beaver Dam Marsh Horse Shoe, Suelflohn & Seefeld, Milwaukee, Wis., for full particulars and prices. See advertisement on another page.

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









What a Gas Engine Will Do.

The gasoline engine will chop your wood, will grind your grain and silo your food; it will pump the water up to the house, it will run your errands and milk the cows. The gasoline engine will bind your grain and haul it off to the railway train; it will work to dark from the earliest dawn, and at night sleep safe beside your lawn, and never break over the pasture bars, and never come home all red with scars. It will hammer the grain from the wheaten sheaves, nor balk, nor kick, nor die with the heaves; it will do the work of two dozen men, and chug for more as it starts again. It will turn your pulleys that churn your milk, it will carry to church your lady's silk; when you sell the steers and the hogs are fat, it will market 'em quick, be sure of that! It will run the belt of the dynamo that sets your house and barns aglow; it will carry you safe to the picnic ground, while the breeze goes by and the wheels go round; it will help you to pasture and salt the sheep, it will shorten your chores and not your sleep; it will lift your farm and set it down one-quarter the distance 'tis now from town. And the years that cover us all with snow will be all forgot in the youthful glow of doing things the tractor way, and the winter of life will seem like May.—Farm, Stock and Home.

Cold Glue.

To make glue liquid in the cold, nitric acid is generally added; thus we may take glue, 8 parts; water, 8 parts; nitric acid, 2½ parts. The nitric acid may be replaced by acetic acid. Thus an excellent liquid gum is made by dissolving one part of glue in two parts of vinegar.

The Chinese army is to acquire an aerial corps of close to 1,000 aeroplanes by the end of 1916, the budget for the current year providing for 250 machines. The government has engaged a French military airman to organize the aerial navy.

A WELL-KNOWN CARRIAGE PAINTER.

W. A. Riggleman, Ohio, an authority on carriage painting who has written a good many articles on that subject for the Blacksmith and Wheelwright.

Care of Belts.

One of the most important points in the care of belts is to keep them clean. All belts should be examined frequently, and the greasy or dirty ones scraped to remove all surface dirt. They should then be washed with warm water and soap, care being taken that the water is not too hot to be uncomfortable to the hands.

Very dirty or greasy belts can be cleaned with a mixture of two parts of gasoline and one part of turpentine, but remember that this mixture is highly inflammable and must be kept away from open lights and fires; then scrape the loosened dirt off with an old file or dull knife, and wash again if you have not reached bare, clean leather. When the belt is dry it should be given a light, even coating of castor oil on the working side, and if very dry, on both sides.

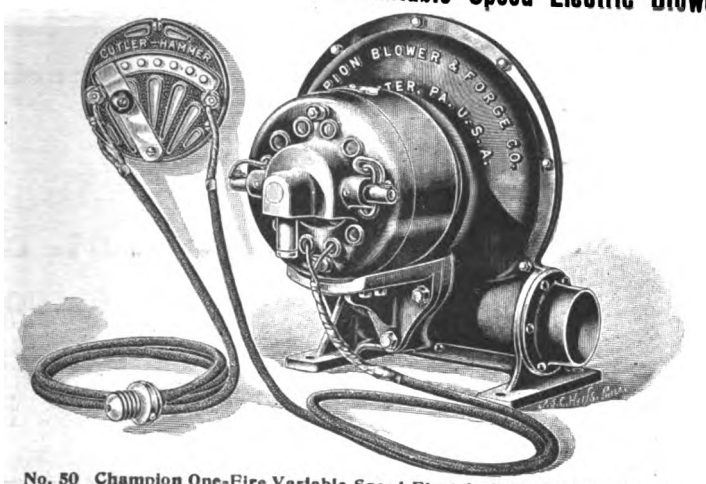
Cemented splice, when properly made, give the best results, and are being adopted. The ends of the belts are beveled and then firmly cemented and rolled or pounded together and allowed to dry thoroughly before being run on the pulleys.

Which Leaves First?

There is an ever-recurring revival of the question as to which wheels leave the road first in making a turn in the road, the inside or the outside wheels. The correct answer is—all other conditions being equal—neither. In making a turn, the car has a tendency to fly off in a tangent. If the outside wheels strike an obstruction, which is likely to be the case, the continued inertia causes the inside wheels to raise and the car thus turns over. If, on the other hand, the inside wheels strike an obstruction in this side-skidding process, of course no overturning tendency follows. Not considering these different conditions, both the outer and the inner wheels have absolutely the same tendency.

Power in the Shop.—We suppose there isn't a reader of this paper who does not comprehend the advantages of power in blacksmiths' shops, but a good many of them have not put it in yet; they have been waiting; perhaps feeling that they could not afford to. The gasoline engine in a blacksmith's shop is a sort of magnet to draw business. Everybody likes to see machinery working and the tendency always is to patronize the man that has a gasoline engine and runs machinery by it. The belief generally is that work can be turned out quicker where improved machines are used and that belief, of course, is correct. Those who have not bought engines yet, or those who are dissatisfied with the ones they have and want to try others, should write to the Consolidated Gasoline Engine Co., 202 Fulton St., New York, for particulars of the Ever-Ready Gasoline Engine, briefly described in the advertisement of the company on another page.

THE CHAMPION
"STEEL PRESSURE" One-Fire Variable Speed Electric Blower



No. 50 Champion One-Fire Variable Speed Electric Steel Pressure Blacksmith Blower with Universal Motor for both Direct and Alternating Current, either 110 or 220 volts, with Detached Rheostat for six speeds, with attachment cord and plug to fit any light socket (therefore can be installed without any expense), and Steel Pressure Fan Case, for all kinds of general Blacksmith work.

Champion Motors are all **GIANTS** in strength. They are 40% larger than requirements. Endurance guaranteed.

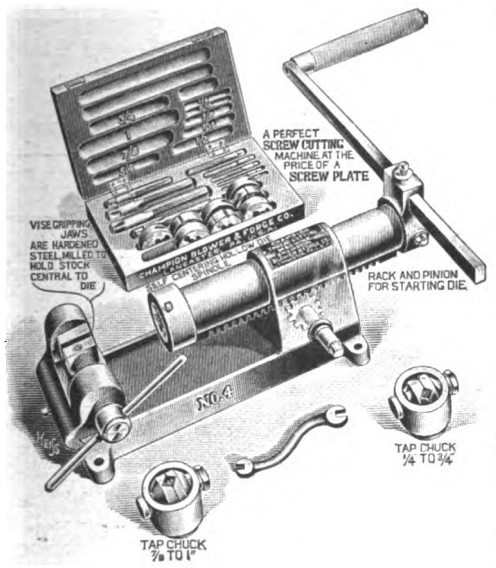
All Champion Motors are designed and built with sufficient units of **power** guaranteed to **run** the **fan** at **highest speed** of **3000 Revolutions per minute,** and at **high pressure** open and away from the fire for **ten hours** without a **single stop.**

Measure your Motor capacity and be certain you get what you are paying for. **The Heart of the Blower is in the Motor.**

All Champion Motors are built from the very highest grade materials, best workmanship, and machinery of the latest up-to-date design employed in winding and manufacturing the Motors.

We manufacture Electric Blowers in eight styles to run from one to nine fires.

THE CHAMPION THREAD CUTTING MACHINE



Furnished with Dies only, or with Dies, Taps and Tap Chucks.

A Thread-Cutter to do quantity jobs equal to machines costing ten times the price.

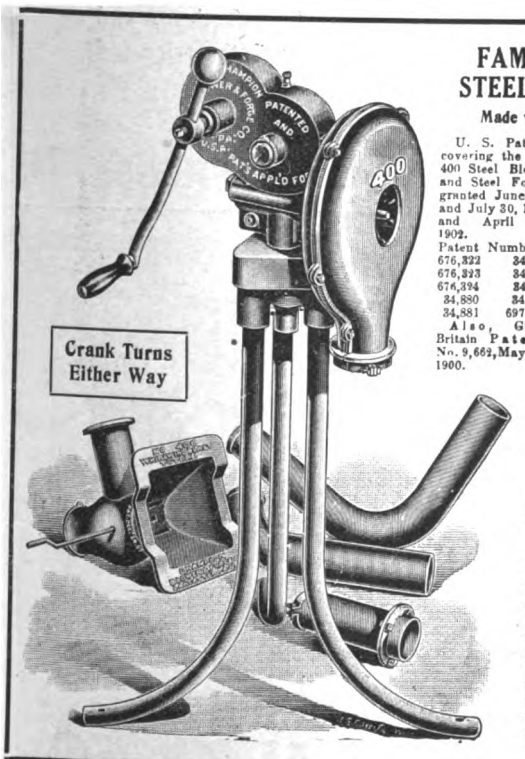
The Champion Thread Cutting Machine represents a **wonder** in its line, as it meets conditions practically equal and sometimes superior to machines costing ten times the price. It will do **better work** and produce **superior threads** at **machine speed;** therefore, no shop cutting threads can afford to do **without this labor saving tool.**

"Costs about the price of a Screw-Plate."

Made in two sizes and several styles from ¼ to 1 inch.

FAMOUS 400 CHAMPION STEEL BLACKSMITH BLOWER

Made with Adjustable Ball Bearings only.



U. S. Patents covering the No. 400 Steel Blower and Steel Forges granted June 11, and July 30, 1901, and April 15, 1902.

Patent Numbers:

676,322	34,882
676,323	34,883
676,324	34,884
34,880	34,845
34,881	697,629

Also, Great Britain Patent No. 9,662, May 25, 1900.

The 400 Champion Steel Blacksmith Blowers and Forges after twelve years of practical blacksmith work number over 600,000 in use. The 400 Blowers purchased twelve years ago are running to-day as smooth and noiseless as the day they were placed to the fire and without a particle of lost motion to the crank. Therefore, the gearing and the bearings in the 400 Blower are as good as new after twelve years use.

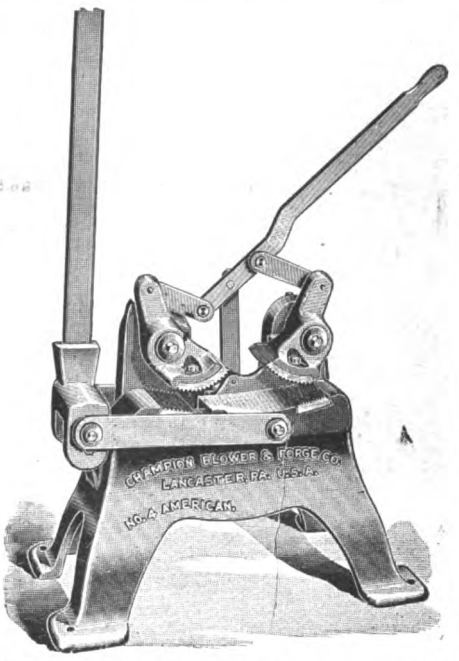
The No. 400 Champion "Whirlwind" Blast Anti-Clinker, Heavy Nest Tuyere Iron is furnished regularly with the 400 Blower **without extra charge.** This is a tuyere iron that is **true to name.** It produces a circular, rotary, "whirlwind" blast and heats iron one-third quicker, as the heat is not blown up through the fire and out of the chimney where it is wasted as in all other tuyere irons. This is not a wild claim. This can be tested and it will be found that less hot air is wasted six inches above the fire than four feet above the fire of any other tuyere iron. Therefore, by the quicker heating and this concentration of all the heating elements in the coal the blower will soon pay for itself in the saving of time and fuel.

No. 4 CHAMPION AMERICAN TIRE AND AXLE SHRINKER

The No. 4 American Shrinker has been manufactured by us for over six years, and is used by over 9,000 smiths.

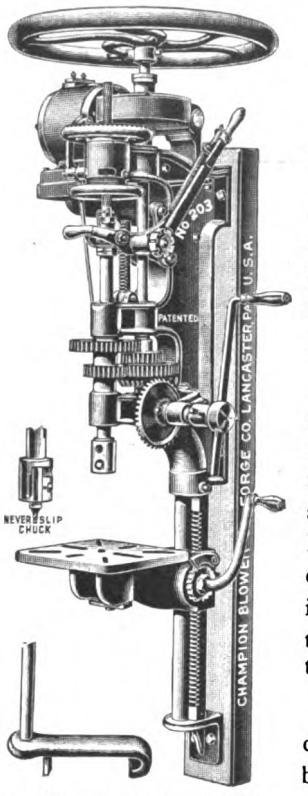
Quantity manufacturing has enabled us to spend thousands of dollars to **build a special moulding machine to mould this shrinker** with the feet up (or in other words upside down), therefore, the **hot metal** is **poured** in from **the feet,** which cannot possibly be done by hand moulding, thus **saving** all **risk** of the **dirt** in the **metal** combined with **air** to **honeycomb** the **arm holding** the **main eccentric gripping dog,** as the **hot metal** must be **poured** from the **top** of the **arm** when the **mould** is made by **hand.**

We positively guarantee no **honeycombing** in the **arm holding** the **eccentric gripping dog** or **main body** of this **shrinker** where the **strength** is **required.**



No. 4 Champion American Tire and Axle Shrinker will shrink up to 4x1 inch round edge tire, and axles up to 1¼ inches, with two steel jaws 4x2 inches wide.

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



No. 203 Electric Driven Self-feed and Double Compound Lever-feed Drill.

MADE WITH CUT GEARS AND BALL BEARINGS

The Drill represents simplicity and durability. The Direct Connecting of the Motor is an entirely new invention on Drilling Machines and is worthy of the most careful attention of any smith looking for a Drilling Machine. It represents a Drill to be operated by Motor or Hand Power.

The Double Compound Lever-Feed produces 80% more pressure to the Drill Bit than any drill ever manufactured, therefore, drills holes quicker and with less labor. The Self-Feed or Double Compound Lever-Feed can be changed from one to the other in an instant. There is no turning back of the feed screw to get the bit out of the work.

The wonderful rapidity by which holes can be drilled on this tool places the blacksmith in position to drill holes as quickly and cheaply as the largest machine shop plants.

Our 1913 Catalogue can be had upon application, showing the very latest and greatest inventions in the Blacksmith line in the world on Blowers, Forges, Drilling Machines, Tire Benders, Tire Shrinkers, Power Blowers, Power Hammers, Punches and Shears, Screw Plates, Thread Cutters, Etc.

Write For Our 1913 Catalogue
It Is FREE For The Asking

THE CHAMPION BLOWER & FORGE COMPANY, Lancaster, Pa., U. S. A.

Buffalo Tool News for August

The 200 Silent Blower with 14-inch fan continues to compel the attention of blacksmiths located where electric current is not available. The 14-INCH Fan undoubtedly is the biggest hit in the hand blower field in ten years. The remarkable thing about this fan is that while it produces a much more powerful blast than any 12-inch blower, at the same time it runs so easy that no appreciable difference can be noticed between it and 12-inch blowers of any kind. It is now also made with 16-inch fan for the heaviest wagon work. Fitted with the finest radial ball bearings and thrust bearings, it stands aloof among all hand blowers in performance and high class construction.

Electricity is the stepping stone from the small shop to a big one. In selecting an electric tool, look first to the size of the motor, and its speed. The smaller the motor, the higher is its speed. High speed is a drawback because it increases friction very fast, meaning more power consumed and shorter life. The large size of the Buffalo Electric blower, with consequent slow speed, stronger construction and lower power cost, has earned for it a reputation against which no argument can prevail.

.....

The "Banner" tire setter (illustrated) is the latest addition to our line of tire setters and tire benders. Its low price and rugged construction are notable features. It upsets tires up to 4 x 1 in., round edge, and axles up to 1¼ in. The weight is 350 lbs., and the list price, $36.00, subject to our regular

liberal discount. The powerful refined tool steel jaws are milled and tempered to suit the work, and are easily set or released. The heavy box frame will stand all the heavy pounding to which it may be subjected.

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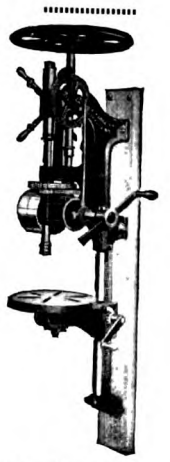


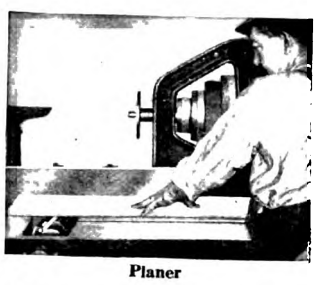
For over a year we have been perfecting a new drill series, made in six sizes, common to all of which is the powerful **capstan feed lever,** by means of which holes up to 1 in. may be drilled. Its leverage is the most powerful given in any black-

smith drill, and at the same time its simplicity and ruggedness make it highly desirable from the standpoint of the user. This is now our leading drill series, into which we believe we have put more value than can be obtained, dollar for dollar, in any other blacksmith drill. We furnish them for hand, pulley or electric drive. No. 124-CE, with electric motor, is a drill of which the most up-to-date machine shop might well be proud.

.....

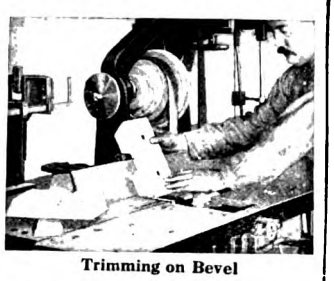
The preference shown Buffalo Forges is due to the superiority of the blower, coupled with a strong, rigid, practical design.

In looking over our list of Woodworker sales, we stumble across the queerest names of people as well as places in distant lands. Here is a gentleman by the name of Lopez Borja, at Riobamba, Guayaquil, Ecuador. A little farther we find the name of Estanislav Martinez, Acajutla, Salvador, and so on. There is some food for thought in the facts surrounding these shipments. The Crain Combination Woodworker is practically twelve machines in one. It embodies an infinite variety of adjustments and refinements for practically all the operations



Planer

of a carpenter and wagonmaker. When shipped to foreign countries, it is taken apart and packed in small boxes. An unknown customer, situated perhaps 12,000 miles away, and where expert help and advice is inaccessible, buys, assembles and operates the machine **without a written word of explanation on any point passing be-**



Trimming on Bevel

tween him and us. Yet he could reach us for five cents if he wanted to or needed to. Surely, a machine covering so wide a range of usefulness as the

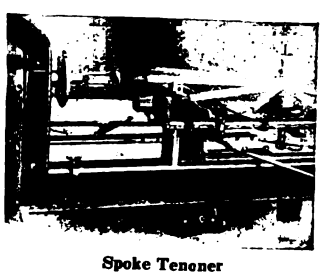
Band Saw

Crain Woodworker has to be truly universal to make such occurrences possible.

The views herein only illustrate a few of the operations that can be done on this machine, so peculiarly adapted to the wagonmaker's needs. It embodies a planer, jointer, shaper, borer, lathe, drill, band

Spoke Equalizer

saw, rip and cut-off saw, and besides these general operations can be used for equalizing spokes, for tenoning spokes, (see illustrations), and for drilling tires and boring rim of wheels on a true line with the center of the wheel. It has capacity and strength for heavy wagon work like no similar machine. Its practicability and satisfactory operation is at-



Spoke Tenoner

tested to as much by the silence of some users as by the words of praise expressed by all those of whom we have made inquiry.

Buffalo Forge Company
Buffalo, N. Y.

THE

BLACKSMITH AND WHEELWRIGHT

Vol. LXVIII. No. 2. NEW YORK, AUGUST, 1913. TERMS: One Dollar a Year

ELECTRIC WAGONS.

Various Styles That Will Interest the Up-to-Date Wagon Maker.

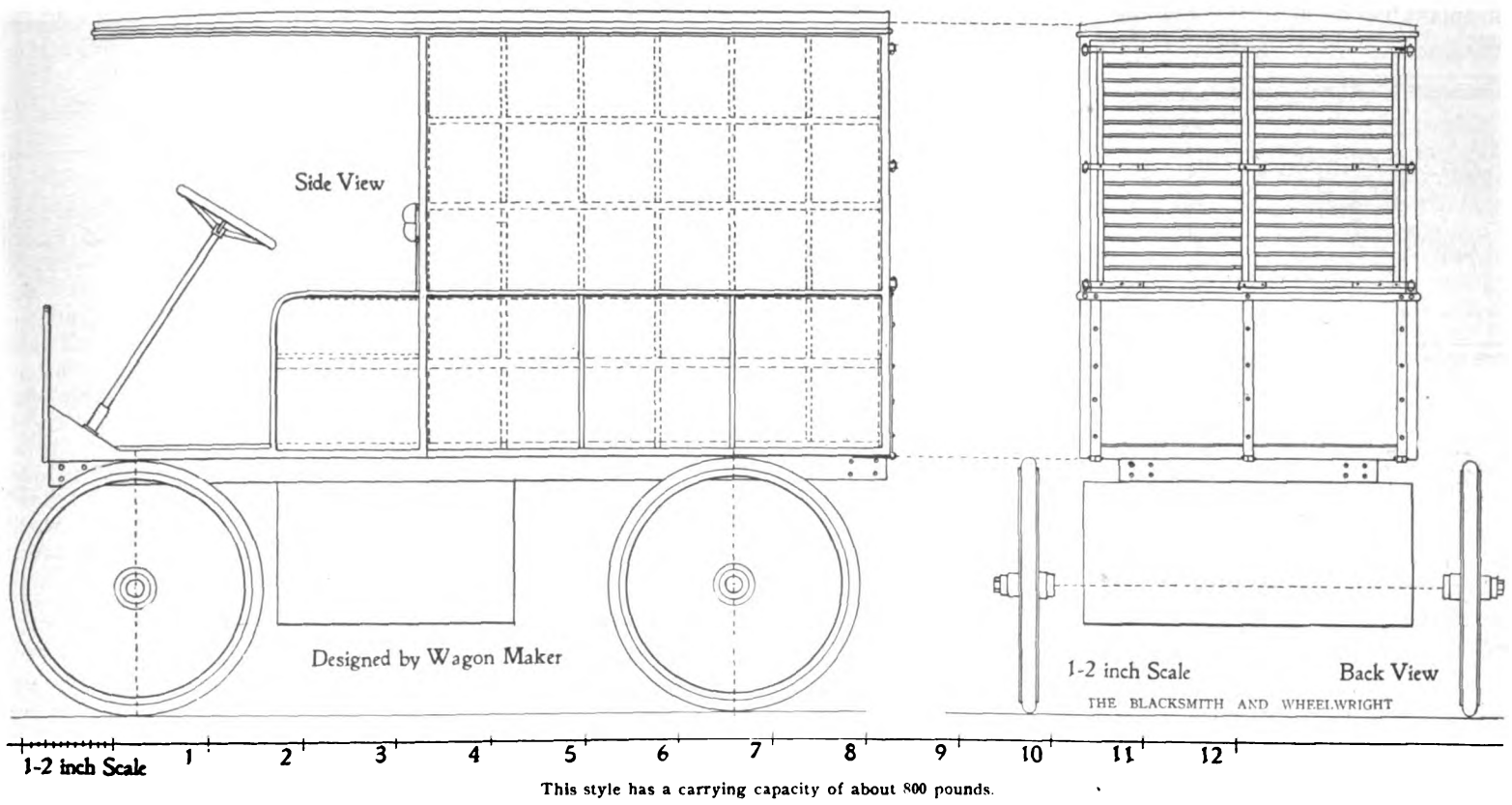
BY WAGON MAKER.

I believe that in the future the electric commercial vehicles will be more numerous for city use than gasoline driven motors. The manufacturers of electric motor driven vehicles in this country have been more aggressive in developing the commercial motor than those in foreign countries, but in another decade we shall see everywhere a great increase in numbers and varieties. The experimental stage of the electric wagon is a thing of the past, and the industry in pleasure and commercial vehicles is at present on a firm foundation, and a great expansion will be noted in a few years. The electric commercial wagons and trucks are built at present to carry 800, 1,000, 1,500, 2,000, 3,000 pounds up and over 5 tons.

The 800 pound electric wagon has a loading space rear of the seat 40 by 58 inches; its length with the seat is 77 inches and its total length on the sills is 105 inches. The height of the body from the bottom boards to under the curve is 54 inches. The length of the frame is 104 inches and the width across 32 inches. The size of the box containing the 44 cells depends on the sizes of the cells in bulk, which the makers of the cells furnish; they also guarantee the kilowatt hours and the battery capacity. The length of the wheelbase is 76 inches, tires 32 by 2½ inches and the width of track 58 inches.

These bodies are built very light. The size of the sills is 1¾ by 5 inches, the size of the end cross-bars the same, and the seven cross-bars between the end bars are 1 3/16 by 2¼ inches equally divided. The bottom boards are ⅝ by 9 inches, with a small space between the joints. The rear corner posts are 1¾ inches square, mortised into the sills and lapped to the top rails and cross-bar. The front posts are 1½ inches square, mortised into the sills and lapped to the top rails.

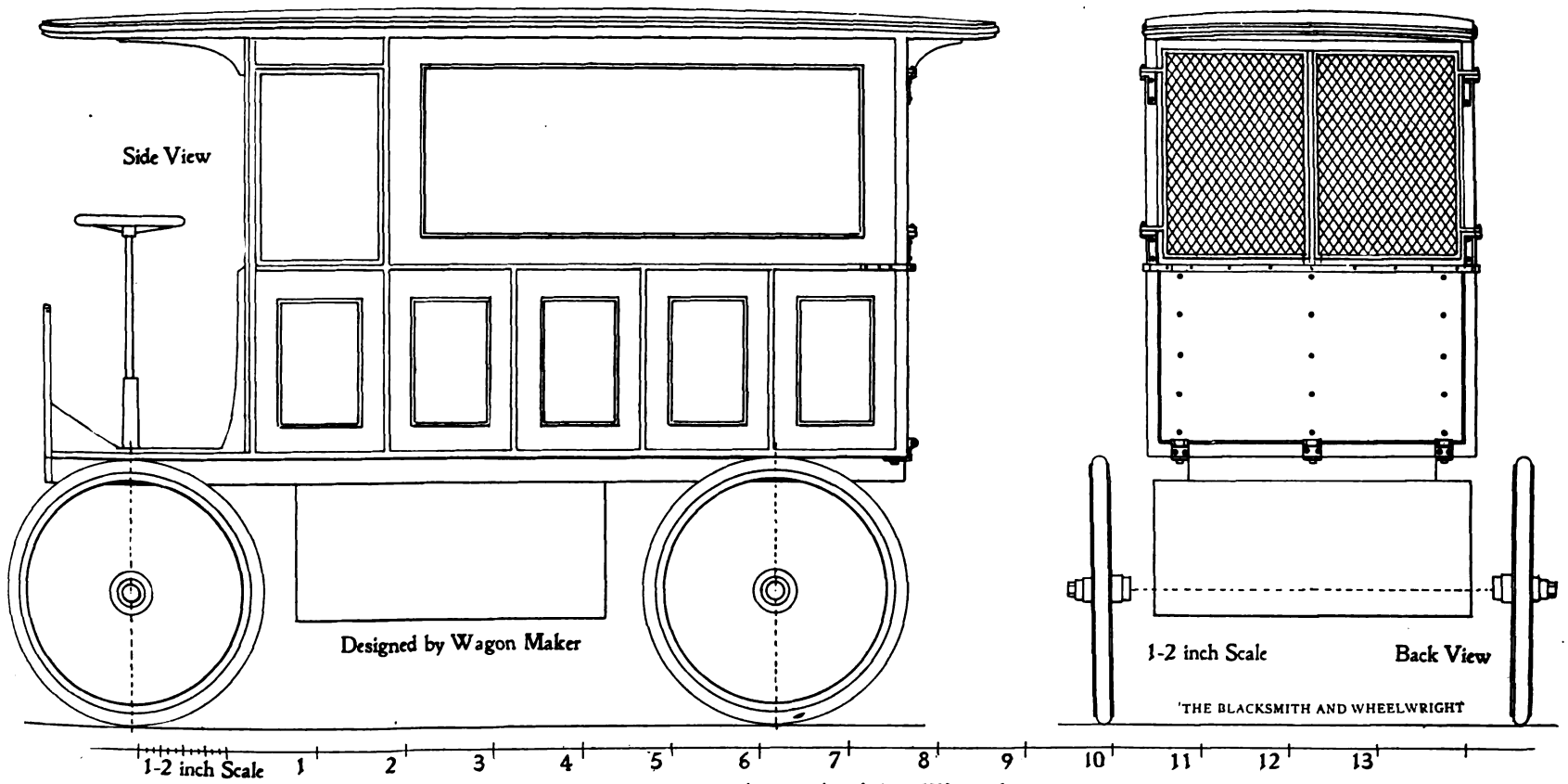
The other ten inside posts, five on each side, are ¾ inch square, and the entire side surfaces are covered with ⅜ inch poplar panels or built-up panels, glued on the posts, canvassed on the inside and painted so that no dampness or water can penetrate. The seat board is ¾ by 17 inches, and the inside is finished to suit the business for which the wagon is used. For a good finish the inside surfaces are lined with built-up panels and the shelves, or boxes, are made convenient for the users.



This style has a carrying capacity of about 800 pounds.

The drop gate is fitted between the rear end posts, and is 19 inches high, with three hinges bolted to the bottom surface of the cross-bar. The upper rear part is closed with two gates, hinged to the posts, and locked in the center. These gates are made of hardwood frames ⅞ by 1 inch thick and finished with 3/16 inch round rods.

This 1,500 pound capacity electric wagon is decidedly different from the light one, is larger and of a better style. The loading space on this wagon is 42 by 70 inches rear of the seat; its length with the seat is 88 inches, and the total length 115 inches, without the hood in the rear. The inside height is 59 inches and the height of the seat from the floor is 15 inches. The length



This design has a carrying capacity of about 1500 pounds.

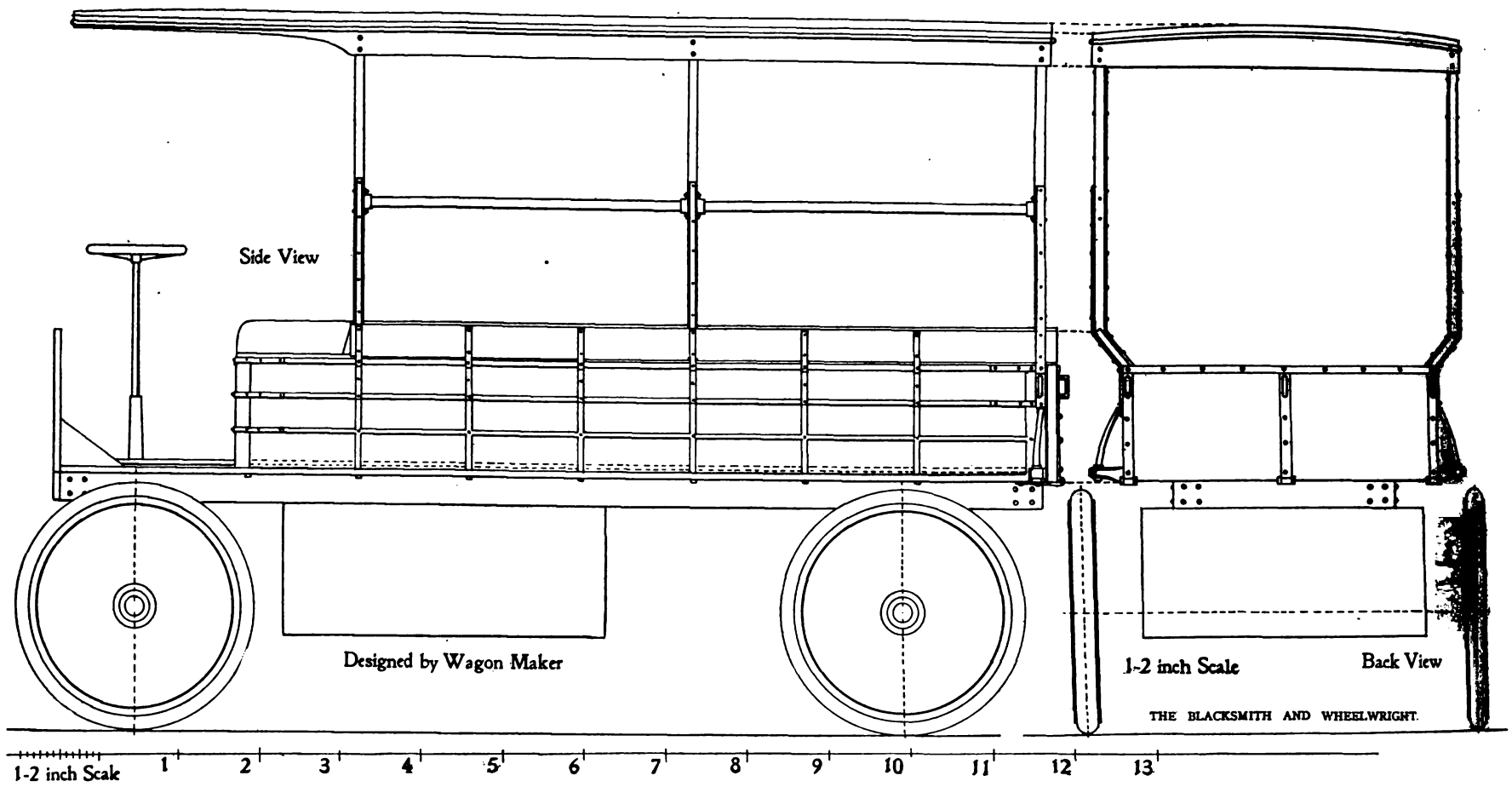
of the frame is 114 inches, and the width across 32 inches. The size of the box containing the 44 cells depends on the sizes of the cells in bulk, and the makers of the cells furnish all the particulars in relation to the kilowatt hours and the battery capacity. The length of the wheelbase is 84 inches, the diameter of the wheels 36 inches, and the tires are 2½ inches.

The sizes of the four front posts depend on the construction. If built without glass frames the size is 1⅜ inches square. If the glass frames are stationary the posts are 1½ inches square, and if made to drop, the size of the posts are 1½ by 2 inches square. The sills are 1¼ by 5 inches, the end cross-bars the same, and the rest of the seven or eight cross-bars are 1 3/16 by 2¼ inches. The bottom boards are fitted in lengthwise and are ⅝ by 7½ inches each. This body is molded and the lower vertical moldings should be supported by posts as indicated by dotted lines. The posts are mortised into the of the body, including the dash and the drop gate, is 12 feet 6 inches, and the outside height of the body 5 feet 8 inches.

The length of the wheel base is 9 feet 6 inches, tires front 36 by 4 inches and 36 by 2½ inches twin tires. Width and length of chassis, 2 feet 10 inches, or 3 feet 4 inches, and 11 feet 3 inches long. Battery 44 cells arranged in six crates. Width of track 5 feet center to center.

Most of the ribbed bodies are framed and paneled, and no doubt this is the best construction when lightness, quality and durability are taken into consideration.

On some of these bodies the sill sizes are 1⅜ by 4 inches and the bottom boards are fitted on the top of the sills, while others are 2 by 5 inches, and the bottom boards are fitted between the sills. This last mentioned construction is the strongest and the best, because when the bottom boards are fitted on top of the sills they carry less and the sills are liable to decay as the damp- and the posts. The size of the corner posts is 1⅝ by 2½ inches, same size for the four gate posts, and the rest is 1½ by 2¼ inches and the top rails are the same size. The short bows are 1⅜ by 1¾ inches and lapped to the top rails from the inside. The rear drop gate is 30 inches high and as wide as the body; the front has a raised heel board and extended top, celluloid curtain window, with a frame fastened to the dash and top rail.



Ribbed Express style body, with top, open sides, and furniture rails.

sills or lapped top and bottom. This body is closed in front, back of the seat; some of them are closed entirely but this is not always the case as some have stationary windows, or to drop down to the fence rail. In some cases the entire partition is made to shift. The rear part is closed with a high drop gate and screens above. The drop gate is fitted between the sides of the body and is level with the rear end of the sides, hinged to three hinges. These hinges are fitted to the square part of the rear end cross-bar, bolted through it and screwed with two screws for each hinge to the rear surface of the cross-bar. The upper part of the hinges at the base are square and turn toward the inside surface of the drop gate and are bolted through it with nuts on the inside. This makes a better finish on the outside of the gate, as the three long hinges on the outside of the gate do not look well. Some wagon and truck builders make the bottom part of the hinge straight and make double corners for each hinge, thus forming a stop for the gate to rest on when up, and at the same time when down the gate is a trifle lower than the bottom boards, which is an advantage for loading and unloading. The upper screens are iron frames ¼ by 1⅛ inches when finished as shown with ⅛ inch wire. The hinges for first class work are welded to the frames and for less expensive work are riveted on. The lower parts of the hinges on which the gate rests are screwed to the corner posts.

The loading space of this ribbed express style body with top, open sides and furniture rails, between the sides, back of the seat and rear drop gate, is 3 feet 9 inches by 8 feet 6 inches; length of body from front posts to rear end of gate, 10 feet 2 inches, width across the bottom of the body outside, 4 feet, and across the top rail, 4 feet 9 inches, which will give 4½ inches flare on each side. The extreme length ness and water will enter between the bottom boards and the sills.

The size of the lengthwise rails is ¾ inch square, while the upright posts are ¾ by 13/16 inch. This last thickness is made to stand 1/16 inch outside of the lengthwise rails to break the joints and keep them from showing when painted. The same holds good with the posts top and bottom on which the sills and main body rails stand over the posts 1/16 inch. This practice is decidedly necessary when first class work is desired. The panels are either ½ or ⅝ inch thick, are grooved into the sills ⅜ or ½ inch deep and routered into the main body rails ½ or ⅝ inch square, thus making the size of the body rails 1 7/16 inches square. The posts are mortised into the sills and the main body rails, white leaded for each tenon and back of rails and posts. The posts are 1½ inches square, ironed inside and out, and each post has a strap bolt.

For furniture rail see side elevation and for drop gate hinges see back view. This drop gate is on the outside of the body and has three hinges.

The loading space of the large stake truck with side gates, rear drop gate and bone top is 4 feet 8 inches by 12 feet 3 inches. Its extreme height of body is 6 feet 3 inches, and the length over all 14 feet 2 inches. Width and length of chassis, 3 feet 6 inches by 13 feet. Wheelbase is 9 feet 5 inches; width of track 5 feet, center to center; tires, 36 by 7 inches front and 36 by 5 inch twin tires for rear wheels. Battery, 44 cells placed in six crates.

The length of sills on this body is 12 feet 1 inch, its thickness 2½ inches and its width 5 inches. The size of the cross-bars is 1¾ by 3 inches and bottom boards ⅝ by 8 inches. The side-boards are ⅞ by 6 inches, stand ¼ inch inside of sills and ¼ inch outside of posts and the rest of the thickness is notched in the boards

CERTAIN PRACTICAL MATTERS.

Compressed Air Forge—Soft Hammer—Mending a Leather Belt—Reinforcing a Hinge.

BY JAMES F. HOBART, M.E.

In the June Blacksmith and Wheelwright, Mr. R. F. Tomlinson of Kansas, asks the size of piping necessary to run a smith's fire with air at 150 pounds pressure. He also asks how large a tank would be required, say running the compressor for ten minutes for two or three hours' work with one large fire. Mr. Tomlinson will have no trouble in operating a smith's fire with compressed air. In fact, compressed air is used by most boiler makers nowadays for heating rivets. The air is connected directly to the forge by means of a flexible hose, enabling the forge to be placed convenient to the work wherever that may be located. The boiler makers use ¾" hose and this would be employed for any ordinary smith's fire.

Probably a ½" pipe at 150 pounds would supply ample air. Indeed, a ¼" pipe might be used for light work. The boiler makers rarely use more than 60 to 90 pounds pressure. Brother Tomlinson can also run a washing machine in his house, and he does not need a compressed air engine for he might procure any little steam engine that he can get hold of and use the same for compressed air without any change whatever.

But, before he starts upon his compressed air forge, let me advise him not to do it if he cares anything about the cost of operation, for he cannot operate a compressed air blast as cheaply as he can one derived from a fan or blower in the ordinary manner. The reason for this lies in the great loss of heat which takes place when air is compressed. If he should compress air to 150 pounds, it would heat the compressor and the receiver, unless they were water-jacketed, so that the compressor could not run. An immense amount of heat is set loose when air is compressed. Therefore, it will be necessary to water-jacket the compressing cylinder and to store the air in receivers out of doors or in some place where the heat may be dissipated.

Then there is another loss in using compressed air. The little engine used in the house to drive the washing machine might freeze up,

were he to operate it under a heavy load. When air is compressed it gives off heat, and air cannot be expanded in the cylinder of a steam engine without taking back as much heat as it lost under pressure. Therefore, when air expands in an engine cylinder it must have its lost heat back again, and it takes that heat from the walls of the engine cylinder or from any other surface it comes in contact with. Hence, such surfaces become very cold and in many cases they are covered with frost to a considerable depth. It is for the above reason that it is often necessary to heat compressed air before using it in the cylinder of an engine, and the heat liberated in compression and the heat required in expansion represents loss of efficiency in the use of compressed air for power purposes. Still the cost will not be

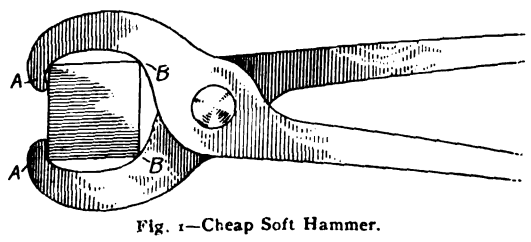


Fig. 1—Cheap Soft Hammer.

very much, and it is perfectly feasible to install such a device as Mr. Tomlinson is asking for save for the expense.

A very good way to rig up a compressor is to obtain a two-cylinder or three-cylinder gasoline engine. Change the engine slightly, so as to use one cylinder for air compression, power being obtained from the other cylinders of the same engine. Probably a three or four H.P. engine connected with a receiver 3 feet in diameter and 6 feet long would supply the forge for one hour by running the compressor ten or twelve minutes.

Mr. Tomlinson also asks for a receipt for a compound to put in water to fill up a cracked water jacket. There are several ways of forming a rust joint between broken parts of jackets. One very convenient way is to place a solution of salammoniac in the cylinder, introducing steam or air pressure on top of the solution in order to force the same into and between the cracked surfaces. After one or two applications of the solution in this manner, lay the cylinder to one side for several days to permit the surfaces which have come in contact with the salammoniacs to rust.

Should there be any considerable opening between the cracked parts, it may be necessary to mix the salammoniac with fine iron filings, forcing the mixture into the crack until it is completely filled. Then set the cylinder to one side until the salammoniac solution has had time to act upon the iron filings, which it does readily, and transforms them into a mass of rust or iron oxide so tightly packed into the crack that it is almost impossible to remove the filling by ordinary means.

Brother J. H. D. of Oklahoma wants to know what kind of acid is used in babbitt or paint to keep it from burning. He adds that he has seen

Fig. 2—Making Ready for the Glue.

it used in babbitt in making gaskets or fillets and it would not burn the wood. It is not necessary to use any acid whatever for this purpose. Merely heat the babbitt to a point which renders it fluid, which takes place at 400 to 600 degrees Fahr. The surface of the molten metal may be covered with rosin or with cylinder oil. Either of these will remain upon the surface of melted babbitt, provided it is not heated too hot, that is too far above its melting point. Common tallow also answers pretty well, but it is volatized by heat at a lower temperature than common cylinder oil. The oil which is used in the cylinders of gasoline engines will answer this purpose admirably.

Regarding brazing spelter, a reader in Nebraska wants a good receipt for making spelter for brazing castings, cracked water jackets and other articles of a similar nature. Perhaps I can answer this question no better than by quoting from page 146 of a book called "Soft Soldering, Hard Soldering and Brazing," by James F. Hobart, M.E., where, in speaking of materials for brazing, he (or I) says:

"There are innumerable alloys used for brazing but three or four will be enough for any ordinary work. It is usual to purchase spelter already prepared for brazing. It is in the form of crushed or granulated powder and in this condition is easily mixed with pulverized borax. If the mixture be wet slightly, barely moistened, it may easily be placed upon the joint to be brazed by means of a small brush or bit of stick.

"Perhaps the brazing mechanic had best prepare four alloys, two hard and two soft, which we will call hardest, hard, soft and softest.

Alloys	Tin	Copper	Zinc	Antimony
Hardest	0	6	2	0
Hard	0	2	2	0
Soft	2	8	6	0
Softest	4	0	0	0

"In a number of text books a metal is given for brazing as follows: Zinc, 1 part; fine brass, 1 part. In making an alloy of this kind it is understood that the copper in the brass receives still another proportion of zinc which lowers the melting point and therefore makes the alloy much softer.

"Fluxes for Brazing: Borax and boracic acid are the two principal fluxes used for this purpose. Some mechanics prefer one, some the other and some men mix the two together in varying proportions. The writer has the opinion that it makes very little difference which one is used; he uses either one and can see no difference in the results obtained with either."

When the smith has occasion to drive a finished shaft out of a machine or to back out a bolt when he does not wish to batter the threads, he will use some form of soft hammer. These hammers are made of copper and also of rawhide, but for every-day purposes the smith may make one as shown by Fig. 1. This tool consists of a pair of tongs which will open about 2" at the jaws. The engraving shows the tongs at A A bent inward like the claws of a dor-bug. The jaws are also spread the same distance apart at

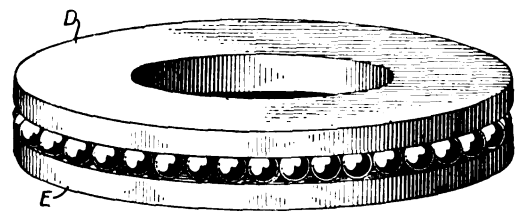


Fig. 3—Ball Thrust Bearing.

B B, and the engraving shows an ingot of babbitt metal placed between the jaws which clamp the babbitt tightly at four places as shown. Babbitt comes in bars which are creased so deeply at one side that they may be readily broken into little squares, and one of these squares is placed in the tongs as shown.

When it is desired to drive with the hammer upon finished work, simply introduce the bit of babbitt between the hammer and the shaft and the men may strike as hard as they choose upon the surface of the babbitt, even using a 14-pound sledge if necessary. To be sure, the babbitt is soon smashed out of shape, but a new piece can be broken off and put between the jaws of the tongs, and the old babbitt can be either used for lining boxes or remelted in the ingot form again. A soft hammer made of copper or rawhide costs from $1 to $3. A hammer like that shown by Fig. 1 may be had for the making.

A smith often finds that one or more of his leather belts have become unglued. Perhaps they got wet and water fell upon them from the water jacket, causing the glue to become loosened and developing one or more gaps as shown at C, Fig. 2. When this takes place, unless it is repaired the belt is liable to go to pieces in a very short time.

To fix up a belt which has become unglued, take it off the pulleys and stretch it out flat upon a floor or a table. With a sharp knife reach into the pocket C and trim off all irregularities which may exist there, such as shoe pegs, etc. Then with a coarse half-round file or a wood rasp, clean off the surface of the leather, scraping off the glue and any dust or dirt which may have accumulated in the pocket. Then turn the belt the other side up and clean thoroughly the surface on that side, so that no particle of saw-dust or dirt remains between the folds of the belt. Then take a stick and whittle from this a shape like a paddle or spatula, and spread a thin layer of glue over the leather. Hot glue may be used for this purpose, or Le Page's cold glue will answer first rate. Good fish glue is the best thing to use if you can get it. Fish glue is water-proof and a belt mended with it will not come apart again unless it becomes very wet indeed.

After both surfaces of the belt have been evenly and thinly coated with the glue, press them together, working from the middle of the belt towards its edge. Then with a large round-face hammer, drive the surfaces of the belt together and place a heavy weight upon it, leaving it there for an hour or two. A very good way is to put a board on each side of the belt, then put upon the boards a couple of clamps or hand-screws. Some people hold glued joints together by driving them full of shoe-pegs. This may be done but it is not necessary. An hour or two in the clamps, and the belt is ready to put back upon the pulleys, and if the job is well done the pockets will all have entirely disappeared.

The writer recently had trouble with a drill press in which the forward thrust of the drill was carried by means of a ball bearing in a collar on the spindle just below the cast iron bearing through which the spindle passed. The ball bear-

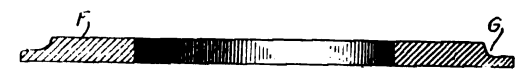


Fig. 4—Section of Ball Race.

ing used there, gave continuous trouble, and upon being overhauled was found to be completely worn out. Another ball bearing was not available and the drill must be used; therefore the bearing was taken apart, the balls and their cage thrown away, and the collars as shown at E and D, Fig. 3, were used to form the upper and lower collars of a new two-metal bearing.

A sectional view of collars D and E is shown by Fig. 4. It will be noted that the edges of the collar are worn irregularly concave. This was done by the balls during their ceaseless journeys round and round the collar. These collars of which there were two, were run with the surfaces, F, towards each other, and held in place by the balls in the worn out race, G. In the new thrust collar, the ball cage being thrown away as stated, the collars were reversed so that the side F instead of being inward was placed on the outside. This is shown by Fig. 5, the surfaces F F being turned outward and what were the outward surfaces being placed inward at H. Next a piece of hard brass, I, was turned smooth on the sides, made about ½ inch thick and placed between the reversed collars, as shown by Fig. 5.

Surface F of the old collars was slightly rough. Therefore this surface would bed itself securely into the lower end of the bearing and into the upper side of the collar on the drill. These surfaces become more or less firmly fixed together and all motion would be between the brass piece I and one or the other of the hardened steel collar surfaces placed below I, as shown by the engraving. This thrust bearing is running yet, and there never has been the least bit of trouble from it.

A job which came into the shop the other day is shown by Fig. 6. It was on a heavy machine used for joining staves, a machine which weighed upward of a ton. The machine consisted of a flat disk 4 feet in diameter, several knives being mortised into the disk in such a manner that

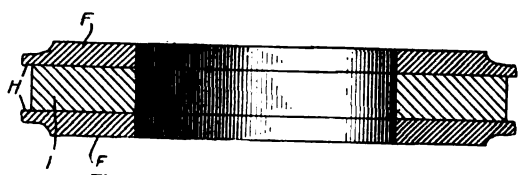


Fig. 5—Section of New Thrust Bearing.

when staves were pressed edgewise against the disk the edges of the staves would be smoothed off by the knives. This device was contained in a heavy cast iron case which opened at one side. One of the hinges had become broken and the machine was brought to the shop that this hinge might be repaired.

To that end, the cast iron was sawed and chipped away, and the wrought steel hinge as shown by Fig. 6 was forged and bolted to the cast iron case. It was not possible to use steel over ¾ inch thick for making this hinge, and upon completion the hinge seemed very weak at the point J, so much so that the writer proceeded to strengthen the hinge by fitting a strap, K, snugly against the body of the hinge and also closely against the eye of the hinge as shown at L. Next a bolt hole was drilled to receive a cap screw and after the same was inserted in its place and tightened, the spring appeared as shown by Fig. 6. The piece K reinforced the hinge in two ways, at L to prevent bending of the eye of the hinge and at J to prevent its breaking through the weakest point of the hinge, i. e., through the metal on either side of bolt M.

There surely are a thousand and one jobs to come to the smith who is handy at any kind of

work besides horseshoeing and wagon tinkering. A job recently came to the shop as shown by Fig. 7, which represents a broken sliding table belonging to a Fay cut-off saw. This casting orginally carried four slides, two of which are shown at A and G. Two more are left off and are not shown in the engraving. The movement of this quadruple wedge shaped casting served to raise and lower the table to suit the convenience of the sawyer.

By some means, probably during shipment, wedge G was broken off, the break occurring at B. It was determined to mend this casting rather than to order a new one, and to this end, piece G was thrown away and a new steel forging was made to take its place.

The new steel forgings are shown at D and E, Fig. 7. Two pieces are used, for it was determined to make this forging in two parts. A bend was made at F and the end E was brought up to align exactly with point G. The bend at F was made as square as possible without upsetting the iron. Piece D was then welded to the lower part of the broken casting, and when

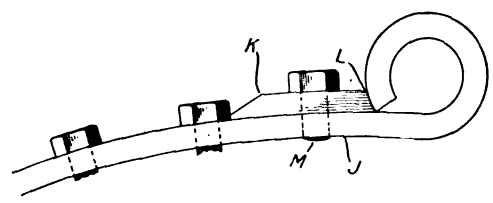


Fig. 6—Reinforcing a Hinge.

it was found that D was accurately in place, then piece I was welded to D and also welded to B. In fact, the weld at B was made first and after the piece I was joined to the casting, the end H was faced off even with E, and the broken wedge had again materialized as shown at G. It was found much cheaper to make the wedge in this manner and to weld it together by the oxy-acetylene process. It was found easier and cheaper to do this than to bend up the broken part from a single piece and to try to fit it into place with the necessary accuracy.

The smith who goes to the expense of putting into the shop an oxygen acetylene welding plant will find that he can increase his income very materially just as soon as he learns how to make a good weld. A good deal of experience and a whole lot of know-how is required to do acceptable oxy-acetylene welding, but once the smith "catches on" he has a money-making addition to his plant.

The writer has worked out a new scheme for using oxy-acetylene welding wherever there is lost motion or much wear found when overhauling and repairing various machines. For in-

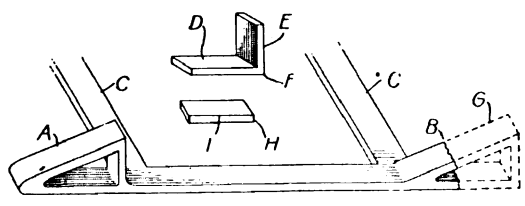


Fig. 7—Broken Fay Sliding Table.

stance, suppose that a lever working upon a pin between jaws is found to have 1/16 inch play sidewise. It is quite a task to take a lever and upset it so as to obtain sufficient metal to fill the fork or whatever the lever is fitted in. Instead of going to this expense, simply procure a piece of sheet iron of the exact thickness necessary to bring the part to be repaired up to full size. Place the sheet iron in position upon the side of the article. Fasten it there securely either by means of clamps or by screws tapped into the part to be repaired. Now let the oxy-acetylene welder run around the edges of the reinforcing sheet iron and melt the edges thereof until it is welded perfectly to the casting. It only requires a few minutes time to add a strip of iron in the manner above described, and a strip thus added may be machined, chipped or filed until it will fit in the fork in which the lever is to be placed. The smith who tries the above method of taking up lost motion will use it a great deal after becoming accustomed to it.

The man who advertises consistently and intelligently needs no argument to convince him of the value of advertising.

You will find a good deal of profitable reading in the advertising pages of this magazine.

PLACE TO SELL CARRIAGES.

An Undeveloped Field for American Vehicle Makers.

The manager of a well known horse dealing firm in New York City, who has just returned from South America, says:

"I believe that without any doubt a man could sell five thousand second hand carriages on the west coast of South America in the next two or three years if the business were properly looked after. My first knowledge of this market came to me from an acquaintance with C. B. Wynn, of Guayaquil, who bought two carriages in New York. He came back each year, and on each succeeding trip took a larger number, until he was shipping fifteen at a time. They were all victorias, cabriolets and landaus. He sold them right on the dock, and not only sold the carriages but sold the boxes in which they were shipped, getting about twenty-five dollars apiece for them. Before the last lot arrived Mr. Wynn was taken sick and had to come to the United States. I arrived in Colon the day he left there, but went right along just the same.

"When I reached Guayaquil the carriages had not arrived, as they had to go away down around Cape Horn, which means from seventy to eighty days at sea. When the canal is opened you can ship to Guayaquil in sixteen days. On account of the danger from disease at Guayaquil I stayed there only three days and went on to Lima, Peru. The carriages reached their destination about a week after I left and were all sold at a big profit.

"Lima is a city of about one hundred thousand inhabitants, twenty miles inland. You go from the port to the city on an up to date electric car. When I got off this car the first thing I saw was a victoria with a number on the back of it, the figures, 974, being about a foot high. I afterward learned this was the license number. There are about twelve hundred licensed victorias in Lima.

"I walked the streets for three days before I found a driver who could speak English. Then I took a drive, my idea being to learn who owned these carriages and where they got them, for in my three days of tramping I had not seen one American carriage—not even a Studebaker. They were all built by German, English, French and Austrian makers. I found there were about a dozen liverymen in Lima who owned them all and hired them out, with the horses, for $2 a day to the native drivers. The drivers made good profits, as everybody rides if he only wants to go across the street. Any afternoon you can see the principal streets crowded with victorias filled with ladies and gentlemen all in their best clothes, out for the daily promenade on wheels. Their principal occupation seemed to be riding.

"When I introduced myself to the liveryman who owned the carriage in which I was riding and told him I was from New York and was there to sell some victorias he said he did not know they built any in the United States. I picked out the best one he had and asked him what he would pay for one as good, free on board in New York. After sparring with him a few minutes I offered to sell him one for $350 in gold. He said he would take twenty at that price. I booked the order and then asked him how much he would give for good second hand coach harness, most of the harness there being patched up with rope and wire and in a very dilapidated condition. He replied: 'Two hundred consols.' That would be $100 in gold.

"That same afternoon with my English-speaking negro as interpreter I took orders for between $20,000 and $25,000 worth of carriages and harness. Every liveryman I visited and showed my pictures to gave me an order. None had ever seen an American carriage. On looking up the responsibility of my customers I found that some were good and some were bad. However, I sent down about thirty victorias and cabriolets and with each one sent a set of double harness. On these we made profits ranging from $100 to $250 and $50 on the harness. Mr. Carroll thought so well of the markets I discovered that he kept it all quiet and was preparing to go extensively into the export business when he was taken sick and died. With a central distributing house in Panama and others in Guayaquil, Lima and Concepcion a lot of profitable business might be done not only in carriages but in all American goods. The business now is in the hands of the Japs, Germans and English."

FILES AND HOW TO USE THEM.

The Whole Subject Covered by the Nicholson File Company.

The well-known Nicholson File Co., of Providence, R. I., have issued a little booklet called "File Filosophy," from which we are permitted to extract the following interesting file information:

Very few mechanical operations are more difficult than that of filing well. Unlike the tool fixed in the iron planer, whose movement is guided by unyielding ways, the file must be guided by the hand, and the accuracy with which this is done will depend largely upon the patience and perseverence given in practice; the "guiding principle," involved in many other tools and operations, being wanting in most applications of the file.

While a perfect file is necessary to secure the best results in filing, the workman's success depends very largely on his ability to select the proper shape and cut of file for the work he has to do, together with his ability to use it properly. There are but few generalities that may be given with any idea of practical value to the beginner. The school of experience is where he must acquire the ability to become an expert.

A Severe Test in Filing.

A severe test in filing would consist in producing a true flat surface upon narrow work, or say that whose width does not exceed one-eighth the length or stroke of the file. To the uninitiated this would seem to require that the file should have a perfectly true and straight surface, but were it practicable to make the file absolutely flat and true, it would then be necessary to move it in absolutely straight lines across the work; even were this operation possible, the pressure, if applied to each end of the file, as is the usual custom, would give it sufficient spring to cause a slight concavity to its cutting surface, and thus an inevitable rounding to the surface of the work must be produced.

Therefore, to produce a flat surface under this severe test, or even under more favorable circumstances, the file should have a convexity given to its surface.

Convexity in Files.

Undoubtedly, few, even of the old filers, have given the subject of convexity as it bears upon broad surface filing the thought it is entitled to. It is known to many mechanics that a file which will bite and cling, with the accustomed downward pressure, upon wrought iron or soft steel will require a greater pressure to prevent it from glazing or slipping over the work, when applied to broad cast iron surfaces. This is owing to the glassy nature and extremely granular formation of these surfaces; consequently the teeth should enter the surface deeper than in the more fibrous metals or they will soon glaze over and become dulled or shiny, thus giving to the file the appearance of being soft, while the contrary may be the fact. Many a well hardened file has been called soft because the operator has failed to give it a fair chance.

Considerable convexity is, therefore, needed in such cases; for while it gives greater control of the file from point to heel, it also presents fewer cutting points to the work with a given pressure downward than the less convex file—the bite being increased in proportion to the increase of the convexity. The ability, therefore, to increase it more or less, at the will of the operator, is of considerable importance.

In finishing many kinds of work, the absence of a suitable convexity limits the usefulness of the file—as in the preparation of the valves of steam engines, tables of printing presses, stereotype plates, or other work requiring a true surface.

While an absolutely true surface is confessedly unattainable, it is evident that, as in the above cases, a degree of perfection is sometimes desirable beyond what the necessities of other work may require; and to be able to touch the exact spot indicated by the straight edge or surface plate with the file, is to utilize it in a manner which could not be done if the convexity did not exist.

File Handles.

When the proper selection has been made, before using the file it should first of all be properly handled; i. e., a handle of the proper size with the proper size hole, drilled straight, should be fitted to the file, not, as is too often the case,

by driving the handle half way down the tang and thereby doubling the chances of breaking it, but by forcing it well up to the shoulder, thus enabling a suitable grip which is essential to a proper guiding and control of the file. It not infrequently happens that the tang hole is not drilled central or is badly out of line, or does not properly fit the tang of the file; in such cases the tang of an old or worn out file of similar dimensions should be heated, taking care, of course, not to draw the temper, and the hole in the handle burned out to nearly the desired size and shape, before driving it upon the tang.

Of the many file handles of special construction hitherto devised, there are none which have, as yet, combined that simplicity, utility and economy necessary to take the place of the ordinary wooden handle; nor do we think it possible to improve for most applications of the file, upon a wooden handle that is conveniently formed and properly ferruled, provided it be firmly affixed and carefully used.

Devices for Holding Files.

The file, when used in the ordinary manner, considerably exceeds the length of the work; but when such is not the case, as in filing large table surfaces and shaping out recesses of considerable length, or when, from other causes, the ordinary handle will not answer, it then becomes necessary to grasp the file by holders of special construction. These special devices (many of which are quite rude) are numerous, and vary to suit the particular shape of the file and the work to be performed.

Short pieces of files of special construction are sometimes clamped to the slide rest, to be used upon work revolving in the engine lathe, and are soldered or screwed to bent handles when required to be used in finishing in and around the bottoms of shallow cavities.

The necessity, however, of this last and troublesome method of holding the file may be avoided by the use of the Stub File Holder.

Woodworkers not infrequently clamp one or more files to pieces of board, or fasten them by means of staples and wire pins, or by cutting in, in such a manner as will enable them to smooth out grooves, or true up the edges of their work, using the board or holder as a gauge. Bent Rifflers are sometimes required in reaching certain irregularly shaped cavities.

In filing large table surfaces, the tang is frequently bent upward to admit of the hands clearing the work when the file passes over the surface; sometimes a crank-shaped holder is employed, having one end fitted to the tang of the file while the other is fitted to receive the handle. These devices, while facilitating somewhat the handling of the file, do not give that perfect control which enables the operator to manipulate it at will, nor do they aid in governing its convexity.

The improved surface file holder is designed especially to meet these points, thus enabling the skillful operator to do much of the work with the file which has hitherto been done with the scraper.

Height of Work.

For filing in a vise the work should be held as rigidly as possible and the vise jaws should be placed so as to be level with the elbow of the workman, which will be found to range from 40 to 44 inches from the floor—therefore 42 inches may be considered as an average height, best suited for all heights of workmen, when the vise is to be permanently fixed. This position enables the workman to get the full, free swing of his arms from the shoulder; the separate movement of the wrist and elbow should be done away with as much as possible.

If the work to be filed is small and delicate, requiring simply a movement of the arms, or of one hand and arm alone, the vise should be higher, not only in order that the workman may more closely scrutinize the work but that he may be able to stand more erect.

If the work to be filed is heavy and massive, requiring great muscular effort, its surface should be below the elbow joint, as the operator stands further from his work with his feet separated from 10 to 30 inches, one in advance of the other, and his knees somewhat bent, thus lowering his stature; besides, in this class of work, it is desirable to throw the weight of the body upon the file to make it penetrate, and thus, with a comparative fixedness of the arms, to depend largely upon the momentum of the body to shove the file.

Grasping the File.

In using the larger files, intended to be operated by both hands, the handle should be grasped in such a manner that its end will fit into and bring up against the fleshy part of the palm below the joint of the little finger, with the thumb lying along the top of the handle in the direction of its length; the ends of the fingers pointing upwards or nearly in the direction of the operator's face.

The point of the file should be grasped by the thumb and first two fingers, the hand being so held as to bring the thumb, as its ball presses upon the top of the file, in a line with the handle when heavy strokes are required. When a light stroke is wanted, and the pressure demanded becomes less, the thumb and fingers may change their direction until the thumb lies at a right angle, or nearly so, with the length of the file; the positions changing more or less, as may be needed to increase the downward pressure.

In holding the file with one hand, as is often necessary in filing light work, pins, etc., the handle should be grasped as already described, with the exception that the hand should be turned a quarter turn bringing the forefinger on top and lying along the handle nearly in the direction of its length. In this position, the freest action of the hand and wrist may be had upon light work.

Amateurs will find that by following these directions, the movements of the file will be simplified and made somewhat easier than if grasped at random and without consideration.

Carrying the File.

The most natural movement of the hands and arms in filing is to carry the file in circular lines, the several joints of the limbs being the centers of motion; this movement of a convex file would apparently give a concavity to the work, but the real tendency, especially on narrow work, is the reverse, owing to the work acting as a fulcrum over which the file moves with more or less of a rocking motion, giving an actual convexity to its surface except when in the hands of a skillful operator. The real aim, therefore, should be to cause the file to depart only so much from a true right line as will be necessary to feel that each inch of its stroke is brought into exact contact with the desired portion of the work; and by thus changing the course of the stroke slightly, thereby preventing "grooving," a more even surface results and the work is completed sooner.

The movements here referred to have reference to those in which both hands are used upon flat work, requiring nicety and trueness of finish, and the difficulties to be overcome in producing even a comparatively true flat surface with a file require much practice on the part of the operator.

In filing ovals and irregular forms, the movements, while not considered so difficult or trying, nevertheless require considerable experience and a good eye, so to blend the strokes of the file upon the round or curved surfaces as to give the best effect; the varied nature of the work upon this class of surfaces, though much might be said, prevents any detailed definition as to the movements of the file within the limit of this article.

In point of economy, the pressure on the file should be relieved during the back stroke; this will be apparent to anyone who will examine the formation of the points of the teeth, when it will be seen that the file can only cut during the ordinary or advancing stroke and that equal pressure during the back stroke must be very damaging to the points of the teeth.

Lathe Work, Etc.

For shafting or lathe work the file should be constantly stroked against the turning of the revolving work, applying the pressure to the forward stroke, relieving it on the return stroke and giving the stroke a slight gliding or lateral motion to assist clearance of chips and to avoid filing ridges or scores.

Machine Files.

For machine filing a special file is usually required and, where any very hard service is called for, the formation of the teeth should be such as to meet this special work. It must be remembered that files are almost always made with the intention that they are to be used by hand. The natural tendency of the workman to apply the pressure as required—to keep the file cutting or down to its work, using less pressure on the first strokes (which prevents the finely shaped tooth point from being broken and dulled) and gradually increasing the pressure as the teeth lose their keenness—is in contrast to the fixed pressure of the machine and must be compensated for in the manufacturing of machine files. It is a well known fact that a file soon becomes dull and worthless if it be constantly stroked over the work without being held to it by pressure enough to keep it cutting. The hand workman's "feel" gives him the advantage over the machine in this point. However, the importance of the work to be done must outweigh the economical use of the file and when the machine is required it should be used and the file maker can produce teeth of the shape that will be far more effective for machine work than the ordinary stock file.

Drawfiling.

Files are sometimes used by grasping at each end and moving them sidewise across the work, after the manner of using the spoke-shave. This operation is known as drawfiling and is usually performed in laying the strokes of turned work lengthwise, instead of circular, as left from the lathe finish, as well as when giving a final fit to the shaft that is to receive a coupling; cases, generally, in which no considerable amount of stock is to be removed, and thus any defects in the principle of construction of arrangement of the teeth of the file are not so readily apparent.

Files as they are ordinarily made are intended to cut when used with a forward stroke, and the same file cannot work smoothly or to the best advantage when moved sidewise, unless care is taken that the face of the teeth present themselves, during the forward movement of the file, at a sufficient angle to cut, instead of scratching the work. To accomplish this, the angle at which the file is held with respect to the line of its movement must vary with different files, depending upon the angle at which the last or up cut is made. The pressure should also be relieved during the back stroke, as in ordinary filing.

When properly used, work may be finished somewhat finer and the scratches more closely congregated than in the ordinary use of the same file; as, in drawfiling, the teeth produce a shearing or shaving cut.

First Use of a File.

In economizing the wear of files intended for general purposes, consideration should be given to the kind of material to which they may be subjected in the different stages of their use.

In the ordinary use of the machine shop, the first wear of these files should be in finishing the larger surfaces of cast iron, bronze or brass metals, all of which require a keen cutting tooth; they may then be made to do good execution upon the narrower surfaces of these metals, and also upon wrought iron and soft steel; as a file that has been used more or less upon this kind of work will not tear the surface of these metals and will consequently do more effective work. To obtain the best results, the file suited for general purposes is not so well adapted to filing brass or other similar soft metals as those whose teeth are arranged for this purpose.

New files, particularly double cuts, are severely worn down by use upon narrow surfaces, as the strain comes wholly upon a few teeth and frequently breaks them.

Preparing Work.

The corners or thin edges of iron castings are very likely to become chilled and a thin scale or skin produced over the entire surface of the casting, caused by the hot metal coming in contact with the moist sand of the foundry molds; this outer skin is usually much harder than the metal beneath it, and many times the thin edges or corners are chilled so as to be harder even than the file itself.

To overcome this hard scale the casting is usually pickled by the foundry before it is sent out—a process of washing the castings in acid and grinding or snagging the edges, or particularly hard parts.

However, the casting, even after being pickled, retains a certain amount of sand and hardness on its surface and this will dull the best file made. Use an old file to break off this scale and clean off the casting and then a good file may be used without danger of injury to it.

The necessity, therefore, of removing this scale and chilled surface becomes readily apparent, and all mechanics who give any consideration to the proper and economical use of the file will be careful to see that the scale and sand are first removed by pickling, and the surfaces which have become chilled by grinding, before applying the file.

Oil for Files.

All files, when they leave the manufactory, are covered with oil to prevent them from rusting. While this is not objectionable for many uses to which the file is put, there are cases where the oil should be thoroughly removed, as when the file is to be used in finishing the larger cast iron surfaces which are of a glassy nature; the principal difficulty being to make the file "bite," or keep sufficiently under the surface to prevent glazing; otherwise the action not only hardens or burnishes the surface operated upon, but dulls the extreme points of the teeth, thus working against the desired end in both particulars.

Oil may, however, be used to good advantage on new files which are put immediately to work upon narrow fibrous metals of a harder nature; in such cases, it is not uncommon, with good workmen, to fill the teeth with oil and chalk.

Oil is also useful on fine files in the finishing of wrought iron or steel, as by its use, the teeth will not penetrate to the same degree and the disposition to "pin" and scratch the work is materially less than when used dry.

Cleaning the File.

The dust and small particles removed from the material operated upon are always more or less liable to clog and fill the teeth. This tendency is especially aggravated when the file is used upon wood, horn, and such other materials as will, upon being mixed with the oil in the teeth, become baked when dry, and thus prevent the teeth from penetrating the work as well as giving them the appearance of being worn and tending to injure them by rust.

In removing oil from the teeth of a new file, a ready way is to rub chalk or charcoal across the teeth and brush thoroughly. By repeating the operation a few times, the oil will be entirely absorbed and the file will be in the best possible condition for use upon cast iron.

When the teeth of files are clogged with wood, or other soft substance which has become baked into them, if the file is held in boiling hot water for a few moments, the imbedded substance becomes so loosened that it may easily be carded out of the teeth. If the operation be quickly performed, any moisture remaining will be readily evaporated by the heat retained in the file.

This cleaning is done in several ways; sometimes, in the finer files, by rubbing the hand over them or by drawing them across the apron of the workman; in others, by striking their edge upon the bench or vise; and again (which is a more common method with the large files), by the use of a strip of old or worn out card clothing, tacked to a piece of wood having a handle shape at one end—a device which is usually rudely constructed by the operator.

The file should be cleaned not only at intervals during its use, but carefully before being laid aside, if the best results are to be attained.

The file card and file brush will be found excellent tools, and master mechanics should see that every file-user in their employ is furnished with one or the other of these, and insist that they be used, if they wish to economize in the wear of their files.

Metals like copper, or brass with high alloy of copper, require a very sharp keen file, preferably of specially shaped teeth, just as these metals require a sharper pointed, keener lathe or planer tool.

Special work may require a special file, but stock shapes and cuts will usually be found to meet nearly all requirements.

Care in Putting Away.

One of the most destructive customs is that of loosely throwing files, fine and coarse, small and large, into a drawer filled with cold chisels, hammers, turning tools, etc., and then throwing the chisels, hammers and other tools on to the files.

When we consider how small a portion of the points of the teeth is worn off by extreme wear when the file is properly used, and that to effectually dull them for some kinds of work requires but slight knocking upon a hard substance, it will be easily seen that the evils of this habit should be more carefully considered by the master mechanic, and suitable provision made to avoid its destructive tendencies.

Testing Machines.

A great deal has been said or written about file testing machines for determining the comparative efficiency of various brands of files. File makers have used such machines for many years, not to determine the value of various brands of files, but to prove by an average of several tests the utility of various formations and arrangements of teeth and cut for different kinds of work. This seems to be the true function of any file testing machine.

As a general rule labor cost greatly exceeds tool cost and that tool or file or method of using is most desirable which produces the greatest output for the labor expended, its initial cost usually being in very small ratio to its general result. Hence the best and fairest test of the value of a file or brand of files is the efficiency per $1.00 of pay roll.

Summary.

Select the proper shape and cut of file for the work.

Handle properly.

Have work properly secured and at a convenient height.

Hold file in a manner to give best control.

Keep pressure on file sufficient to keep it cutting—less for a new file—more as it becomes dulled—but keep it cutting.

Keep file clean—a dirty file is a dull file.

Clean surface of work to be filed.

Take good care of your files. Don't abuse them. They are cutting tools.

General Description.

Files and rasps have three distinguishing features:

First. Their Length—Which is always measured exclusive of their tang.

Second. Their Kind or Name.—Which has reference to the shape or style.

Third. Their Cut.—Which has reference not only to the character, but also to the relative degrees of coarseness of the teeth.

The length of a file is the distance between its heel (or part of the file where the tang begins) and the point (or end opposite). The tang (or portion of the file prepared for the reception of the handle) is never included in the length. In general, the length of files bears no fixed proportion to either their width or thickness, even though they be of the same kind.

By kind, we mean the varied shapes or styles of files which are distinguished by certain technical names, as, for instance, Flat, Mill, Half-Round, etc.

The kinds are divided, from the form of their cross sections, into three geometrical classes, namely: Quadrangular sections, Circular sections and Triangular sections. Odd and irregular forms are collected under Miscellaneous sections.

These sections are in turn subdivided, according to their general contour or outline, into taper and blunt.

Taper.—Designates a file the point of which is more or less reduced in size (both width and thickness) by a gradually narrowing section extending from one-half to two-thirds the length of the file, from the point.

Blunt.—Designates a file that preserves its sectional shape throughout, from point to tang.

Cut.

The cut of files is divided, with reference to the character of the teeth, into single cut, double cut, and rasp cut; and with reference to the coarseness of the teeth, into rough, coarse, bastard, second cut, smooth and dead smooth.

Regarding the latter we may say very briefly that the coarse and bastard cuts are used upon the coarser, heavier classes of work, while the second cut and smooth are used for the finer grades and for finishing the work started by the coarse and bastard. The rough and dead smooth are seldom called for, but correspond to the above use.

The single cut file is one in which a single, unbroken course of chisel-cuts is made across its surface, arranged parallel to each other but with a horizontal obliquity to the central line.

The double cut file has two courses of chisel-cuts crossing each other, the second course with rare exceptions being finer than the first.

Rasp cut differs from single or double cut in the respect that the teeth are disconnected from each other, each tooth being made by a single pointed tool, called a punch.

With this brief description, we proceed to a more detailed explanation of the different kinds of files and to an enumeration of some of their uses, as we have found them applied in various industries.

Mill File.—Tapered. Single cut, mostly bastard. Length, 3″ to 18″.

Flat Shoe Rasp.—A form of shoe rasp but little called for.

Hand File.—Section, 1″ advance on flat. Parallel as to width, taper in thickness. Double cut, bastard mostly, though many second cut and smooth and dead smooth. Length, 3″ to 16″.

Use: This file is preferred amongst machinists and engineers for finishing flat surfaces, and owing to its shape and its having one safe edge, is particularly useful where the flat file would not answer.

Pillar File.—Parallel as to width, taper in thickness. Double cut, same as hand. Length, 6″ to 16″.

Use: For general machine-shop use on narrow work.

Cotter Blunt, Cotter Taper or Taper Cotter. Slotting File (Blunt).—All made from pillar sections, the cotters being made from 2″ smaller stock. Double cut, mostly bastard. Principally used in filing grooves for cotters, keys or wedges. Seldom called for.

Square file. Taper. Double cut, bastard. Length, 3 to 18 inches.

Use: In almost all branches of mechanical industry, principally for enlarging apertures of a square or rectangular shape.

Square blunt file. Blunt. Double cut, bastard. Length, 10 to 20 inches. Use: By engine builders, and in the shops of railroads and ship-yards, for the rougher work in finishing or enlarging mortises, key-ways, or splines, when of considerable length.

Warding file. Parallel in thickness, much tapered in width. Double cut, mostly bastard. Length, 3 to 10 inches.

Use: Considerably used by jewelers and machinists; but more especially by locksmiths, in filing the ward notches in keys.

Drill file. Cut only upon its edges. Especially adapted to extending or rounding the bottom of slits, where the round file would be found too frail; also as drill file, for filing small twist drills, and for other purposes of a similar nature.

Horse rasp plain. Blunt. Rasp cut, coarse. Length, 13 to 18 inches.

Use: for horse and mule shoers.

Horse rasp plain slim. Length, 16, 18 and 20 inches.

Horse rasp tanged. Same as the above with addition of a tang.

Rasps. (See various headings under cabinet, horse and wood rasps.)

Round file. Taper. Cut: mostly bastard. Length, 4 to 18 inches.

Use: For enlarging round holes and shaping internal angles which are filled in, for which uses the quadrangular sections would be unsuitable.

Round blunt. The round file is oftentimes made in blunt shape, and is used for the same purpose, but for heavier classes of work.

Rat tail file (or mouse tail). Another name sometimes used for a round file.

Gulleting files. Round section, blunt shape. Single cut. Length, 6 to 10 inches. Principally used in extending the gullet of the teeth of what are known as the gullet-tooth and briar-tooth saws. Seldom called for.

Half round file. Taper. Double cut, mostly bastard, though many second cut and smooth, and some dead smooth. Those finer than bastard are cut single on the convex side. Length, 3 to 18 inches.

Use: from its section, this file has a wide use in the machine shop.

Half round wood file. Taper. Double cut, coarse. Length, 6 to 16 inches. Use: By woodworkers generally and occasionally upon the coarser kinds of brass work.

Half round wood rasp. Taper. Rasp cut, bastard. Length, 6 to 16 inches. Use: Principally by wheelwrights and carriage builders, and to some extent by plumbers and marbleworkers.

Hook-tooth file. Blunt. Single cut, bastard. Length, 8 to 10 inches. Used principally in sharpening the teeth of the cross-cut saws technically called hook-tooth. Seldom called for.

Pitsaw file. Sometimes ordered as framesaw. Blunt. Single cut, second cut. Length, 3½ to 10 inches.

Use: For filing the teeth of what are known as pit and frame saws.

Cabinet file. In section wider and thinner than the half round. Taper. Double cut, coarse bastard. Length, 6 to 16 inches.

Used by cabinet makers and other woodworkers generally.

Cabinet rasp. Rasp cut, second cut. In other respects and uses same as cabinet files.

Taper. (See various headings, as handsaw taper, etc.)

Three-square file. Taper. Double cut, mostly bastard. Length, 3 to 18 inches.

The handsaw and three-square file, while both made from the three-square section, are different in the respect that, in the saw files both single and double cut, the edges before being cut are set to give them the proper bluntness for durability; in the three-square file, the edges are left very sharp and not cut, thus making them entirely unfit for the purpose of filing saws.

Handsaw taper double cut or taper double cut. Double cut, second cut. Length, 3 to 6 inches. Use: They are preferred by some in filing the fine-toothed hand and hack saws, also the metal workers' hack saws, which are considerably harder than those used upon wood.

Slim handsaw taper or slim taper. Made from three-square section. Taper. Single cut, second cut. Considerably lighter, but in every other respect like the ordinary handsaw file. Length, 3 to 10 inches.

This file has largely superseded the regular handsaw file; the principal advantage being the greater sweep or stroke obtainable from the same section.

Extra slim taper. Lighter stock than slim taper—cut usually single cut, second cut. Generally tapered but occasionally blunt. Length, 4 to 8 inches.

Handsaw blunt. The handsaw files are sometimes made in a blunt shape.

Double-ender handsaw file. Furnished with handle. Single cut, same as slim taper. Length, 6 to 12 inches. Use: Same as slim taper, with the added advantage of having two files in one and a handle which can be easily attached.

Bandsaw file. Same as the regular or slim handsaw files, except with edges rounded. Cut shorter angle than tapers. Length, 3 to 12 inches. Use: In filing bandsaws, the slenderness of which would hardly admit of the teeth being filed to a sharper bottom.

Cant saw file. Formerly called lightning blunt. Single cut, bastard. Length, 4 to 12 inches.

Use: Principally in filing cross-cut saws having M shaped teeth.

Knife file. Taper. Double cut, mostly bastard. Resemble somewhat when finished the blade of a knife. Length, 3 to 12 inches.

Use: In limited quantities are in pretty general use in work for which their shape adapts them.

Ginsaw file. Knife shape. Single cut. The three-square ginsaw is gradually supplanting it.

Three-square ginsaw file. Made of handsaw slim steel. Taper or blunt. Single cut. Length, 4 inches. Used for filing cotton ginsaws.

Cross or crossing file. Double oval, one side shaped like half-round, the other like cabinet. Cut bastard, second cut and smooth. Length, 6 to 16 inches. Used as an engineer file.

Feather edge file. Blunt. Double cut, bastard, second cut and smooth. Length, 4 to 12 inches. The acute angle of the knife file corresponding so nearly to those of the feather edge, the former will answer for most purposes. Seldom called for.

Half round shoe rasp. Sometimes called double improved shoe rasp. Cut, file quarters bastard; rasp quarters second cut. Length, 6 to 10 inches.

Use: This form of shoe rasp is the one in general use at this time.

Cross cut. Blunt. Cut single cut like mill bastard of same size. Length, 6 to 12 inches.

Reaper file. Of several sections, mostly knife, and all blunt. Single cut, bastard. Use. Principally for sharpening the knives of mowing and reaping machines.

Tumbler file. Double oval shape. Taper or blunt. Cut, double cut, bastard, second cut and smooth. Length, 4 to 14 inches. Seldom called for.

Inserted tooth. Made from half-round steel with edges ground off. Cut single cut, second cut like mill file. Length, 8, 9 and 10 inches. Used for filing inserted tooth saws.

Specialties.

File Cleaners. Consisting of card, brush and scorer together, or card and scorer alone. Use: For keeping a file free from filings. The scorer is made of soft iron, and is used to remove the "pins," which fill up and clog the teeth, causing scratches in the work if not removed. The brush will be found a most efficient annex to the card, especially upon finer files, removing the filings much more effectually than can be done by the card alone.

File holders. A device in which files may be firmly held for service in surface filing, and while in this condition, readily sprung, in order to give, at the will of the operator, more or less convexity to the working face of the file. In this way, files may be more fully utilized and made to render greater service.

Horse mouth rasps. A short rasp (or file) having a long handle, used in filing down horses' teeth. In limited use.

File handles. As their name indicates, a handle, usually of wood, applied to the tang to afford a firmer and at the same time a more convenient grasp of the file.

Manicure files. Various shapes and lengths, single or double cut. With or without a cleaning point. Occasionally flexible. Used for the care of the finger nails.

Terms Defined.

Back.—A term commonly used to describe the convex side of half-rounds, cabinets, pitsaws and other files of similar cross-sectional shape.

Bellied.—A term used to describe a file having a fullness in the center.

Blank.—A term used to describe files in any process of manufacture before being cut.

Blunt.—A term applied in describing files which preserve their sectional shape throughout from point to tang.

Equaling.—A term applied to describe a blunt file upon which is produced an exceedingly slight belly or curvature, extending from point to tang, the file apparently remaining blunt.

Filing Block.—A piece of hard, close-grained wood, having grooves of varying sizes upon one or more of its sides. It is usually attached to the work bench by a small chain, and, when grasped in the jaws of the vise, is particularly useful in holding small rods, wires or pins, which are to be filed; also in filing small flat pieces, which are held to the block by pins, or by letting in.

Float.—The coarser grades of single cut files are not infrequently called floats, when cut for the plumber's use or for use upon soft metals or wood.

Hopped.—A term known among the file makers, and used to represent a very coarse or open spacing of the teeth (sometimes exceeding ½ inch) mostly applied to the backs of half-rounds and to the edges of quadrangular sections.

Middle Cut.—A term used to designate the cut of a file when it is of a grade of coarseness between the rough and bastard. It is but little used in this country.

Over Cut.—A term used to describe the first series of teeth on a double cut file.

Re-cut or Re-cutting.—The working over of old or worn out files by the several processes of annealing, grinding out the old teeth, re-cutting, hardening, etc., and thus again preparing them for use. This operation is sometimes repeated two and even three times, but the economy of re-cutting at all is very much questioned, and the practice is done away with in most of the best appointed shops of the present day.

Safe Edge (or Side).—Terms used to denote that a file has one or more of its edges or sides smooth or uncut, that it may be presented to the work without injury to that portion which does not require to be filed.

Scraping.—As applied in machine shops, the process consists of removing an exceedingly small portion of the wearing surfaces of machinery by means of scrapers, in order to bring these surfaces to a precision and nicety of finish (as determined by the straight edge or surface plate) not attainable by the file or by any other means with which we are acquainted.

The Speed of Animals.

According to naturalists, no animal is known to have exceeded the speed attained by the famous race horse Sysonby. Instantaneous photographs show the full length of one complete stride as about twenty-six feet. In the stride of the fastest racers the hind quarters and limbs are raised considerably higher than the shoulders, and from this relatively great height brought downward and forward, widely separated from each other, as a sportsman says, "to avoid striking the fore legs." The hare which is hunted with fast hounds has not in reality the speed of the dog. The dog, on the other hand, does not attain the speed of the horse. The giraffe is said to run at the rate of 15 meters (yards) per second under the most favorable conditions. The elephant, going at the rate of two yards a second, carries a weight approximately of that carried by six horses.

A NEW ENGINE FUEL.

Made From Kerosene and Alcohol and Tests Seem to be Successful.

A contender for the $100,000 prize offered by the International Association of Recognized Automobile Clubs for the best substitute for gasoline as a motor fuel has appeared in Milwaukee in the person of Prof. Frederick C. Raeth, who, with Kurtis R. Froedtert and William A. Biesmann, of Milwaukee, has perfected two different motor fuels, one using kerosene and the other denatured alcohol as a base.

Common kerosene and ordinary denatured alcohol, chemically treated by a secret process evolved by Professor Raeth, form fuels which in tests on air and water-cooled motor car engines and on small stationary or farm engines prove to be at least as good as gasoline and in some ways much better. Professor Raeth and his associates pursued their investigation in the direction of treating denatured alcohol to make it suitable as a fuel for internal combustion engines with the idea of appealing particularly to Europe, where the denatured alcohol industry has made great strides under the influence of governmental inducements. The cost of treatment adds but .5 to .75 cent per gallon to the price of the fuel.

Comparative tests of gasoline, the kerosene fuel and the denatured alcohol combination were made under the same conditions, and in point of fuel economy kerosene ranked first, gasoline second and alcohol third.

The test was made on an Auburn five-passenger touring car, carrying a four-cylinder Rutenber motor rated at 40 horsepower and equipped with a Rayfield carburetor, hot-air-jacketed. The course of 4.3 miles through Wauwatosa provided practically every highway condition.

An ordinary aspirator bottle, with a capacity of about 1,750 cubic centimeters, graduated up to 1,500 cubic centimeters was used as a container for the various fuels. A split-second stopwatch was used.

A striking characteristic of the denatured alcohol fuel was the ease of starting the motor. The temperature at the time of the tests ranged between 57 and 63 degrees Fahrenheit. The car was drained of gasoline and allowed to cool for about 10 minutes. The alcohol fuel was then introduced and the motor started as readily as with gasoline. It was immediately noticeable, however, that the motor was being starved, and the fuel adjustments of the carburetor were opened several turns, the air adjustment remaining untouched. The car was then run at a speed of 20 miles per hour over a distance of 4.3 miles, which required 5.28 pints of fuel. More difficulty was experienced in keeping the car at 20 miles per hour than with gasoline.

The motor was operated on gasoline for a few minutes and then kerosene was introduced as the alcohol had been previously, and the motor turned over. The motor started readily, but lagged after a few revolutions, when the gasoline vapor in the cylinders was exhausted. It was necessary to do considerable adjusting on both air and fuel valves of the carburetor in order to make the kerosene mixture run the motor smoothly. After the motor became hot, the sluggish action disappeared and the car was run 4.3 miles on 2.24 pints. The motor did not at first show the life and dash that was displayed on the alcohol fuel and on gasoline. It climbed hills with much less labor than on either alcohol or gasoline. The kerosene used in the test was of the lowest grade.

Each time the motor was stopped it was necessary to use gasoline before throwing in the kerosene fuel.

Gasoline came out ahead in the acceleration tests. It required 8.5 seconds to accelerate the car from 10 to 20 miles per hour and 8.75 seconds to accelerate from 20 to 30 miles per hour on gasoline. Alcohol ranked second, the 10 to 20-mile acceleration being accomplished in 9.5 seconds, and 20 to 30 miles, 10.5 seconds. On kerosene, it required 11 seconds from 10 to 20 miles and 11.5 seconds from 20 to 30 miles. The specific gravity of the kerosene used in the formal test was .805, or 43 degrees Beaumé. The boiling point of this mixture was 112 degrees Centigrade.

The alcohol fuel tested for specific gravity at .835, or 38 degrees Beaumé, and had a boiling point of 67 degrees Centigrade. Neither of two Raeth fuels has an offensive odor. At no time was smoke detected at the exhaust while the car was running.

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AUGUST, 1913.

PARTIAL CONTENTS.

FOR TRADE BETTERMENT.

Our readers are again reminded that letters for publication upon any subject in relation to the trade are not only welcome, but are appreciated both by the editor and by other readers. It is seldom that such letters need be long. Frequently some readers may have a single idea of value to other readers, and yet it may be expressed in a sentence or two. For illustration, not long ago a reader said in a letter for publication: "The best protection against dead beats is to do a cash business." Now of course there is nothing especially new or novel in this idea, but it stimulates thought and sometimes takes one out of a rut which is one of the purposes of all literature, whether practical or theoretical.

In these days when blacksmiths' tools and machines can to so large an extent be purchased, and when blacksmiths' work is more in the line of replacements and repairs than in the actual construction or forging of things as used to be the case, less space is naturally given to such work than formerly, but more space must necessarily be given to other work which is now far more important.

We want to see automobile repair work fall into the hands of blacksmiths. There is where it belongs. Regular machinists may be better able to make automobile parts, but they are far less able to take out broken parts and put in new ones, they are far less able to properly handle vehicles, they have as a rule less space in which to dismantle them, overhaul them and reassemble them; and in case something needs welding or forging they are less competent than the average blacksmith. Parts may be had of automobile manufacturers at far less cost than they can be made—or this should be the case, and it is the case, as a rule—and the blacksmith is the man to install such parts.

Possibly some of our readers may feel that we have from time to time dwelt upon this subject too much, but it must be borne in mind that the automobile is a new vehicle and gradually displacing a good many horse-drawn vehicles, and far more so for business than for pleasure. The horse will always be used for pleasure and for certain kinds of farm work, but for marketing and for commercial purposes and trucking, the automobile has come to stay and to increase in number to an extent little dreamed of at present.

Although the automobile seems at first sight almost mysterious and incomprehensible, a little study now and then soon makes it seem comparatively simple. We advise our readers to send to the manufacturers of automobiles for catalogues and study them from time to time as they find opportunity. It is well enough likewise, to subscribe to some good automobile magazine which is devoted to the practical facts concerning the care and repair of automobiles.

Ten minutes a day devoted to such matters for a few weeks will enable the average smith to acquire a complete knowledge of automobile construction. It is a good idea to go about it somewhat systematically, however. For instance, first become familiar with the operation of the internal combustion engine; then take up the subject of ignition; next, that of carburetion; then learn all about lubrication; next, one may well take up the subject of pneumatic tires and automobile wheels; transmission and clutch may then be studied; and lastly the body, or as it is usually called in automobile parlance, the "tonneau."

Quite likely some of our readers may have ideas concerning this which are at variance with the foregoing. If so, we should be glad to hear from them. "In the opinion of the multitude there is wisdom." We have no opinions or ideas which we will not willingly exchange for the truth or the facts.

Letters for publication by our readers upon the foregoing subject or upon any others that will contribute to trade welfare are solicited.

MAN AND MACHINERY.

Henry Ford, the man who has made the phenomenal success of the Ford automobile, building up a business in nine years from nothing to where it gives employment to more than 16,000 men, says: "A man should be allowed to do no work which a machine can do better."

This spirit is largely responsible for the marvelous rise and prosperity of the Ford Motor Car Company. The saving of labor by every possible means or device is the keynote of the business. Although now and then there have been cases where firms have incurred more expense for new machines and devices for saving labor than they could afford, thousands of firms have failed for not keeping up with the machine era to one which has gone into it too heavily.

In the case of the blacksmith installing an engine for power in the shop, it not only permits the smith to do work at a lower price than by the old hand method, but it turns the work out quicker, thus pleasing the customer and attracting increased trade.

It will be admitted that there have been cases where a smith has run in debt for an engine and machinery and has finally gone to the wall, but cases of this sort are as one to one hundred where the introduction of these labor and time savers have increased business and profits enormously.

WHERE LEAST EXPECTED.

Five new and novel forces have recently appeared to aid the cause of temperance or total abstinence. In our opinion they have done more, or are doing more, to restrict the drinking of alcoholic liquors than is being done by temperance or prohibition laws, and more even than the work of churches and of the usual total abstinence societies, although we would not belittle such work or claim that it might be done better.

Briefly, these forces may be enumerated thus: The moving picture show; the automobile; the use of much machinery, thus making for shorter hours of work and for less physical weakness and mental depression; the reform of a well-known prize fighter who is now a physical culture teacher and a total abstainer after having haunted saloons and kept saloons for a good many years; and the talks at churches and before other bodies of men and women of another well-known prize fighter who not long ago dropped that calling for the dramatic stage.

Singular forces, are they not? And yet they are most effective. Take the moving picture show, for illustration: Men are beginning to find that they can get more recreation and more pleasure by spending 20 or 30 cents to take their families to such entertainments than by spending it in the saloon. It is simply a matter of business with them—where they can get the most for the little they can afford to spend for pleasure out of their earnings. And without going into the evils of drink, or denouncing the "poor man's club"—which is as much an effect of wrong conditions as it is a cause of wrong results—we may say that the change from the saloon to the moving picture show is about as wise a one as a man can make, and it will do more to make himself and his family happy and contented than anything else we can think of just at this moment. In a good many places the saloons are seriously feeling the loss of this former patronage.

The second great temperance force—that of the automobile—works in a different way. Not only has the automobile driver or owner no use for whatever tonic effect there may be in alcoholic liquors, but the man who attempts to drive a car with a brain slightly befuddled is courting an accident and personal or property injury. The riding in an automobile is in itself a sufficient inspiration for reckless speed; to add to that recklessness by a drink or two is the height of imbecility and most automobile users know it.

As to the third temperance force, it has been going on longer. The lightened physical toil due to the machine and the shorter hours of work leaves the worker less physically and mentally depressed, and consequently with less desire for the liquor stimulant.

The fourth and fifth temperance forces are still more unique, and although they are less general in their application, yet they are more potent in effect wherever known than either of the others. We refer to those two famous whilom prize fighters, James J. Corbett and "Kid McCoy," whose right name, we believe, is Norman Selby. For some years these men have been the adoration and reverence of a certain class of young men who are most susceptible to saloon and drink influence. And what do we hear? Each talking and lecturing against the blighting effects of the saloon and of drink. They can surely speak with authority, and what they say is thus taken as gospel truth by a certain class who most needs to hear it, and yet a class who could not be reached any other way. Neither of these men is mawkish or sentimental in his denunciation of drinking and of saloon influence, but they

speak plainly and with a good deal of common sense. They deserve great credit for what they are doing.

This matter is not referred to here for the purpose of instilling a temperance lecture, although no apology would be needed for doing so. It is rather to impress the fact that great reforms are often brought about from sources least expected. A carpenter's son laid the foundations of Christianity; a peasant girl—just a little "out of her head," according to history—freed France; "plow joggers" inspired the movement that resulted in establishing this republic; a "rail splitter" struck the shackles from the slaves of the United States. And now temperance is receiving its impetus from sources least expected. "The stone that the builders rejected, the same shall be the head of the corner."

LOOKING FOR FOREIGN MARKETS.

A few days ago Gov. Foss, of Massachusetts, the head of a large manufacturing plant, said: "American manufacturers have completely filled the American market and their production now is greatly in excess of the domestic demand. Under these conditions, the expansion of their domestic plants is impossible, and it is becoming necessary for them to curtail production."

Quite likely this statement is strictly true, and the same may be said of a good many other American industries; "they have filled the American market, their production is greatly in excess of the domestic demand," and they must either curtail production or secure a market in foreign countries for this excess of production.

But is the situation in this country without precedent and singular? By no means. Every great country in the world is practically in the same condition; that is to say, it has completely filled its home market and is looking to some other country for a dumping ground for its excess of production. That is the situation in England, and, of course, it has been so under free trade laws for a good many years. But this is now the case in protected countries as well. It is the situation in Germany; it is the situation in France and Italy; it is the situation in all the minor countries of Europe. It is even the situation in Russia, a country which until quite recently has been decidedly backward in its manufactures. It is true in the case of Russia that only in few instances is its production of manufactured goods of greater volume than its power of consumption, that country being able to consume many of our machine-made products. Yet this will last but a short time only. Russia will soon be producing more than she can consume, and she will not import foreign manufactures a moment longer than she is compelled to do so. A similar situation is rapidly developing in Japan and China, and in the more progressive Asiatic countries.

Why this condition is so prevalent or so rapidly developing is easy enough to determine. The use of so much labor-saving and effective machinery has caused production to far outstrip consumption. Thus what Gov. Foss states is practically the cry of manufacturers all over the world, the exceptions being few and constantly decreasing in number.

In other words, the great manufacturers of other nations are looking with quite as longing eyes to the markets of this country as Gov. Foss is looking to the markets of foreign countries.

What is the practical and sensible policy for this country to pursue then? Is it to relinquish some of our home markets to foreign producers in order that we may in turn secure outlets abroad for our surplus production, or shall we continue to protect our domestic markets, reserving them for our home manufacturers? The reply is not difficult: If we are willing to submit to the same conditions of work and wages here that prevail in foreign countries—the same conditions of living and hand-to-mouth existence—then we can afford to take down the foreign tariff bars and compete with other nations. There is no other way. The time is past when we in this country can keep to ourselves quick and cheap machine production; other nations can and will adopt the same methods as soon as it stands them in hand to compete for our home markets.

Quite likely some reader is now remarking that as we have allowed labor to come in free so long while putting a tariff on the products of labor, the workman in the United States is now no more prosperous than the worker of Europe, when both wages and the cost of living are considered. We reply that while in some rare instances labor may not be doing better in this country than abroad, there is the strongest kind of proof that as a rule it does far better here than anywhere abroad. The proof is this: There is a constant stream of labor running from those countries to this country, and labor does not leave a country where it is doing well for a country where it will do worse, but it leaves a country where it is doing ill for a country where it may do better. All theories and all claims of a contrary character are completely wiped out in the face of this great fact.

Right here we fancy another reader may like to call attention to the fact that in the matter of production, there are monopolies in this country where there is no competition in selling price to our home consumers, and foreign competition would wipe away this injustice. Well, in case of a monopoly, let the duty come off and the sooner the better, although this course will only hasten the advent of world monopolies which are quite as easy to form as national monopolies and far easier to maintain.

SEEKING AND NOT FINDING.

Have you ever thought, dear reader, that the thing all mankind is seeking never comes by being sought, but is far more likely to come when least expected and when actually viewed with indifference?

We refer, of course, to happiness. And it is a fact that the harder and more strenuous happiness is pursued the more difficult it is to gain. This is the truth of all history and of all experience—and yet human beings still pursue and fret and violate conscience, all to no purpose.

Take history, for illustration: Antony sought happiness by a certain form of selfish love, Brutus tried to find it in worldly glory, and Caesar in conquest or dominion. They each suffered death by punishment, while the first named got in addition, disgrace; the second, disgust, and the third received ingratitude. Then there have been conspicuous cases where it has been sought by just the opposite means, as for illustration, by the stoics. They thought they could gain happiness by shunning and vilifying it. Their search for happiness was rather unique, or more properly, paradoxical. They disciplined themselves—their appetites, their desires—but for themselves alone and not for others. Yet happiness shunned them.

Let us take the case of the modern multimillionaires who have been so abnormally successful in securing that which they imagined would bring them the cherished happiness—the Rockefellers, the Morgans, and Vanderbilts or the Goulds. It is safe to say that not one of them is as happy now as when his riches were far off.

This all teaches us that the only way to find real happiness is to renounce—not for one's own sake but for the sake of others. Try and make others happy. Then it is likely to come to you and always when least expected.

"FILE FILOSOPHY."

It is felt that something more than the acknowledgment given in the article itself on files, printed elsewhere in this issue, is due to the Nicholson File Company, for the comprehensive and instructive way the subject has been treated. In the preparation of a work of this kind, most firms are unable to resist the temptation to refer frequently and perhaps in a biased way to their own product or goods, but this is not the case with the firm in question. The booklet applies to all files alike and is quite impartial in statement, besides being the most thorough and exhaustive treatment of the subject we remember to have seen.

Many of our readers will find this little book, "File Filosophy," useful for reference as well as for information, and a copy will be sent free to any who apply to the Nicholson File Company, Providence, R. I. The book is well illustrated, this adding much to its value.

American Express Sticks to Horses.

A significant transaction in the horse market in New York City was the placing of an order for 100 fresh wagon horses by the American Express Company. The report gained wide circulation last spring that the progressive American Company would shortly sell off all its horses and replace them with motor vehicles. There can be little doubt that something like such a move was then under consideration, but an exhaustive investigation of comparative cost and efficiency seems to have turned the decision in favor of the horse, and it is now reported that the company will use more horses than ever in its collection and delivery service.

Legal Department

All legal questions answered free of charge. Address Communications to Editor "Legal Department," THE BLACKSMITH AND WHEELWRIGHT, P. O. Box 654, New York City.

Title to Land.

Question.—I traded for a piece of land from a man whose wife had died leaving some small children. Now, how is the best way to get the title to this land fixed so it will be good and so the children could not lay claim to it when they become of age? I traded him other land for it and he still has the land; however, he is about to trade it for other land.—W. C. W., Texas.

Answer.—Decidedly the wisest policy would be for you to consult a competent lawyer and have him search the title. If there is a title company down in your section of the country it would be well to have them guarantee your title and in that event they would make the search for you, thus obviating the necessity of employing a lawyer. If the land is worth anything at all, it is worth employing competent aid to determine the validity of its title. If you do not deem it wise to follow the foregoing advice, I can give you a simple method of finding out whether or not the deed from the widower to you was valid. Go to the county clerk's office in the county in which the land is situated and find from the records who was the previous owner of the land which you received in exchange for your property. If the previous owner was the husband and the husband signed the deed alone, his wife being dead, the deed is sufficient. If you find from the records that the previous owner of the property was the man's wife, you next have to go to the office where wills and administrations are filed and recorded and first find out whether or not the wife left a will. If you find that she did leave a will, locate the book in which the will is filed and read it. If the will leaves this property to the husband and not to the children, your deed is still sufficient, the will of the wife being the connecting link of your chain of title between the man's wife and yourself. If you do not find that the wife left a will, look under administrations and see if you can find an administration of the wife's estate. If you do find an administration, I greatly fear that your title is defective, because I believe that under the intestate laws of Texas the property descends in the absence of a will, to the children, and in this event you want to consult a lawyer immediately.

You must bear in mind that all the foregoing advice relates only as to whether or not the deed from the husband to yourself is valid. In order to find out whether or not your title is good, you would have to search all the way back through the different conveyances, wills and intestacies of former years—quite a complicated matter. In conclusion I recommend that you employ a lawyer in such a case where the title of real estate is involved.—M. H. B.

A Bank and a Loan.

Question.—A lady in Illinois has $10,000 loaned out on real estate mortgages. The money was loaned through an officer of the bank. She has receipts from the bank for these mortgages marked "held for safe keeping." The interest is paid to her regularly by the bank. She desires to leave this money to a son by will, stipulating that the bank is to hold the loans for five years after her death, paying the interest to the son, at the end of that time, son to be paid over the full amount of the loans. The question is this: Would the bank have to act as administrator, and therefore entitled to administrator's fees, or would they act without fees, simply paying to the son the interest formerly paid to the mother, and at the specified time paying him the legacy?—A. C. C., Michigan.

Answer.—The only way that the bank would be able to retain the loan after the death of the mother would be by making the bank trustee for

the son for five years, with the provision that if the son should die before the five years expires, that the principal and interest of the mortgage should be paid to some one else. It would not be necessary to make the bank an executor of the will, but it would be necessary to make the bank a trustee of this particular bequest. As to whether the bank is qualified to act as trustee, depends entirely upon its charter. If the bank was qualified to act as trustee of this loan it would certainly be entitled to the legal commission to which all trustees are entitled, and I seriously doubt whether the bank would consent to act as trustee without receiving its commission. There are so many pitfalls in an arrangement of this kind that my best advice is that the mother consult a reputable local attorney.

Correspondence

British Horseshoeing Prize.

(From Our Own Correspondent.)

London, July 1.—The offer of a prize of $500 for a horseshoe which adapts itself well to modern roads is a step in the right direction. The British Road Improvement Association, which issues particulars of this contest, no doubt bases its action upon philanthropic motives, but from a practical point of view this contest, if it produces the class of shoe which will lengthen the life of a horse, will earn the gratitude of those who still believe in horse labor, whether for light or heavy draft work. It is plain to those who have followed the revolution in the system of road making in this country that the foothold of the horse has been regarded as of minor consideration. The great object has been to secure smooth and dustless surface for motor traffic. Consequently a glassy road surface has come into being, and horses are not all shod in the most suitable manner to combat this change, and to obtain the greatest propulsive power with the minimum of exertion.

The conditions laid down in this competition are not very onerous, but certain considerations must be kept in view by competitors. First of all, a satisfactory and non-slipping foothold must be obtained. Then the least disturbance of the road surface possible should be studied, while the cost of manufacture should not be greater than the present outlay involved in the shoeing of the horse. The modernized shoe which meets all those conditions is likely to be well patronized, and certainly the time is ripe for a mechanical adaptation of all those principles to the shoeing of the horse.

The shoe which finds most favor in the causewayed streets is not necessarily best adapted to the smooth paving which is the rule in London, consequently the horse has been shod differently in the North and South of England because of the peculiar variation in the surface of the roads. There can be no doubt that a horse can pull a much heavier load over a road surface where the shoe affords a firm footing than where the surface is smooth and the foothold insecure. This is observed noticeably in London, where draft horses must have exceptional collar weight in order to start heavy loads, but that same consideration is not so much insisted upon where the animal has purchase in the foothold, and is able to bring to bear its muscular strength in getting a load under way. Now that a common system of treating roads is being adopted, to meet this policy it is necessary in those districts where it has not already been tried, to shoe the horse in a suitable manner. This premuim may be productive of many good ideas, and may be commended from both a humanitarian and a business point of view.

Good Shoeing Points.

From Corry Williams, Indiana.—As to-morrow, June 26th, is my thirty-fourth birthday, I will endeavor to write a little item on horseshoeing. Although I have had a wide experience traveling around and picking up different ideas, I have a great deal more to learn than I already know.

For interfering, one of the most common faults with roadsters, I have always had the best results in paring the foot a little low on the outside and also raising the inside calk, or in bad cases putting a side calk on the inside heel, and if any toe have it very low. In lots of bad cases I don't weld on any toe.

Forging horses are very common. I have different ways of guarding against the habit. One has to size up the way the horse is coupled up and then judge for himself. I have very good success if I use a Burlington front shoe or Memphis bar, but prefer the Burlington. Use a grab between the first and second nail on each side and side grabs on heels that have a tendency to break over. I always pare the front toes all they will stand, and for the rear feet I always leave as much toe as possible, and rather a high toe, or level with the heels. I tried one shoe that you showed in your journal which I think is a very good shoe for forgers. I forget whose idea it was but I found it a good rear shoe with the grabs at the toe welded on V shape.

Another bad habit in pacing horses is cross-firing. I always plate in front, if possible, although lots of customers will not submit to plates. In the rear in bad cases I box the shoe on the inside from the point of the toe to the first nail or a little past the nail, and leave the hoof extended good over and only round the edges. I have stopped some bad ones that way; some that would cut their quarters half off.

For the knee hitter I always weld a grab on both heels and a small grab between first and second nail, or a rim from heel to point of toe on the inside.

There is much trouble in summer with hard and burned-up feet on the hot and dusty roads or pavements, and this is something the owners of horses do not look after. I have the best results with tar and oakum and leather pads. I put the tar in boiling hot and pack the oakum until full, and be sure the frog gets plenty of soaked oakum.

I have derived a great benefit from reading your journal. A great many good points can be obtained from either reading or watching other good craftsmen and not telling all you know, but watching and listening. The trouble is there are so many fellows that picked up the trade out on the farm and learned to drive a shoe with a monkey-wrench or a hatchet, and then started a shop, cutting prices and butchering, and of course picking up some trade until they got pretty handy in an awkward way. I hope to see the day when a shoer must have a license, the same as a doctor. There are so many horses ruined by bum shoeing. I for one would like to see the prices go up the same as in all other lines of business; although I do not belong to a union now I helped to organize one in Bartlesville, Oklahoma, but it soon played out as there were two men who had never got very good prices, and I don't think they ever learned the trade.

I spent four years as an apprentice in old New York State and I found when I cut loose that I knew little. I went to Ohio in the palmy days and finally quit the shoeing, and drilled for a few years, and then to Indiana, and from there to Roumania in Europe, and there I used to watch the natives shoe horses naturally and once in awhile I would show them how we Americans shoe horses, but they couldn't see that our way was any better than their way. There it takes two men to shoe a horse, one to hold the foot and the other to do the work.

Ratchet Wrench.

From S. E. Wells, Indiana.—The way I make a ratchet wrench is very simple but strong and durable. I first take a piece, A, Fig. 1, of 1¼ by 1 inch buggy tire and drill a ¾ inch hole, B, about ¼ inch from the end, then 3 holes, C,

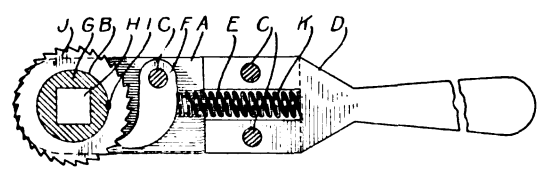


Fig. 1.

3/16 inch, for rivet. This piece, A, is 3 inches long, and there are two pieces just alike. Then I take a piece, D, 5/16 by 1 inch flat iron and beat out a handle, split 1 inch as at E, and drill two 3/16 inch holes. This I make 4½ inches long, but it can be made any length to suit. Then I make the catch, F, 5/16 inch thick and about ⅞ inch long, as in Fig. 1. Now comes the barrel, G, which is ¾ inch round and 1⅛ inches long. I then drill a ⅜ inch hole from end to end and square it as at H, with a diamond point chisel to fit the nut, and cut a small key seat, I, at center, as in Fig. 1. I make the ratchet, J, of 5/16 by 1¼ inch flat iron, drill a ¾ inch hole to fit over the barrel, cut notches with a file about 1/16 inch deep and ⅛ inch long. Then I take a piece of coil spring, K, about 5/16 inch in diam-

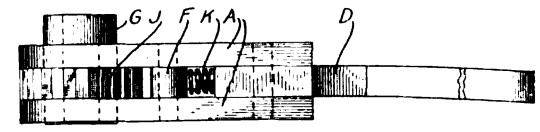


Fig. 2.

eter and about 1 inch long to fit in split, E, in handle, then put it together as shown, and after putting the top plate on and riveting it makes a fine wrench for tire bolts, etc.

A Wheel Holder.

From F. H. Higgins, Washington.—I am sending you a sketch of a device for holding buggy and hack wheels while removing the burs when using a bolt machine, as it is lots of work lifting

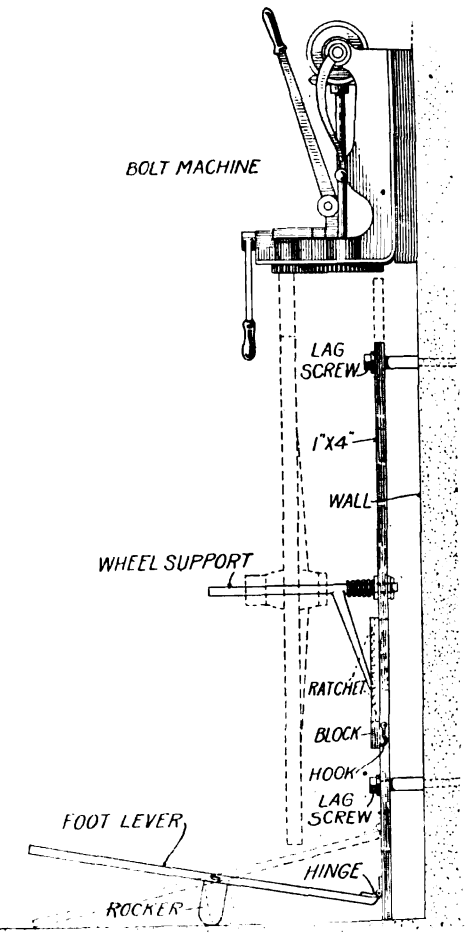


Fig. 1.

them by hand every time and turning, especially if they are of any size. This process is a good deal quicker, easier and better, as one can readiiy see. It is made of ash wood, 1 by 4, and consists of one hinge, two lag screws, 5/16 by 3½, and a spring to hold the wheel support in

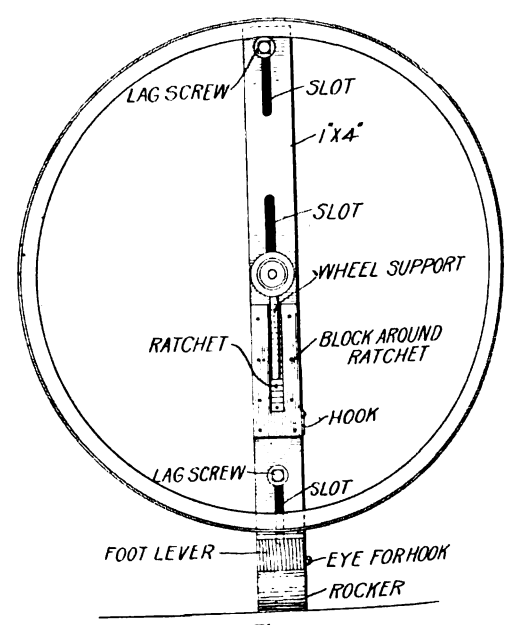


Fig. 2.

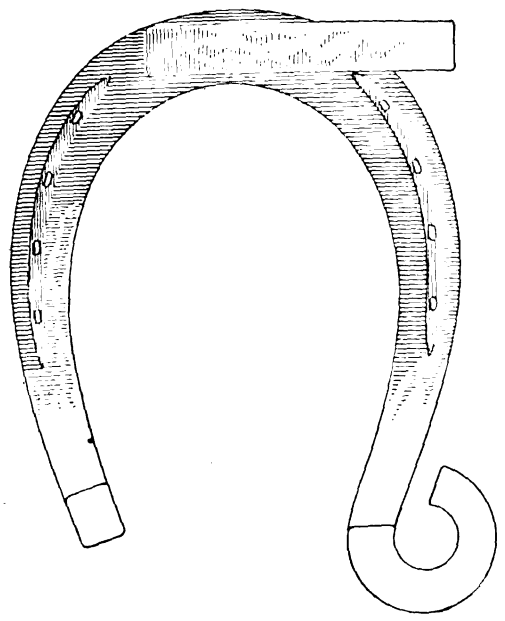
position. The wheel support is made of ¾ inch iron drawn down to ⅝ inch, as that is the size I find that will go in all wheels. The ratchet allows one to shift it to fit any height of wheel, and by putting a foot on the footboard or lever you can easily raise and lower the wheel, and

when the wheel is raised it can be turned to the next bolt.

The illustrations, as shown in Figs. 1 and 2, are so clear that the reader will find little difficulty in understanding how the device is made.

Replies to Inquiries.

From Jas. Lowe, New Hampshire.—Will Watson of South Dakota in the May number asks how to temper axes, knives and chisels. Heat your axe to a cherry red very evenly to the eye, then dip in soft water or brine until perfectly cold, then rub until bright. Hold over the fire until a pigeon blue color comes, then take a new file and when you can file it quite easily and you see a silver color after the file passes over



Shoe for Cross-firing.

it, dip in water enough to keep the temper from running. Temper knives the same but temper chisels for rock one or two shades harder.

Regarding the inquiry of Mr. H. T. Hart, England, for a cure for corns, the best thing I have found is a lump of sulphur or brimstone put into the hole just after you have the corn out, and then put a hot iron to it and hold it there until it is burned out; that is, the sulphur. Two or three times doing this will make a cure.

Replying to H. E. Wiehert of Illinois in the May number, for a pacing horse that cross fires, put a six or eight ounce shoe on the fore and hind feet, making the hind shoes like the illustration. Run the toe calk out on the outside three-quarters of an inch and mule the outside heel also. This will stop the horse from rolling over and throwing the foot across to the forefoot.

Wants No Horseshoeing.

From Ernest Wylie, Texas.—I started at the trade about ten years ago. I first got a small forge and anvil to do my own work, but my neighbors wouldn't let me alone so I got a larger outfit and started in to work for the public. I have only a small country shop, 20 by 20 feet. It is 2½ miles to the nearest post office and neighbors are scattered, but I get about all the work I can do. The main trouble is the credit system. Prices are fair if we could only get on a cash basis.

I am rather like W. H. Chambers of Washington. I believe in a clean shop with a place for everything and everything in its place. I get lots of jobs that a good many smiths would need help to do, such as filling a 4 inch wagon wheel, shrinking the tire and putting back on the wheel. I very often have 1¼ inch stock to weld alone and think I could do larger if I had it to do. I get quite a variety of work to do, from traction engines down. Plow work and wagon repairs are the main jobs. I live in a rice country where all kinds of machinery has a hard road to travel. The farmers are not so wild about rice as they were six or eight years ago; water is scarcer now than it was then on account of so many irrigation plants on the Colorado River.

I leave the horeshoeing for the smith that likes the job. I never shod a horse in my life and don't intend to, as I can get all the other work I want. I build a wagon bed that I think is hard to beat. I use 1¼ by 12 inch double dressed pine lumber. Other kinds are hard to get here but 14 or 16 inch would be better for the sides, with bolts to fasten the sides to the sills. Then make brackets any pitch wanted. Use 5 brackets to the side for a 12 foot bed. Bolt the brackets to the sides with from 2 to 3⅜ inch bolts. Then take 4 strap hinges, say 10 inches, and rivet one between each bracket on the sides, then to your side boards. I use 1¼ by 8 or 10 inch. You can either use the bed as a common wagon bed or take the rods and end gates out. Lay your side boards over on the brackets and you have a bed that you can haul almost anything on. One man hauled 37 sacks of Jap rice on one of my beds that weighed over 7,000 pounds. The bed was 12 feet long. I generally use a 2 by 4, about 42 inches long in each corner in front with a cross piece of the same stuff near the top. It is good to keep sack stuff from falling out in front, also as a line holder. Bolt your top end gate to the same, then it is not always lost when you want it. With best wishes for the paper and the brothers, I am yours for better times.

An Interesting Contribution.

From William Graham, California.—We get fair prices for our work, as this county has an association and fair prices are maintained. June 14 was picnic day for Riverside County blacksmiths and all smiths of San Bernardine County were invited. Nearly every shop in this county was closed, while the smiths and their helpers, with their families, took a holiday. All enjoyed it very much.

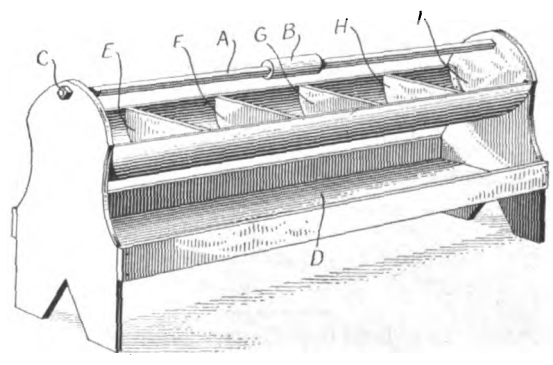
Here is a little kink which although known to some of the older smiths may be new to some of the young apprentices: We put on a good many 1 by 4 inch steel wagon tires here, and it often happens in rolling these tires that they get in a wind. This can be taken out very easily by raising up and dropping on the anvil—much easier than with a sledge, and it leaves no marks.

Repairing a sunken down or bent buggy pole is a kink some are not on to. A short time ago a customer of mine drove up to my shop with the pole of his rig very badly sunken down and he wanted a new one put in. I told him that I could repair the old one and it would be as strong as new. This he doubted very much, but after I explained the matter to him, he determined to try it. I took an old steel buggy tire, straightened it out and bolted it to the bottom of the tongue. I first fastened the back of the tongue under a girder in the wall, set a trestle under the tongue, bent down the point until the center over the trestle was a little crowning, and fastened it there with a piece of 2 by 4 wood extending up against the ceiling joist. Then I bored the holes through the old holes in the tire, put in the bolts and the job was done. After the job was completed my man came in and tried to break the pole down by jumping on it with his full weight and although he weighed over 200 pounds he could not make any impression on it.

I read with great interest the articles from different writers on interfering horses. We have a good many interfering horses here, and I have had good success with most of them. I tip the ankle out by dressing the outside of the foot a little the lowest, turn the inside heel in close and have a long heel on the outside, giving it more weight on the outside.

A Tool Box.

From Sneeve Bros., Idaho.—Here is a sketch of our farriers' tool box which we made. I



Tool Box for Farriers.

think every reader can understand how to make one. All that are required are some small boards, and some heavy tin of which the nail boxes are made. A is a ⅝ rod or square iron, with a thread cut on each end. B is a wood handle put on solid. C is a nut. D is a box for tools. E, F, G, H and I are half round nail boxes made of tin with wood partitions.

ANSWERS TO CORRESPONDENTS

Under this head will be found each month replies to questions asked in previous issues. Our readers will appreciate the importance to inquirers of furnishing the desired information as promptly as possible.

Horseshoeing.

From A. A. Hood, Mississippi.—The science of horseshoeing at the present time is a question of vast importance, not only to mechanics but to every thinking mind. The amount of injury being done by poor horseshoeing is not fully realized. The art of farriery is a branch of science which is very valuable to the public. The public ought to support the educated farrier—one who has studied the anatomy, is progressive, skilled in his profession, and no other. Practical and scientific horseshoeing is what is needed at the present time—more so than ever before.

I have traveled over a considerable portion of the State of Mississippi and pay close attention to horseshoers everywhere I go, and it pains me severely sometimes to see the carelessness and ignorance displayed and the cruelty inflicted upon the poor horse's feet by ignorant men following this profession. The typical farrier of to-day dwells in fancied and blissful security. He rather resents suggestions that jostle his settled opinions. From his point of view he is right, for has he not inherited his beliefs as sacred heirlooms from his ancestors in the art as we inherit our religion? And surely the mistakes of the fathers have been visited upon the children even unto the thirtieth and fortieth generation of them that hate to entertain any idea at variance with these inherited opinions. Important discoveries and wonderful advancement is being made yearly in the art of horeshoeing, and every progressive horseshoer should study and try and learn all he can along the line of his chosen profession.

The foot of the horse is undoubtedly one of the most important parts of the animal, and it is subject to many injuries and diseases, which in part or in whole render the animal unfit for the work he is intended to do. The old maxim, "no foot, no horse," is as true to-day as when it was first expressed. As the value of the horse depends largely or entirely upon his ability to labor, it is all important that his feet be kept sound. To do this it is necessary not only to know how to cure all diseases of the foot but how to prevent them. The hard and rough work the horse is compelled to do and the abuse the feet are put to by defective shoeing are the fruitful causes of so many diseased and injured feet. The foot may be said to be composed of the hoof and the structures contained therein. Within the foot may be found the coffin joint, navicular bone, sensitive laminae, lateral cartilages, plantar cushion and fatty frog. The hoof is composed of the wall, sole and frog. The wall is that portion of the hoof that can be seen when the foot is placed on the ground. The frog is the three-cornered portion of the bottom of the foot that terminates near the center of the foot in a point. The sole comprises the remaining portion of the bottom of the foot. The frog is composed of a soft, spongy tissue and serves as a cushion to the foot. Lateral cartilages are pads of cartilage (gristle) placed one on each side of the foot in the region of the quarters. They are just inside the hoof and act as a spring to the heel while the animal is traveling. When they become diseased they turn to bone and are then called "side bones." The coffin joint is situated deeply in the foot, and is formed by the union of the coffin bone, navicular bone and short pastern. When it becomes diseased it is very hard to treat, as the trouble is located so deeply in the foot. The coronary band is situated just to the inside of the top of the wall of the hoof, and from it the walls grow.

Preparing the foot for the shoe is of the greatest practical importance in the farrier's art. This is one of the first things he must learn to do properly. It is advisable at first to get a dead foot, dissect it and study its anatomy before practicing on the living animal, as most beginners do. You will find the anatomy of a horse's foot an interesting study and the time spent studying it will not be time lost. The structure learned, you will know where to cut and when to stop cutting.

In the preparation of the foot for the shoe, all extra growth of wall and sole should be carefully removed by cutting or rasping to its natural size. Use a great deal of judgment in doing this as there are scarcely two feet alike. Some grow fast, while others grow slow; some are high heeled and some low; some have thick concave sole while others are thin and flat. Flat-footed horses have thin soles, while club feet, etc., have the opposite. A good rule to go by is to pare down the foot until you come to what may be called the white line, or union of the sole and wall. All the horn removed in cutting down to this white line is extra growth, and should be cut away. In flat feet little paring is necessary as it is seldom afflicted with contraction, while the strong foot is very prone to contraction and needs considerable paring to prepare it for the shoe. After paring down to the union of sole and wall care must be taken to leave the foot a perfect level—a dead level fore and aft, and from side to side. A foot may be perfectly level on the bottom and yet not be properly balanced. That the angle of the wall varies in different horses is a fact that should be known to all horseshoers. What that angle should be must be determined by a lateral survey of the foot and limb, so as to have the strain or weight equally divided. Step in front or behind the animal and note if the limb tilts in or out. If it does, the hoof is not level on the ground surface, and must be made level and well balanced before the shoe is applied. If this leveling and balancing cannot be properly done with the eye alone, a compass for the purpose may be of considerable service in fitting the foot for the shoe. The object of the frog of the foot is to break concussion and when in a healthy state should never be touched with a knife, except to pare away the ragged edges, etc. The frog of the foot is nature's cushion and is intended to come in contact with the ground. By rights the shoe should be set so that the frog will be level with the hock at the heels. Horses hoofs grow at the rate of about one-third of an inch in a month. Consequently, it will take about one year for the hoof to grow down at the toe. The foot not only requires proper shoeing, but also should have proper treatment to keep it healthy and sound. The shoe will depend somewhat upon the weight and size of the animal and the nature of the work he has to perform. Draft horses, of course, usually require heavy shoes with calks attached, while driving horses need only light plates; except in the North during the winter time, they have to be shod with ice shoes to prevent slipping. In all cases make the shoe as light as the nature of the animal's work will admit. The only mission of the shoe is to prevent undue wear of the foot, and a light one will do this quite as well as a heavy one. Let the shoe be of good length, perfectly level on the bearing surface to correspond to the prepared foot and a weight to suit the animal, as horses of the same size require shoes of different weight. The fore shoe may vary in weight from ten to twelve ounces; the hind ones from eight to twelve ounces, according to the size and the requirements of the animal. In cases of deformity, lameness, etc., good results are obtained from mechanical means, but all such cases should be under the supervision of a qualified veterinary surgeon. It would seem unnecessary to say that the shoe should be so shaped as to fit the foot and not the foot to fit the shoe, as so generally practiced. Of course it is much easier to make the foot to fit the shoe than it is to make the shoe fit the foot, but such an excuse is a lazy one on the part of the shoer. The rasp should never be used on the outside of the wall, except below the nail holes as by doing so you remove the crust which forms a protection to the hoof. If the shoe is properly fitted a touch of the rasp under each clinch would be all that is necessary, and even this much might be dispensed with.

Springing in Spokes.

From T. J. Hoyle, Virginia.—In answer to Brother Dunn's question, my way to spring a spoke in a wheel is to first get out the old spoke from the hub and rim, and then cut the tenon one inch long that goes in the hub and one-half inch long that goes in the rim. Make the spoke the same length as the others. I then take a narrow board a little shorter than the spoke and set it on the hub. I also put a piece on top of this board and under the rim. I then drive the spoke into the hub and using the pieces of board as a lever, spring the rim up until I can slip the spoke under, then driving it down good and hard. I think I have made this clear to the brother. I wish all the craft long lives and prosperity.

Putting in New Spokes.

From J. F. Holden, West Virginia.—Answer to W. T. Dunn of Canada: I have tried this; I know it will work. First mortise the stub out of the hub, and fit the spoke so that it will just go in the mortise, then take a good strong piece of wood and sharpen one end. Set the other end on the hub and take two bars of stout iron under the felloe and on the top of the piece that sets on the hub. Bear down on the other end. The irons should be 6 or 8 feet in length. This will spring the felloe up so you can see just how long to cut the tenon. Then get everything ready and use some good cement and it will stand as long as any of the others.

QUESTIONS FOR OUR READERS

You are invited to ask questions freely on all points pertaining to your work. Our subscribers who have solved successfully the problems which confront you will take pleasure in imparting the results of their experience for the benefit of their fellow-craftsmen.

Trouble Welding Wagon Tires.

From A. W., New Jersey.—Having considerable trouble in welding wide wagon tire, would like to ask the brother smiths, through the columns of The Blacksmith and Wheelwright, for information regarding the same. My trouble lies in the inability to get a clean welding heat. Whether the fault lies with the blower not giving a strong enough blast, the fire being too small, or poor coal, I am unable to say. I have a Centennial belt blower which, though rather old, does excellent for shoeing and light work, but gives, I think, hardly enough blast for welding work like 3 or 4 inch tire, ½ to ¾ thick. The coal is not likely the fault as I have tried several kinds with the same results. I have fair success welding axles, but when I get hold of something wide, it seems that I am unable to get a heat on the top side. When near a welding heat, a juice, or liquid, forms on top and the metal seems to roast and waste away and throws off a shower of dirty sparks or fireworks. Instead of just scarfing and welding tire, I am compelled to back up the edge to allow for the eating away. All information on the above subject will be deeply appreciated, and I thank the editor for the space in the best paper published to-day concerning the trade.

Axle Gather and Plow Beams.

From E. N. See, Nebraska.—What is the proper set and gather to give a buggy axle? I have measured new buggies and found that they varied, so will some brother that knows please give me the proper measurements?

What is the proper distance for a plow beam above the point of the frog of the plow? Also the proper distance for Lester beams above the point of the frog? I am in a hilly and stumpy country and I have a great many Lester and Cultwater beams to shape.

Remedy for Forging.

From Thomas J. Locklin, Missouri.—Could some reader give me a remedy for a forging horse? The case is a very bad one.

(Note.—You will find something in relation to forging—or overreaching—in this issue, but we hope some of our readers may add their own experience and practice. The subject is one that seems to require varying treatment, not only owing to the different causes of forging but owing to different effects.—Editor.)

Shoeing for Overreaching.

From J. F. Holden, West Virginia.—I want to ask through your columns how to shoe a horse that wears the front of his hind hoofs from the shoe about halfway up to the hair. What weight of shoes should I put on and how should I shoe him to prevent this overreaching?

Cold Tire Setting.

From H. F. Myers, Pennsylvania.—I would like to have some of your readers give me their experience with cold tire setting.

HORSES AND MULES.

Something About Their Use in Spite of the Advent of the Automobile.

From a government bulletin of recent issue we learn some interesting figures and facts concerning horses, cattle and automobiles of the country, the figures being later than any we have before published. On January 1, 1913, the total number of horses on farms and ranges in the United States was 20,567,000, valued at $110.77 per head, with an aggregate value of $2,278,222,000. Compared with January 1, 1912, horses had increased 58,000; mules increased 24,000; milch cows decreased 202,000; other cattle decreased 1,230,000; sheep decreased 880,000; swine decreased 4,232,000.

Without pausing here to discuss what bearing this decrease during the year 1912, in the numbers of cattle, sheep and swine, may have on the future of these useful quadrupeds we will just say that so far as is indicated by those impartial records—the United States census reports—neither the horse, the mule, the ass, nor the burro has ever suffered any such setback. And it is to these census reports that we must go for evidence, either affirmative or negative, as to the coming of the "horseless age."

When George Stephenson constructed his first locomotive in 1814 and the wiseacres of that day saw this "iron horse" travel at the rate of six miles an hour they undoubtedly told their neighbors that the four-footed horse was doomed to extinction. When fifteen years later, Stephenson and Booth built the engine Rocket, which traveled at the rate of 35 miles an hour, the horse was surely a back number.

As the census tells us the story, the horse increased in numbers as the country developed. Nothing apparently disturbed the even tenor of its way until the cable car appeared upon the landscape. This means of traffic was but a temporary institution, being quickly pushed out of the way by the far more efficient and economical trolley car.

The census shows that in the year 1890 there were 4,061 miles of street railways operated by horses, 283 miles of cable railway, and 914 operated by electricity. These figures show us that in this year, 1890, the horse car was still the dominant figure in the street traction world, that the cable had made its little step, and that the electrically operated trolley had taken a firm foothold. The car mileage of the cable-drawn car has shrunk to 113 miles, while the trackage of the electrically propelled trolley car has leaped to 16,230 miles. The generating plants of these electric trolley roads are developing a total horse power of 1,298,133.

In the year 1890 there were on the farms and ranges of the United States 15,266,244 horses. Ten years later—two years before the later figures just given concerning street railways—the number of horses on farms and ranges had increased to 16,952,191. The number of horses in this latter year, 1900, not on farms and ranges was 2,936,881. In this same stretch of ten years the bicycle industry made as phenomenal a leap forward as did the trolley car. In 1890 the value of the bicycles and tricycles manufactured in the United States was $2,568,326. In 1900 the value of the bicycles and tricycles that were manufactured in the United States had jumped to the astounding figures of $31,915,908.

The bicycle was generally hailed as the "poor man's horse." We do not need to be very ancient to remember the time when our city streets and our suburban roads were crowded with these two-wheeled vehicles. But in spite of this tremendous leap in the number of "poor men's horses" during this period and also of trolley cars, we have already shown that the old-fashioned four-footed horse more than held its own during this period.

The "horseless carriage" was known before the year 1900, but so little did it figure in the general industry of the country that in compiling the census of that year the general statistics of the automobile industry were included with those for carriage and wagon manufacture. Only 3,897 automobiles were then reported.

Even that staid publication, The Abstract of the Census, waxes lyrical over the leaps and bounds made by this branch of manufacture in the next ensuing ten years. Says The Abstract:

"The growth of the automobile industry has been phenomenal. In 1904 the total number, including automobiles made by concerns classified

under 'other industries,' was 22,830, while in 1909 the number was 127,287, or nearly thirty-three times the number reported in 1899."

For the year 1910 the census shows that the total number of horses in the United States has increased to 23,015,902, having a total value of $2,505,792,588. The number on farms and ranges has increased to 19,833,113, with a total value of $2,083,588,195. Much as it may surprise the reader who has seen our city streets usurped by automobile traffic, the number of horses not on farms and ranges has gone up to 3,182,789, with a total value of $422,204,393.

These figures give us the interesting fact that the average value of the horse in the United States in the year 1910 was $108, as against $49 ten years previous; that horses on farms and ranges in the later period were worth $105, as against $49 in 1900, and that the horses in cities and towns in 1910 were worth $132, compared with $52 in the earlier period.

"We have heard a great deal about the automobile displacing the horse," says the editor of the Rider and Driver. "I believe that such a thing as 'the horseless age' is as remote as the millenium.

"This statement as to the non-extinction of horses is, of course, based upon the assumption that in spite of the enormously increased use of mechanical power in lines previously occupied exclusively by the horse the proportionate increase of demands for animal power will more than keep pace, and thereby require the horse's continued reproduction.

"As a comparison, I think it reasonable to refer to the conditions attendant upon the introduction and gradually increased use of labor-saving devices for replacing the labor of man. It may be recalled that when the first 'new-fangled' machine came in there was almost a panic among many who were dependent entirely upon the labor of their hands for sustenance, and, also, that this fear was eventually forgotten.

"It was in the early nineties that the horse market got its first bad blow from a new form of vehicle. It was the bicycle that administered this first blow. It closed a great many livery stables throughout the country and really threatened the entire horse industry for a short time.

"It is interesting to recall that a riding academy in New York, that is now one of the largest in the world, was about to close as a riding horse institution and put in a bicycle rink. The bridle paths in many of the cities were turned over to the bicycle people. A feature of the situation was that livery stable keepers complained that since the advent of the bicycle there was no more buggy riding.

"This bicycle upset of the horse market, however, lasted only two or three years. During this period the value of horses decreased sporadically. Only saddle horses and livery horses were affected. The high class carriage horse maintained its value undisturbed.

"It was about this same period that the trolley car supplanted the old horse car. This change, however, great as it was, affected only the general utility horse. The effect upon the market as a whole was slight.

"Then came the auto. It affected all kinds of horses that were driven on the roads for pleasure purposes, not so much because the people lost their fealty, their love for horses, but because of fear. In the early stages of the automobile's popularity many of the drivers were speed crazy, and the horses were absolutely unacquainted with the new vehicle. There were many runaways and accidents, and it was these that caused many people to discontinue their accustomed use of the streets and roadways.

"When the auto once became recognized as an assured fact—when people knew it was a practical thing—many of them gave up the horse for night and station work. The use of the horse for shopping and for theatre and opera purposes is regarded by many people as a great hardship upon the horse. It means that they must often stand through rain and sleet and snow. When the machine became regarded as an assured fact many people who used horses simply for shopping, for calling and for going to the theatre and opera closed out their stables. These people have never reopened them.

"The auto truck has not as yet had an appreciable effect on the horse market. There are a number of auto trucks which render very satisfactory service, but there are a greater number which do not meet the conditions as well as do the horse-drawn wagons.

"The upkeep of the auto truck is very large. I know of a number of large concerns here in New York which have tried the auto trucks and gone back to the use of horses. There are many farmers now going into the breeding of draught horses because of the high prices obtaining.

"The reaction now setting in is toward a re-establishment of high-class pleasure horses for both riding and driving, the riding horse being especially in demand.

"This is due largely to the fact that motoring has been reduced to a safe and sane sport, and as a consequence the fear that prevented horse lovers from using the roads and streets has gradually subsided.

"Another reason for the popularity of the horse is that bridle clubs are being established throughout the country in all social settlements. These clubs obtain the consent of estate owners, most of whom are members, to ride over the roads and lanes that lead through the woods and dells that make up their places.

"This takes the horses off the roads, keeping them away from automobiles and giving them better footing, and it also gives the drivers a more intimate acquaintance with nature. Whereas, farmers are going in for the breeding of draught horses yet, in my opinion, that is the class of horses that eventually is to be the most seriously affected by motor vehicles, especially in the cities.

"The motor engine for farm purposes—the tractor, as it is called—forms a very big item in the economy of big farms in the West. It has not, and I do not believe it ever will, play any part on the small farm, for the simple reason that it is not sufficiently mobile for cultivating and similar agricultural uses."

Some mention has already been made of the mules, the asses and the burros within our national borders. In 1900 there were 3,438,523 mules in the United States; ten years later the number was 4,480,140. During the same period the number of asses and burros moved from 110,012 up to 122,200.

A. D. Cottingham of Kansas City, the biggest mule dealer in the country, has this to say of his stock in trade:

"Kansas City sold more mules to the British Government during the South African war than did any other market. At that time the American mule was a small creature, and the sale of the big lot during that period was not any loss to this country. Nowadays the farming machinery that a mule has to work would be too heavy for the mule of ten or twelve years ago. Since that time mule breeding has been developed tremendously by the use of better mares. Twenty years ago the top price of mules was from $60 to $75. The best mules now fetch anywhere from $225 to $275, and the average of the 8,500 I sold last year was $190. I have seen some sell for $350 and others, which were intended for show purposes, have brought still bigger prices.

"When I started out in the business they called me 'the gypsy,' because I used to travel in a gypsy wagon. I used to travel some pretty great distances. It was a sort of hand-to-mouth existence, but it is pleasant to look back upon when you have come to be doing considerably over a million and a half dollars' worth of business in a year.

"While the South is a great country for using mules, it is not much for breeding them. Most of the mules used in this country come from Missouri, Kansas and Oklahoma. We have two big seasons. The season for what we call 'cotton' mules starts in September and lasts until April. Then the season for 'sugar' mules begins in June and lasts until September. The sugar mule is the best on the market, but the cotton mule is pretty good. We call them by those terms because the former are in demand for work upon sugar plantations, while the latter are needed for working cotton plantations.

"The mule is the nicest dumb brute there is. Why, in my stable in Kansas City, which has a frontage of 645 feet, I don't keep the mules in stalls, but in pens. They don't fight, and I can put double the number of mules there that I could of horses, and you could handle those animals all day long without any trouble. It's all bosh about their being harder to handle than horses. I don't know how the term 'mulish' was derived, except the man who first used it might have come up against what we call an 'outlaw,' an independent cuss of a mule; but, pshaw! there are just as many 'outlaws' among horses as among mules. Why, I could put 100 mules into one of your streets here with only three men to handle them, and they wouldn't interfere with traffic at all. A mule becomes very much attached to the man who drives it. If you were to lead a procession of 200 mules with an old gray mare they would follow her all day, especially if she had a bell on her, and if the mare went into water over her head the mules would go right in too. You, see, they can easily distinguish a gray horse. They will not follow a bay so readily."

WELDING A CRANK SHAFT.

How It Was Done By the Autogenous Method.

An automobile crank shaft recently came to the shop to be welded, and while this job was in no way different from many other welding jobs, it will be described somewhat at length, in order to give the beginner in welding some idea of what should or may be done in similar cases, and what should be avoided. The crank is shown in outline by Fig. 1, an ordinary double crank without any central bearing. The breakage was at A. The only guarantee made in welding this shaft, was that it should be straight and the two

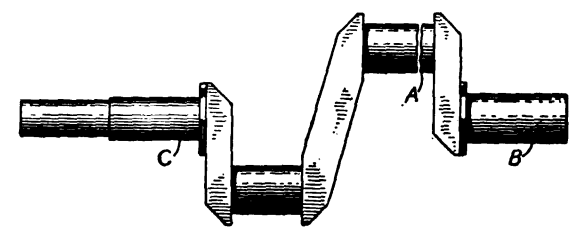


Fig. 1—Where the Shaft was Broken.

bearings in alignment with the crank wrists, or so nearly so that it could be easily trued by taking a slight cut in the lathe, over those surfaces.

In order to make good this guarantee, the broken shaft was clamped in position, as shown by Fig. 2, an old headstock from a defunct lathe being used to support the crank shaft in position as shown. But as bearing B was between shoulders, and much larger than bearing C, the problem came up as to how the clamp-bearings, Fig. 2, were to be aligned with each other and at the same time made to fit the broken shaft. It was not possible to do this entirely by babbitting, as soft metal in D, Fig. 2, would be melted out by the heat of the welding process. It was desirous of avoiding, if possible, the turning up of a special mandrel the same size and shape as the broken shaft, with which to align the clamps, therefore the work was done in the following manner:

A split bushing was made to fit bearing B,

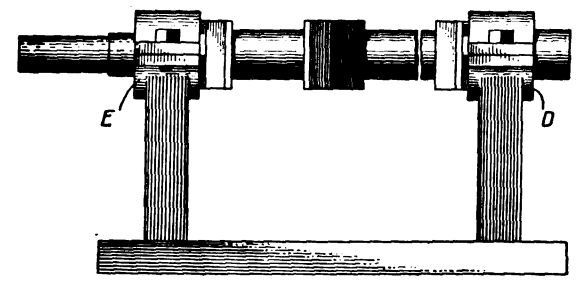


Fig 2—Crank Shaft Clamped for Welding.

Fig. 1, and to also fit into clamp D, Fig. 2. Bearing C, Fig. 1, proved to be of standard size, therefore a bit of cold rolled shaft, the exact size of bearing C, was selected and another bushing turned up which would fit the cold-rolled shaft, and also fit tightly inside the split bushing in D, described above. These bushings were placed in position upon the piece of cold rolled shaft, which was then clamped in position in clamps D and E, Fig. 2, in place of the crank shaft as shown by the engraving. With the piece of cold-rolled shaft in the position described, babbitt was poured into clamp E, making it into a regular bearing, in two pieces, same as any cap journal-bearing.

The cold-rolled shaft was then removed, together with the small extra bushing, and the shaft clamped in its place, as shown by Fig. 2. Bearing E being so far from the broken part, it was possible to do the welding without melting out the babbitt, especially as a wetted rag was kept wrapped around E, during the welding operation.

The crank had to be welded twice, in spite of the excellent preparations made for its support, for the first welder proved to be one of the men who skim over the top of a welding job instead of burning right down to the bottom of it. And right here is the great secret in autogenous weld-

ing, and its difference from soldering. For mending the crank shaft the first time the welder filed a shallow groove around the crank right along the break. When this weld was completed, had it been cut apart at the weld, it would have been found that it was welded on the outside only, the interior being a sort of "cold-shut." This matter was not discovered until the weld was being machined down to size, when the lathesman found a number of unwelded places, and the crank was promptly returned to the welder for further treatment.

The second attempt at welding was successful, for the welder did it properly, and fused the parts together instead of merely skimming over the surface of the parts. The first step, in welding a large mass of metal, is to cut or melt a channel directly along the crack or break as shown by Fig. 3, where the space G H, has been melted right out of the crank.

Glancing at the sectional cut in Fig. 3, it will be noted that the welder melted out the old metal for about a quarter of an inch wide from G to H, which is a little more than one quarter of the crank shaft. When the metal had been burned away down to H, and forward to I, using lots of oxygen and as little acetylene as possible, then the gas was changed, using more acetylene and less oxygen until a neutral flame was secured.

As soon as the neutral flame was on, the metal which was melted down, was permitted to remain

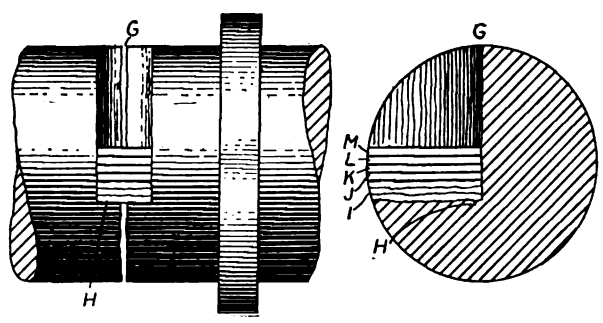


Fig. 3—The Weld which Held.

in the bottom of the cut-out place, as shown by the first section layer. A glance at the side elevation in Fig. 3 shows the first and succeeding layers of metal which were in turn melted into the cavity, from the "welding stick" used by the workman, which in this instance was a piece of very soft steel.

Successive layers, J, K, L, M, etc., were melted into the cavity, and also melted into the walls of the cut, and the process repeated with the various layers until the cavity had been filled up to G, when the crank—together with its lathe-head clamp, were revolved to 90 degrees, and another section cut out and in turn filled with welded-in new metal. By proceeding in this manner, working from the center of the crank section to the surface, there was no question whatever but that the entire crank section had been welded. And it was also certain that there were no "cold-shuts" in the crank.

The whole secret of successful autogenous welding may be briefly summed up into three things. First, take care of the expansion, so the article may cool without being torn apart. Second, make sure that the metal added during the welding process actually joins with the surfaces to be welded and does not merely skim over them. Third, see that the welding begins in the middle of the mass and proceeds toward the surface. And it may be added as a sort of "tiger" to the three above noted points, that a proper flux be used.

To make a first-class flux for oxy-acetylene welding, put a 10-cent paper of borax in a cigar box, add a tablespoonful of common salt and also add enough black oxide of manganese to color the mixture nearly black. This flux never fails to do good work after being well mixed.

The Horse to His Master.

I am a Horse; you are a Man; I've been your slave since I began, and though I'm strong enough to shake my shackles off and make a break for freedom that would lift the lid, you've noticed that I never did. By day and night I've worked for you and done the best that I could do; and though I may not always like your methods, yet I never strike; in heat and cold, in wet and dry I'm always ready—glad to try to do the very most I can to satisfy my master, man. Therefore, my master, if you please, considering such facts as these, say, don't you think it ought to be your pleasure to look out for me, if for no other reason than my greater usefulness to man? Of course, you might be worse, I know you sometimes treat your own kind so, but I'm a horse, and truer than the manslave to his master, man. And, furthermore, my nature is much more dependent than is his. And as I trust you, sir, you should do all you can to make it good. Nor do I ask a lot, I guess, to be a fairly fair success—good food, good shelter, and good care, I think, is just about my share. No other pay I ask—no touch I make, but this! Is that too much?—W. J. Lampton, in New York Times.

AUTOMOBILE AND HORSE.

More Than Three Thousand Cars at the Belmont Track Re-opening.

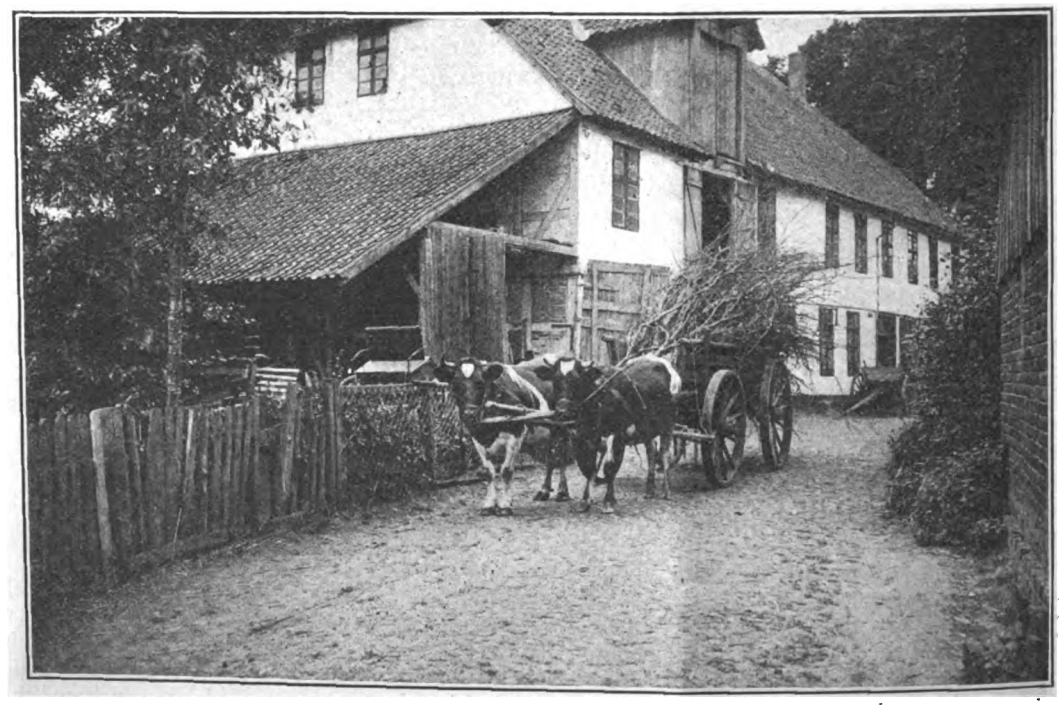
Many of our readers will be interested to know that at the opening of horse racing at Belmont Park, N. Y., on Memorial Day, there were 3,342 automobiles present, most of them, of course, coming from New York City. It would appear from this that horse racing is still popular and among none more so than wealthy automobile owners.

The cars were of very high average list price and the total valuation was estimated to be in the neighborhood of $14,000,000. It is quite likely that the showing is a new high record for number and value of automobiles within an enclosure, because while it is a fact that estimates of automobile assemblies have been made that ran higher, the actual count has been lacking heretofore.

Details of the number of each kind of car follow, and it will be seen that there were far more high priced cars than cheap ones present.

Packard	465	Palmer-Singer	28
Cadillac	212	Haynes	27
Chalmers	191	Oakland	27
Peerless	186	Maxwell	21
Pierce	155	Premier	20
Hudson	131	Moon	14
Simplex	129	Mitchell	12
Stearns	128	Marmon	11
Fiat	124	Cole	9
Locomobile	120	Mercer	8
Ford	119	Thomas	8
Alco	112	Garford	8
White	98	Columbia	8
Lozier	97	Lancia	7
Mercedes	94	Rainier	7
Renault	93	Marquette	6
Pope-Hartford	73	Isotta	6
National	63	Apperson	5
Abbott-Detroit	57	Napier	5
Jackson	46	Case	5
Stoddard-Dayton	43	Knox	4
Studebaker	42	De Dion Bouton	4
Buick	41	Overland	4
Velie	40	Benz	3
Oldsmobile	39	Panhard	2
Rambler	32	Minerva	1
Franklin	31	R. C. H.	1
Delaunay-Belleville	30	Crane	1
Winton	30	Stutz	1
Speedwell	29	Daimler	1
S. G. V.	28		
		Total	3,342

Big sixes were the favorites of all makes that turn out such cars. The most expensive models were the ones used by the racing devotees. Despite the genial warmth of the day, there were about 500 luxurious limousines in the array. The listing prices of the cars ranged from $525 to $14,500, and the average, which is based to a considerable extent on close estimating, was about $4,115. There was one Packard in every seven automobiles present. There was one Cadillac for each sixteen present and so on down the list. The imported cars numbered 246, or about 7 per cent of the total, and Mercedes was first by a narrow margin. This estimate, of course, places the Fiat among the cars of domestic manufacture.



Broke to Harness.

POWER

In this department an expert will reply to any questions our readers may propound as the result of their experience, or inspired by a desire to become acquainted with the value of power in the shop. All inquiries should be addressed to the Editor of THE BLACKSMITH AND WHEELWRIGHT, P. O. Box 654, New York City

Pointers for Little Engine Troubles.

There are a great many small things coming up every day with the operator of a gasoline engine that it is impossible for the uninitiated to become familiar with except by actual experience. Among other things, it is occasionally necessary to remove a pulley from a shaft where it has been fastened for some time, and it often sticks. If the shaft is rusted, the first thing to do is to remove the rust from the shaft in the direction the pulley is to be removed. Remove the set screws and fill the holes with kerosene and let it stand for a little while, tapping it occasionally with a hammer. If this does not start the pulley, heat its hub and it will expand sufficiently to be slipped off the shaft.

It is also well to remember that the valves of a gasoline engine need attention from time to time in the shape of grinding. By this we mean to re-seat them so they will hold the compression. To do this, it is first necessary to remove the valve that is leaking, then scrape the valve stem with a piece of metal (an old case knife is good), and note the condition of the seat. In order to grind the valve, place on it a mixture of fine emery and vaseline, then use a screw-driver, either by hand or in a brace, and turn it first one way and then the other, lifting it from time to time so that no deep grooves are cut. Take the valve from the cage occasionally and examine the seat, and if it does not show a bright ring all the way around, give it the second coat of emery and vaseline and repeat the operation until it does. The seat, as well as the valve, should be thoroughly washed with gasoline before replacing to remove any particle of emery that might get to the cylinder. Replace the valve in the cage and the spring in position and the job is complete.

Occasionally it is necessary to remove screws and cap screws that have rusted so much so that they will twist off before coming out. In cases of this kind it is best to take a little time and heat the head of the screw by holding against

the head a hot iron which may be heated in an open fire outside or by the application of a blow torch. This will, in practically every case, loosen the screw so that it can be removed.

A Novel Gasoline Storage System.

A local newspaper published in Glasgow, Scotland, according to an extract sent by Consul J. N. McCunn, describes a new method of keeping gasoline which eliminates waste from evaporation. The account is as follows:

A model illustrating a new system for storing petrol (gasoline) in bulk is being shown by the Hydraulic Petrol Storage Company, 11 Bothwell Street, Glasgow. The company is a London concern, and until a few weeks ago its operations were confined to England. The novelty of the system consists in the fact that the storage tank is always full of liquid, and that no air is admitted at any time. The liquid in the tank may be all petrol (gasoline) or petrol and water, or all water. The water and petrol do not mix, and owing to the difference in their specific gravities the petrol always floats on the surface of the water. By simple, ingenious mechanism water is pumped into the tank to force out the petrol when required, while the water is drained away when space in the tank is needed for the storage of petrol.

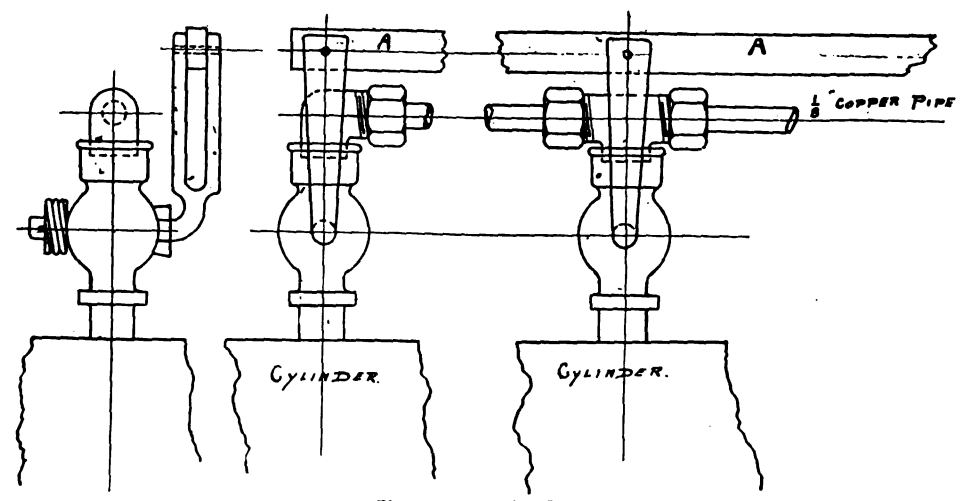
The advantages which are claimed for the system are that there is no loss from evaporation, that no gas is forced out when the storage tank is refilled, and that the petrol will not deteriorate, no matter how long it is kept in the tank. It need scarcely be added that the apparatus is so designed that no water whatever can be drained off along with the petrol. It is understood that at least one large firm of motor-car owners in Glasgow is considering the advisability of fitting an installation in connection with new works.

Pure Drinking Water.

Procure an ordinary lamp chimney, put bottomside top and fit two or three thicknesses of cheesecloth over the lower end of it. Press a tuft of absorbent cotton into the small part of the neck to a depth of about three inches. Insert the chimney in a hole cut in a wood shelf used as a support. Pour the water in until the filter is filled, when it will be observed that any organic matter will be retained by the cotton. The fine organic matter may penetrate the cotton for about one inch, but no farther. The resultant filtered water will be clear and pure. Change the cotton from time to time.

A Simple Starting Device.

From G. H. Waltman, Pennsylvania.—A very simple device for starting an automobile engine can be easily assembled and installed by first removing the pet cocks on the cylinders and replacing with those which have a split handle. Connect all the split handles to a rod A A, which is long enough to pass through the dash board, where it can terminate with a handle of any convenient arrangement. It is now clear to see that by one push or pull on the rod all the pet cocks can be opened or closed from the driver's seat and avoiding the getting out, raising and closing the hood.



Plan of the Engine Starter.

Next run a one-eighth inch copper pipe along the top of the opening of these pet cock cups with a T connection at each pet cock excepting the last which terminates with an elbow. These T's and elbow, as shown in the illustration, make connection with the one-eighth inch pipe line and are not connected to the pet cocks, but allowed to only lie or rest on top of the cups. The other end of this pipe line is run through the dash and connects with a small tank supplied with a small force pump; or a better arrangement is to use instead of the tank a K-E-W three-way-valve pump, and then connect the pipe line to the main gasoline pipe line or gasoline tank.

To operate it is simply a matter of throwing open all the pet cocks with one push or pull on the rod and by forcing gasoline through the pipe line, all cylinders are instantly primed. With the cocks again closed and the spark applied in the usual way, the engine is most likely to start.

We have called this our "priming starter" and in general principle it is the same as the majority of starters on the market today and may be easily and inexpensively installed.

The writer does not guarantee it to positively start the engine every time, but can truthfully say that in a very large per cent. of trials it has done the trick, and when it has failed of itself, one turn of the crank is all that is necessary. It will be found a big help to those having engines which start hard or require a good deal of cranking.

A Wonderful Machine.

The machine illustrated in the cut is one of the new machines shown in the new catalog of the Parks Ball Bearing Machine Company, and is especially adapted for the wagon shop that is crowded and every inch of space must be utilized. Many wagon shop owners do not feel able to purchase a double spindle shaper, and the new machine will appeal to many who are looking for a cheap serviceable combination that is compact and does not require much space. The double ended mandrel takes the place of the double spindle shaper, the only difference being that the material is handled perpendicularly instead of horizontally, and passing from one side to the other as the grain of the

wood requires instead of going from one spindle to another. By having a cutter on each end of mandrel exactly the same shape, circular moulding, rim rounding, rabetting, inside panel work, etc., can be done, gauging from face side of material, and the same results are obtained as on a double spindle shaper. The machine is furnished in either light or heavy sizes, with either 6 or 12-inch jointer or 36-inch band saw can be substituted for the 22-inch. The steel plates of the interior are either 6 or 12 inches wide, the one in front of the cutter head being 2 feet long and the one in the rear 2½ feet long; both are ground to a true and finished surface, and both have hand wheel adjustment to raise and lower on inclines in perfect alignment to adjust depth of cut and can be slid to and from cutter head. Plates being of steel can be made much thinner in front and rear of cutter head than cast iron will stand. This allows the plates to come as close together as possible to make. The front plate has an extension on the left side beyond the cutter head, and rear plate has an adjustable drop surface on left side in line with end of head adapted for rabbetting on the end of jointer head, and with this adjustable surface you have a support for material when cutting any depth rabbet desired. The head is four-sided and held in plate with key and set-screw and has slotted knives on two sides and the other two sides are drilled with screw holes to receive moulding knives, which can be added to jointer head and used without taking the straight knives off the head. The band saw shown has a 22-inch swing, both upper and lower wheels being 22 inches in diameter, with 1½-inch face, fitted with endless rubber bands, ground true for the saw to run on. The upper wheel has a tilting adjustment on top bar for leading saw with proper tension against the guide, which is a very desirable feature. There is also a hand wheel for regulating the tension on saw, which also serves to lower the upper wheel to accommodate shorter saws. The tilting table of the band saw is made of cast iron, planed true, and 14¼ inchs by 17½ inches, and on machine shown is 40 inches from the floor. The ball bearing guide runs as easily as it is possible to make it to prevent saws from breaking. The guide can be raised to saw material up to 6½ inches in thickness.

Used Absorbine Twenty Years.—A liniment that makes good so consistently that it will hold customers year after year must possess an abundance of merit. Absorbine is continually making new friends, but it also holds the old ones, because it does everything that is claimed for it in a mild and pleasant manner. F. B. Loomis, 1052 Richard Street, B. C., writes:

"I have been using Absorbine ever since 1892. I started using it the season of 1892 with the mare Nellie Mason that I was racing that year, and have stuck to it ever since. I can't say too muih for it, and I keep it in the stable all the time."

For further particulars and testimonials, address W. F. Young, P.D.F., 55 Temple Street, Springfield, Mass., not forgetting to mention this magazine.

A Durable Wrench.

From L. W. Winford, Texas.—I enclose a sketch showing how to make an S wrench out of

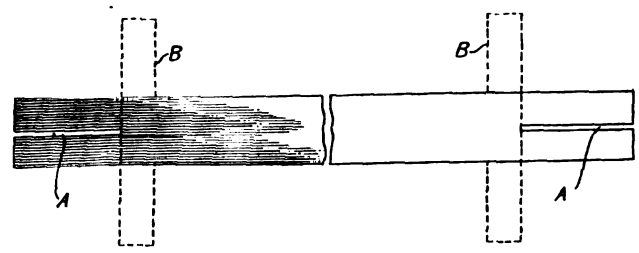


Fig. 1.

an old rasp. First, split the old rasp as shown at A, Fig. 1. Then turn back the part split as shown by the dotted lines B. Then lap them back on the old rasp and weld. It will then be

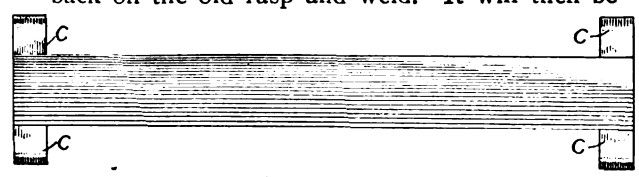


Fig. 2.

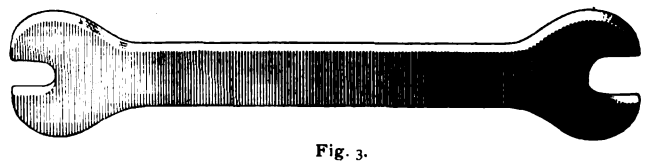


Fig. 3.

as shown at C, Fig. 2. Then place on the end of the anvil and give it the circle wanted to fit the size nut you wish it for. After you draw it up with a file it will be like Fig. 3. The length of the split needed as shown at Fig. 1 depends upon the size of the nut you wish the wrench to fit. This wrench is easily made and is very durable.

Used for Lawn Mowing.

The illustration shows a 1907 Reo runabout having been converted into a mammoth lawn mower by the Quincy (Ill.) Country Club, with which the grass on their golf ground is now cut in less than one-sixth of the time and at less than one-fifth of the cost at which it was formerly done.

The two passenger body and rear system of this runabout are retained intact while the front is supported by a triple-armed frame which converges down to the axle running through an iron collar two feet in diameter and three feet long across the chassis frame. A three-foot mower is attached in front of this roller and another at the left side of the car. These two mowers cut a swath six feet wide which, with the nominal speed of six miles per hour, would mean eleven acres per day of eight hours. Assuming that the cost of gasoline is twenty cents and oil fifty cents per gallon, and the driver is paid three dollars per day, the cost per acre would be less than thirty-five cents. Here is another explanation of what becomes of old cars while it is also a convincing reminder of the fact that they are widely useful.

Lawn Mowing.

The Universal Horseshoeing Box.—This is a device which will save any horseshoer time, nails and money. The box, which is illustrated in our advertising columns this month, has five compartments for nails. Only one size can spill out when the box is kicked over, and no dirt or hoof clippings can be mixed with your nails. No horseshoer who has tried one of these boxes would be without one. The box is carried in stock by most jobbers, but the manufacturers would be pleased to have you send to them direct for descriptive circulars, which will be sent free on request if you write to Krug Bros., Mfrs., Fon du Lac, Wis., and mention The Blacksmith and Wheelwright.

Steel Tempering Compound.—A preparation for oil tempering which is highly recommended is manufactured by C. W. Leftwich, 112 South Kentucky Street, Sedalia, Mo., and Mr. Leftwich states that this preparation is worth hundreds of dollars to any blacksmith, as it is wonderfully effective in tempering edge tools. Readers of this publication should write to Mr. Leftwich for free circulars and mention The Blacksmith and Wheelwrgiht.

Lesson for Owners of Horses.—The statistics of the recent Work-Horse Parade in Boston disclose some interesting facts. There were 1,231 entries, and of these only 89 failed to appear, a much smaller percentage of absentees than is usual. There were 1,516 horses actually present. In the Boston parade every entry that deserves a ribbon receives one, and the ribbons were awarded as follows: 1. (blue) 765; 2. (red) 235; 3. (yellow) 511.

No horse that was lame, thin, or badly groomed received a ribbon, but the number thus disqualified was astonishingly small, being as follows: Seventeen for lameness, sixteen for being thin, six for being badly groomed.

These results show how much the horses in Boston have improved in quality and condition since the first annual parade ten years ago.

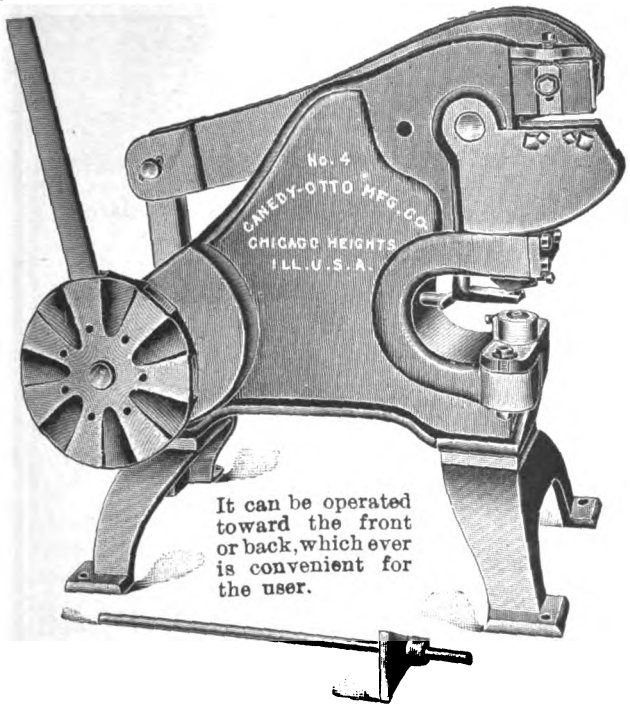
Owners of horses everywhere might, by a little encouragement, by awakening the pride of their drivers, and perhaps by offering them occasional slight rewards, greatly improve the condition and treatment of their horses, and save thousands of dollars a year in the wear and tear of horseflesh.

Owners and drivers of horses should read "Drivers' Rules" and "Stable Rules," which appear in the "Saddlery and Harness" department of this issue.

Band Saw Rubbers.—The endless circular bands of rubber, covering the face of large wheels on a band saw and on which the saw itself runs, sometimes become loose at points, and if run that way they "bag" out or stretch so that when resetting the band it is found too large for the wheel, or it may be that the band was originally too large.

To make it fit, procure a pail of boiling-hot water and immerse a loop of the band, say, about 1½ feet, in it at a time and continue until the entire length has been gone over. It will make the band a tight fit on the wheel. If applied with a coat of shellac it will be a permanent and satisfactory job.

No. 4 Combination Punch and Shear



Will shear ½x4-in. flat bars.
Will shear 1-in. round bars.
Will punch ½-in. hole in ½-in. plate.
Depth of throat 6 inches.
This machine is furnished with ½-in., ⅝-in. and ¾-in. punches and dies, also a lever bar.

When choosing your blacksmith shop equipment why not get the best—

CANEDY-OTTO

It costs no more.

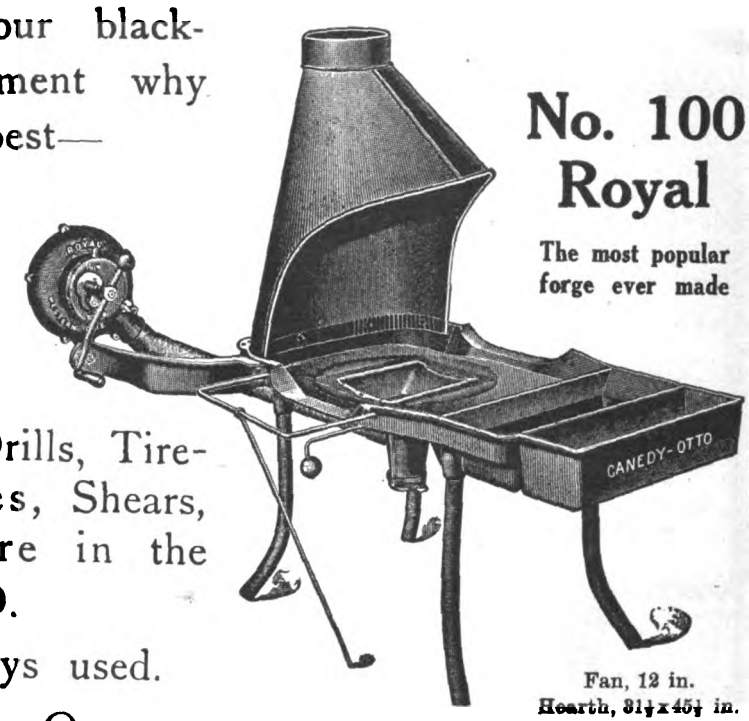
Manufacturers of the finest line of Forges, Blowers, Drills, Tire-Shrinkers, Punches, Shears, produced anywhere in the WORLD.

Once tried, always used.

There's a reason — QUALITY.

No. 100 Royal

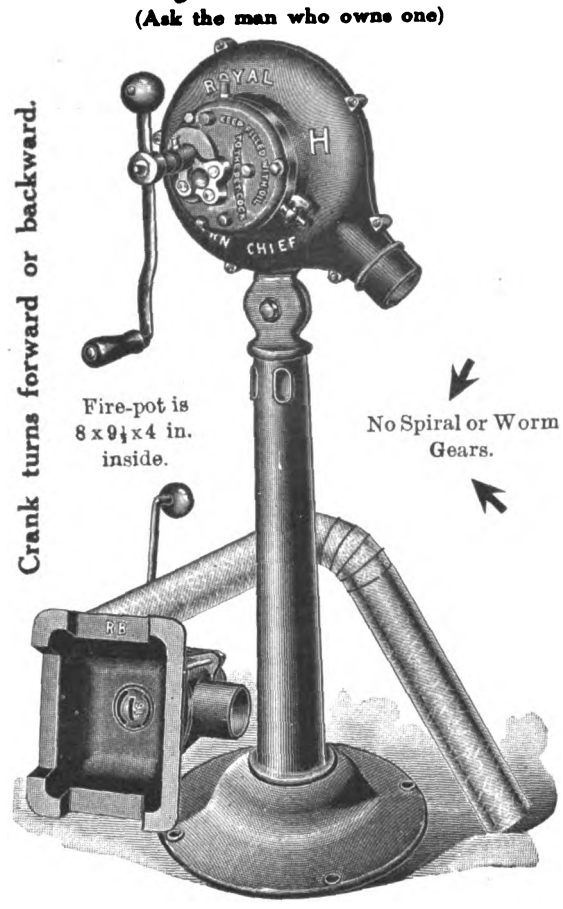
The most popular forge ever made



Fan, 12 in.
Hearth, 31½x45½ in.

Royal Blower

(Ask the man who owns one)



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PUNCHES
SHEARS

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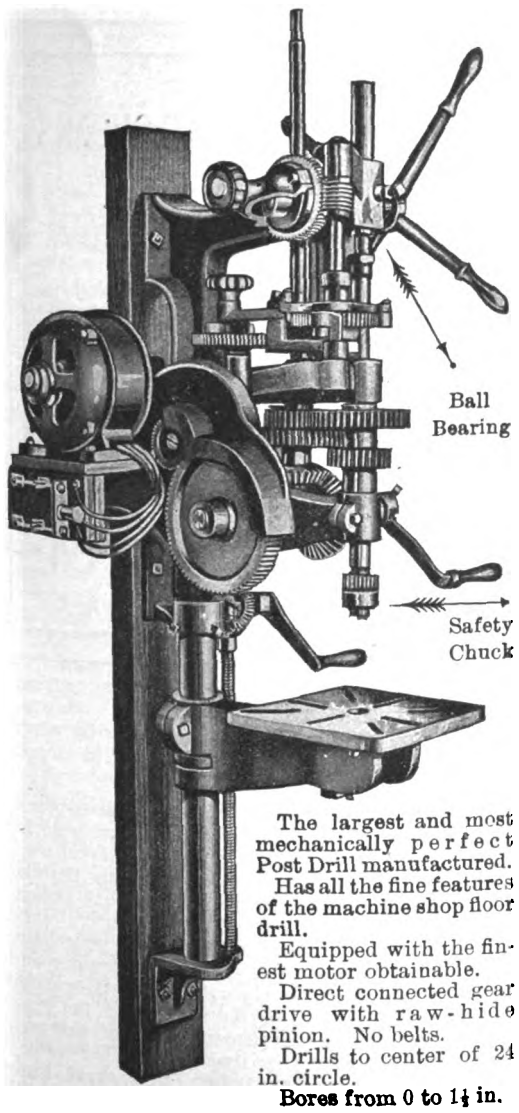

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Has all the fine features of the machine shop floor drill.
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Direct connected gear drive with raw-hide pinion. No belts.
Drills to center of 24 in. circle.
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Over 200 different styles of TOOLS. We can suit every need.

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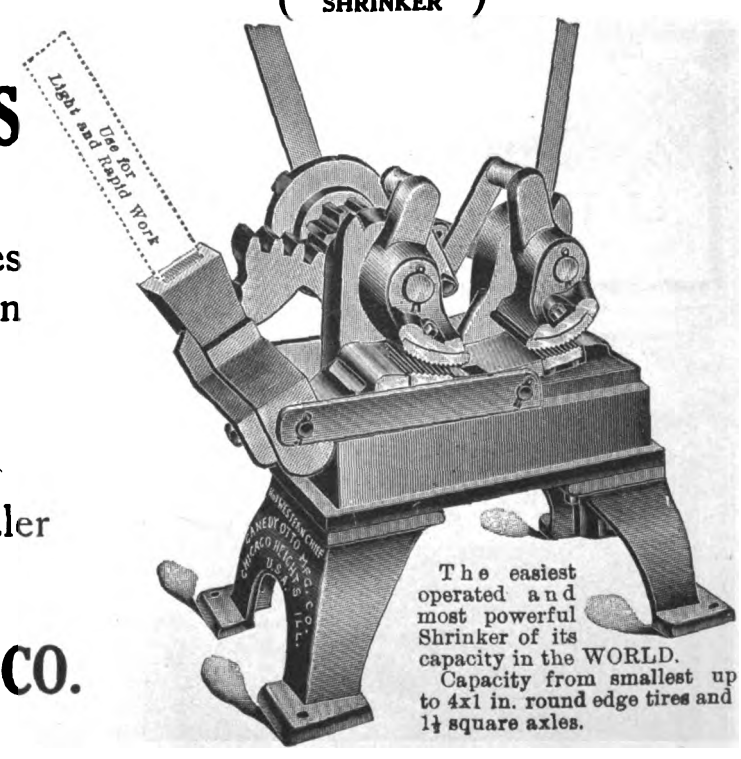
(TIRE and AXLE SHRINKER)



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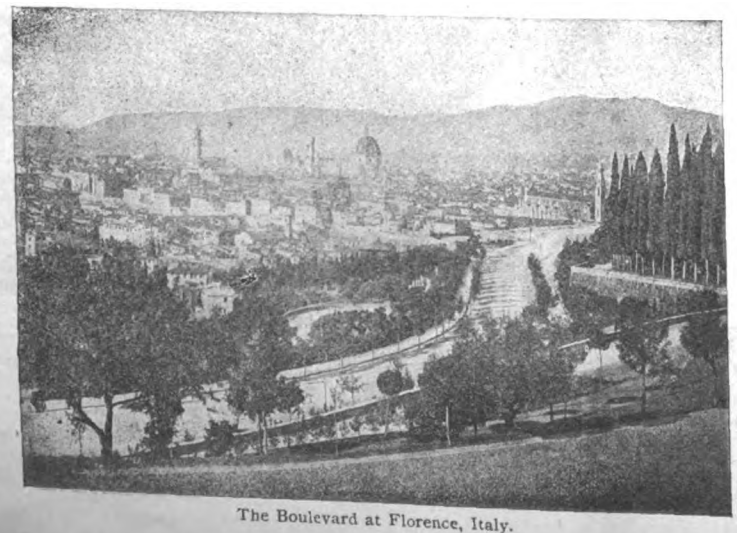
Capacity from smallest up to 4x1 in. round edge tires and 1½ square axles.



The Boulevard at Florence, Italy.

New Way of Making Plow Points.—A new method of manufacturing plow points has been patented by an inventor of Evansville, Ind., which it is claimed will materially reduce the cost of manufacture. From 28 to 40 steps are required in the present process of welding the parts, while only four steps are required in the new method. The point is cut in one piece and bent without welding, according to the claims of the patentee.

Detecting Defective Welds.—A German technical society has offered a first prize of $243 and a second prize of $121.50 for the best method of proving, without disturbing a welded surface, whether or not there are unsound places or accumulations of dross beneath the weld, and for determining whether the metal has been overheated in the welding operation. The method of testing must be of a simple character and easily carried out. The prizes, however, may be awarded to essayists, who, without actually solving the problem, offer the best suggestions for a sufficiently accurate method of determining the soundness of a joint.

The Duplex Plow Share Sharpener.—This is an extremely handy machine for any blacksmith's shop where farm work is done. It is manufactured by the Duplex Compressing Rolls Co., Indianapolis, Ind. The manufacturers state that this will save your arm, your hammer, your anvil, your time, temper and trouble. It is claimed that this machine will save more than one-half the time and labor over the old way of sharpening. You are invited to write for further information regarding this great little hand-power machine. The price will please you, and the machine is manufactured by a thoroughly reliable firm. Address the Duplex Compressing Rolls Co., Indianapolis, Ind., and mention this magazine.

A MANUAL OF MENTAL SCIENCE.

By Leander Edmund Whipple. Published by The Metaphysical Publishing Co., New York. Price, $1.

Two decided merits of this work are its conciseness and lucidity. Mr. Whipple has been studying mental science and writing about it for twenty-five years and perhaps more, and he has thus given the reader mature thought as to right doing and right living. He says in his preface that "the facts given are known to be as stated," and that "anyone can test them in his own daily life." The book is specially adapted to those who have not previously taken up the study or consideration of mental science or the best use of the mental faculties. The practical every-day man who can't seem to get hold of much logic or evidence from the postulates in the various works brought out by the New Thoughters, the Christian Scientists and other modern cults—who is like the man from Missouri, and must be shown, and who is impatient at the multitude of assumptions with no evidence and little force of argument to prove them—will read this book without the usual feelings of impatience and doubt. The author says that the propositions stated as facts have all been carefully examined, tested, demonstrated and proved to be sound, correct and permanent.

We commend this manual to the sick and discouraged, to the selfish and sordid, to the investigators of truth and to those of settled religious faith, as a substantial guide for right doing and right living. If we all follow its teachings, we shall be healthier, happier, more useful, better fitted for right living, and better prepared for dying.

Here follow some of the more important topics treated: Reality, being and life; the universe of reality; symbolism in mental science; rules for living, for character, for the home, for business, and for health; a manual of the mind, and how to think.

Cast Iron Will Bend.—Few mechanics know that cast iron can be bent or straightened, as the case may be. For example, take a piece of cast iron, place it on a level, solid surface and strike it lightly with a ball-peen hammer. If this simple experiment is tried, it will be found, to the surprise of the experimenter, that metal of this kind readily yields to the light blows of a hammer. Do not strike hard enough to break or crack the casting.

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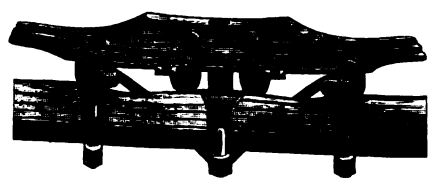
Easily Attached to Axle.



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The lugs, together with these bolts, make the strongest attachment that has ever been devised.

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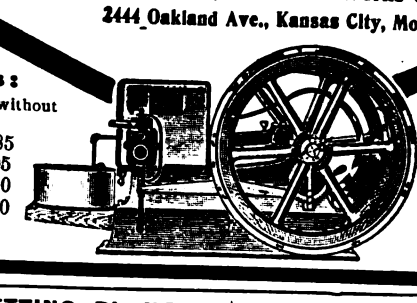

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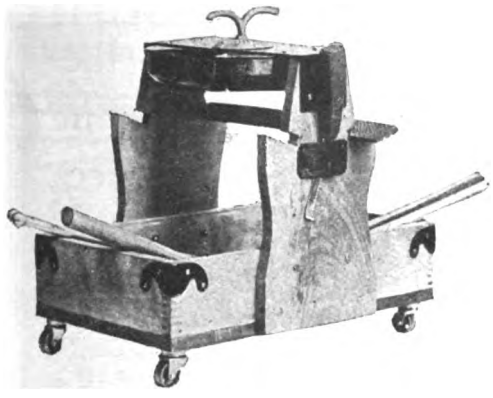

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FOR SALE.
Horseshoeing shop; a snap; doing between $600 and $700 per month; reason for selling, other business; three electric fires, one electric clipper; shop first class and up to date. W. A. SCOTT, 409 Minnesota Ave., Kansas City, Kansas.

FOR SALE.
Blacksmith shop, stock and tools, house and half acre of ground; good trade for three men. Write for particulars to WILLIAM YOUNT, Okolona, Ohio.

The Reading Habit.—Written or spoken words are conveyances for passing along an idea to the other man. If you spend time in talking piffle or in carrying idle gossip, you are wasting words, killing time—and it is you for a small job, a small salary and a lay-off during dull season. The man who attempts to monopolize an idea and keep it under cover loses it, because we understand a thing best only when we have written it or when we have given it away. That is to say, we never understand a thing quite so well as when we have just explained it to someone else.

Coming down to the work-a-day phase of this problem—no man can afford to get along or try to do business without the reading habit, and no man can afford to surround himself with employes who do not read. The man who does not read, does not care, and he is not concerned to know and understand the best in his field or in his line. If a business concern employs enough men who do not read, who do not keep in touch with the ideas which concern the things they are supposed to do, it is only a matter of time until the rats will gnaw such a business down on their shoulders.

The Common Sense Tire Remover.—This is described by the manufacturers as "the best machine on earth" for removing tires, and many of our readers are willing to testify that it is a machine that will soon pay for itself in any shop. We refer our readers to the illustration which appears this month in our advertising columns. The Common Sense Tire Remover is for sale by most heavy hardware jobbers, but if your dealer does not handle this machine, write direct to the Common Sense Tire Remover Co., Dowagiac, Michigan. The price of the machine is $20.00, and if you will send your draft or money order for this amount the machine will be shipped promptly to you. In writing this company mention the Blacksmith and Wheelwright.

The Smallest Plow Ever Made.—Charles McWane, of Lynchburg, Va., inventor of the "boltless" plow and the self-sharpening plow point, was today showing to his friends what is believed to be the smallest complete plow in the world. When seen, this plow was in a small pill box, which would easily have held two score more plows of the same size. The little plow is complete in seven pieces, and has beam, handles, moldboard and landslide. It is made of brass and weighs one and three-quarter grains. There are 7,680 grains to a pound, and at this rate it would take 4,400 plows to make one pound. It would require 704,000 of the miniature plows to equal the weight of an average two-horse plow.

DO YOU KEEP UP WITH THE PROCESSION?

If you do not, you are neglecting your business. The blacksmith and wheelwright business must progress just as much as any other if it would keep up with the times. And you cannot keep up with the times unless you know what is going on in the great world of manufacture—the great world of production—wherein the new and improved things that make for betterment in your work are produced.

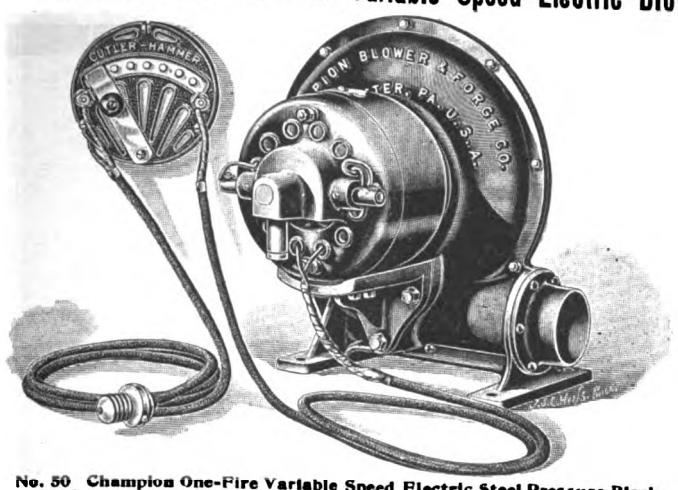
Please take a little time—this evening, if possible—to read the advertisements in this issue. It will not be found a dull or a difficult or an uninteresting bit of reading.

If you see anything that you don't understand, or if you need more information than is given in these advertisements, write the advertisers and ask for further facts.

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

THE CHAMPION

"STEEL PRESSURE" One-Fire Variable Speed Electric Blower



No. 50 Champion One-Fire Variable Speed Electric Steel Pressure Blacksmith Blower with Universal Motor for both Direct and Alternating Current, either 110 or 220 volts, with Detached Rheostat for six speeds, with attachment cord and plug to fit any light socket (therefore can be installed without any expense), and Steel Pressure Fan Case, for all kinds of general Blacksmith work.

Champion Motors are all **GIANTS** in strength. They are 40% larger than requirements. Endurance guaranteed.

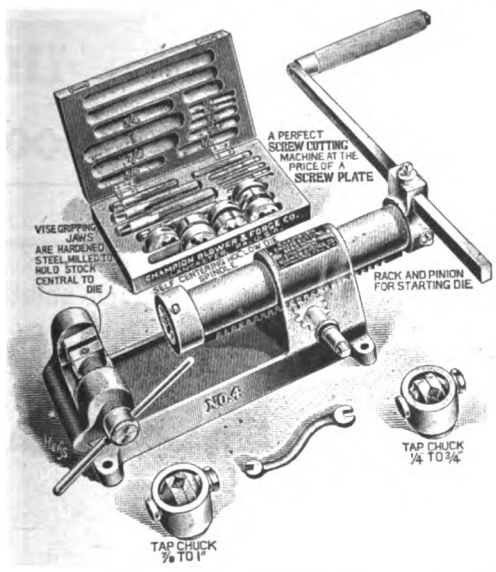
All Champion Motors are designed and built with sufficient units of **power** guaranteed to **run** the **fan** at **highest speed** of **3000 Revolutions per minute,** and at **high pressure** open and away from the fire for **ten hours** without a **single stop.**

Measure your Motor capacity and be certain you get what you are paying for. **The Heart of the Blower is in the Motor.**

All Champion Motors are built from the very highest grade materials, best workmanship, and machinery of the latest up-to-date design employed in winding and manufacturing the Motors.

We manufacture Electric Blowers in eight styles to run from one to nine fires.

THE CHAMPION THREAD CUTTING MACHINE



Furnished with Dies only, or with Dies, Taps and Tap Chucks.

A Thread-Cutter to do quantity jobs equal to machines costing ten times the price.

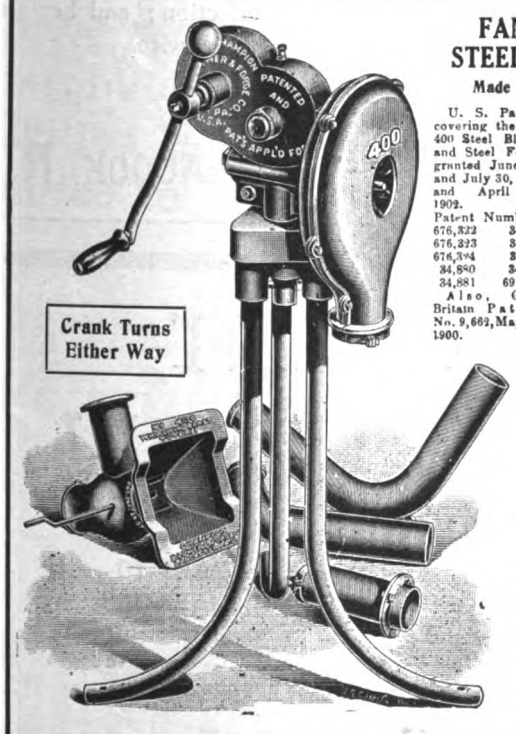
The Champion Thread Cutting Machine represents a **wonder** in its line, as it meets conditions practically equal and sometimes superior to machines costing ten times the price. It will do **better work** and produce **superior threads** at **machine speed;** therefore, no shop cutting threads can afford to do **without this labor saving tool.**

"Costs about the price of a Screw-Plate."

Made in two sizes and several styles from ¼ to 1 inch.

FAMOUS 400 CHAMPION STEEL BLACKSMITH BLOWER

Made with Adjustable Ball Bearings only.



U. S. Patents covering the No. 400 Steel Blower and Steel Forges granted June 11, and July 30, 1901, and April 15, 1902.

Patent Numbers:

676,322	34,892
676,323	34,893
676,324	34,894
34,880	34,895
34,881	697,699

Also, Great Britain Patent No. 9,662, May 25, 1900.

The 400 Champion Steel Blacksmith Blowers and Forges after twelve years of practical blacksmith work number over 600,000 in use. The 400 Blowers purchased twelve years ago are running to-day as smooth and noiseless as the day they were placed to the fire and without a particle of lost motion to the crank. Therefore, the gearing and the bearings in the 400 Blower are as good as new after twelve years use.

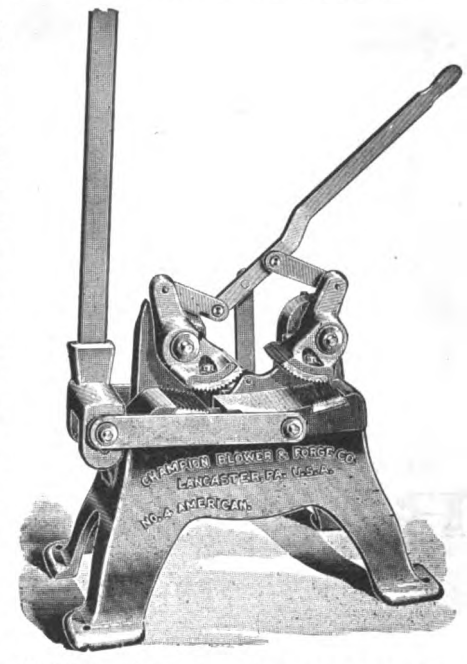
The No. 400 Champion "Whirlwind" Blast Anti-Clinker, Heavy Nest Tuyere Iron is furnished regularly with the 400 Blower **without extra charge.** This is a tuyere iron that is **true to name.** It produces a circular, rotary, "whirlwind" blast and heats iron one-third quicker, as the heat is not blown up through the fire and out of the chimney where it is wasted as in all other tuyere irons. This is not a wild claim. This can be tested and it will be found that less hot air is wasted six inches above the fire than four feet above the fire of any other tuyere iron. Therefore, by the quicker heating and this concentration of all the heating elements in the coal the blower will soon pay for itself in the saving of time and fuel.

No. 4 CHAMPION AMERICAN TIRE AND AXLE SHRINKER

The No. 4 American Shrinker has been manufactured by us for over six years, and is used by over 9,000 smiths.

Quantity manufacturing has enabled us to spend thousands of dollars to **build a special moulding machine to mould this shrinker** with the feet up (or in other words upside down), therefore, the **hot metal** is **poured** in from **the feet,** which cannot possibly be done by hand moulding, thus **saving** all **risk** of the **dirt** in the **metal** combined with **air** to **honeycomb** the **arm holding** the **main eccentric gripping dog,** as the **hot metal** must be **poured** from the **top** of the **arm** when the **mould** is made by **hand.**

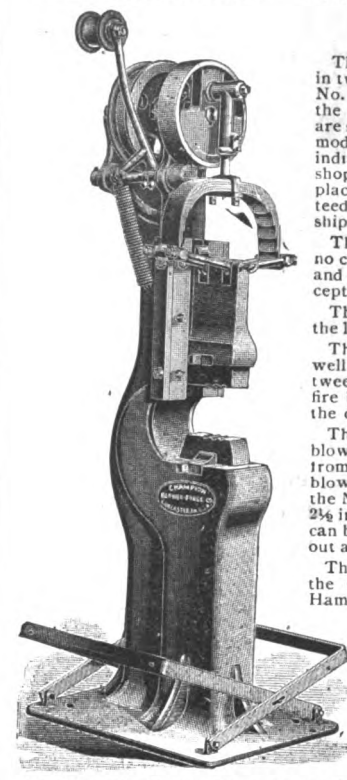
We positively guarantee no **honeycombing** in the **arm holding** the **eccentric gripping dog** or **main body** of this **shrinker** where the **strength** is **required.**



No. 4 Champion American Tire and Axle Shrinker will shrink up to 4x1 inch round edge tire, and axles up to 1¼ inches, with two steel jaws 4x2 inches wide.

THE CHAMPION "PATENTED" POWER HAMMER

Made in Two Sizes



The Champion "Patented" Power Hammer is made in two sizes: No. 0 with Ram weighing 30 pounds, and No. 1 with Ram weighing 65 pounds. They contain all the good features of the best Hammer ever built, and are superior to any of the high priced ones, and sell at a moderate figure. They are strictly up-to-date machines, indispensable in any carriage maker's or blacksmith shop. The Champion "Patented" Power Hammer is placed before the world as a strictly tested and guaranteed tool, and represents in its material and workmanship the highest CHAMPION standard.

The frame and anvil are cast in one solid piece with no core, therefore insures perfect alignment of the dies and a solid anvil, giving rigidity and solidity for the reception of severe and rapid blows.

The position of the dies is such that there is no limit to the length of the bar which can be worked.

They are double sided Hammers, and can be used as well from one side as the other. They can be placed between two fires, and operated equally as well from either fire by a double treadle, as can be seen by referring to the cut.

The control of these Hammers is so perfect that the blow can be made absolutely at the will of the operator, from a gentle stroke to a rapid succession of mighty blows that will weld with the regular dies furnished, on the No. 0 machine 2 inch axles, and on the No. 1 machine 2½ inch axles at one heat, and material to its full capacity can be forged down to the size of a horseshoe nail without any change of adjustment.

The friction for stopping the Hammers is such that the operator can strike one blow and stop with the Hammer on the up-stroke.

The Hammer Head and Ram stand out from the main part of the frame, are not covered up to obscure the work of the operator, which is a great advantage; also in forging iron with an angle in it, you can get in very close to the corner.

The height of the frame is such that a tire three feet in diameter can be welded, and it will weld a tire 4 inches wide and 1 inch thick very easily. It will also weld the lightest buggy tire.

The Champion Power Hammers are sold guaranteed to represent the very best procurable materials and workmanship in every respect, therefore, when once installed means a life-long money earner with little attention or expense.

No. 0 Champion "Patented" Power Hammer, with one regular set of dies for plow work, upper die 3x1½ inches, lower die 3x2 inches. Size of base of Hammer 18x28 inches. Height over all 5 feet 4 inches. Weight of ram 30 lbs. Pulley 9x2¾ inches. Speed 400 RPM. Capacity 2 inches, square or round. ½ H.P. required to operate same. Weight 900 lbs.

No. 1 Champion "Patented" Power Hammer, with one set of dies 2½x6½ inches, with plain surface 2½x3 inches, and two plain grooves and one tapering groove across one end for forging round iron, straight and tapering. Size of base of Hammer 20x27 inches. Height over all 5 feet 8 inches. Weight of ram 65 lbs. Pulley 10x2¾ inches. Speed 300 RPM. Capacity 2½ inches, round or square. 1 H.P. required to operate same. Weight 1,250 lbs.

Any ordinary shaped dies can be furnished instead of regular dies if specially ordered

Extra dies for special work will be charged extra.

Our 1913 Catalogue can be had upon application, showing the very latest and greatest inventions in the Blacksmith line in the world on Blowers, Forges, Drilling Machines, Tire Benders, Tire Shrinkers, Power Blowers, Power Hammers, Punches and Shears, Screw Plates, Thread Cutters, Etc.

Write For Our 1913 Catalogue
It Is FREE For The Asking

THE CHAMPION BLOWER & FORGE COMPANY, Lancaster, Pa., U. S. A.

THE

BLACKSMITH AND WHEELWRIGHT

Vol. LXVIII. No. 3. NEW YORK, SEPTEMBER, 1913. TERMS: ONE DOLLAR A YEAR

BUILDING AND FITTING BODIES.

Various Styles for One Popular Make of Commercial Vehicle.

BY WAGON MAKER.

The conditions for fitting bodies to a chassis vary, as very few chassis are alike. In fact, the work calls for the use of individual judgment from beginning to end, otherwise it will not be satisfactorly when finished.

For the purposes of this article we use a popular make of a gasoline chassis, on which the tires may be either solid rubber or pneumatic and the wheels of wood, artillery type. The size of the solid tires is 34 by 3½ inches in front and 4 inches rear. The pneumatics are 36 by 5 inches front and back, with two extra inner tubes. The rear springs are 46 inches long, ten plates and 2½ inches wide. The width of the chassis is 34 inches over all, and straight from both sides. The length of wheel base is 8 feet 2 inches and length from rear of seat to rear end of chassis is 8 feet 6 inches. The top of the chassis is clear of any obstructions, except the gasoline tank around which the body is built. On this chassis the seat is not stationary. The utility and handiness of this seat is that it is made in two parts on which the upper part or seat is hinged to the lower part, and the lower part is hinged to the stationary part, so that there is a very easy and convenient way to inspect and to "get at" the machine. The width of track from centers of tires is 4 feet 10 inches.

While the above dimensions will be right on this chassis they may not when compared with other makes, but there is no other chassis to which it is easier to fit bodies than the one we illustrate.

As the length from rear of seat to rear of frame is 8 feet 6 inches, the body should not be any shorter but rather overlap the frame.

With Fig. 1, we illustrate a plain paneled wagon body, 8 feet 6 inches long and 46 inches wide, straight, vertically and lengthwise. Such a body can be fitted directly to the frame and bolted to it and it will be about 30 inches from the floor. As there are no obstructions on the chassis except the gasoline tank and the width of the body does not interfere with the fenders or tires, the body is easily fitted.

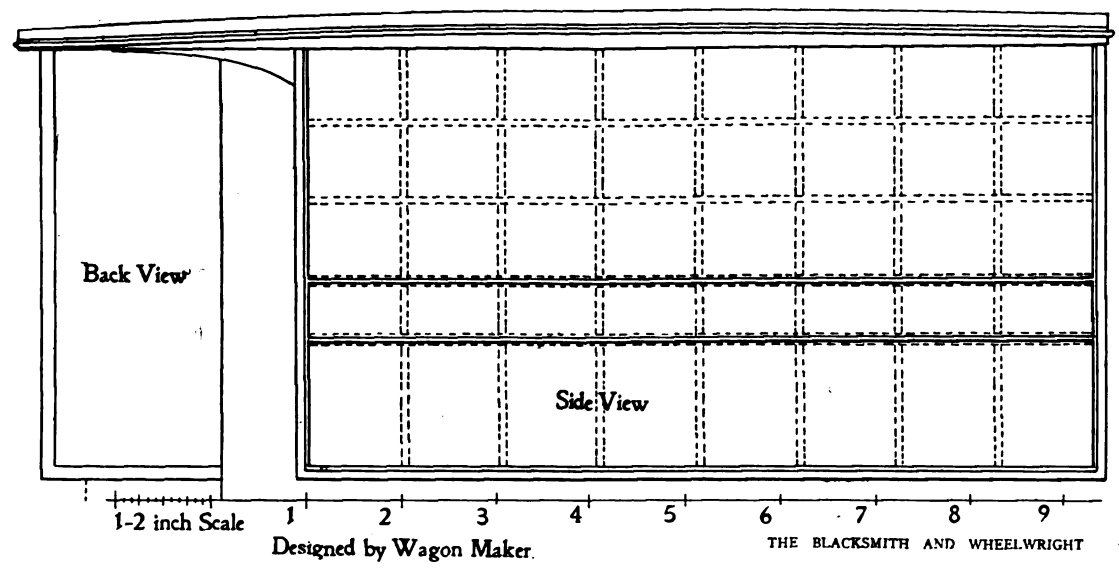


Fig. 1—A plain paneled business wagon body without gate and screen on the rear end.

If the owner wants the body somewhat above the chassis, it is raised with cross-bars or lengthwise risers. If the body is wide the cross-bars are preferred but when not over 48 inches and 2 inches turn under on each side, the lengthwise risers are preferable.

This body has 3 feet 6½ inches by 8 feet 6 inches floor space, is 4 feet 8 inches high at center of curve and the front of the top rails extend 35 inches from the front parts. The four end posts are 1½ by 2½ inches, on which the panels are rabbeted and joints are covered with the molding. The top rails are grooved ¼ inch deep for the side panels and the ¼ inch thick moldings are level with the top rail.

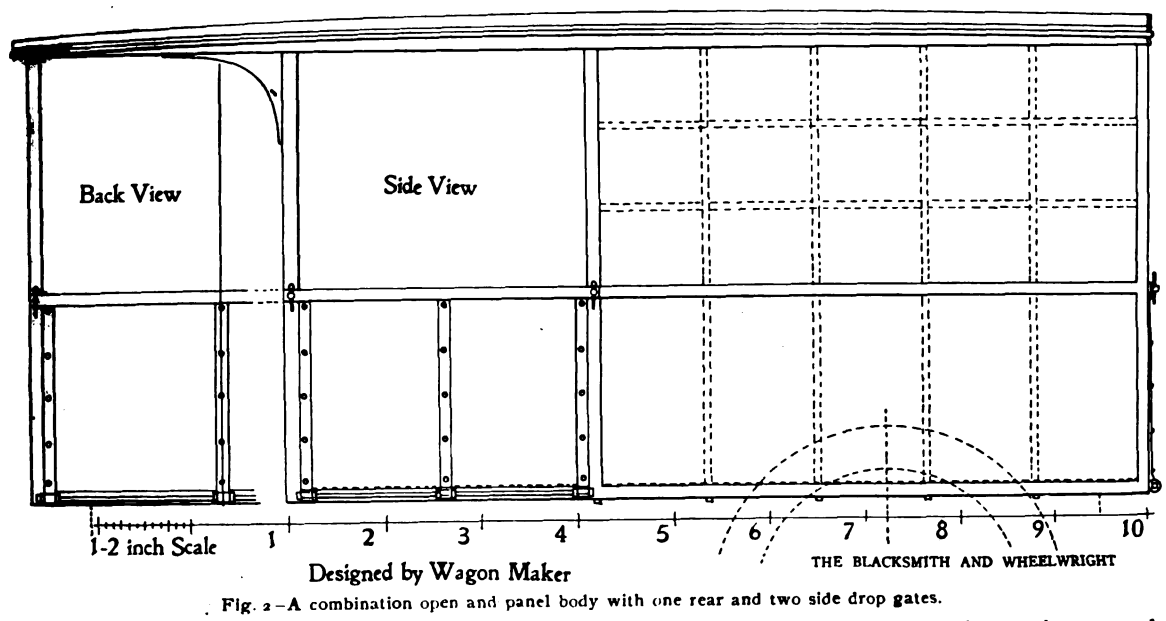


Fig. 2—A combination open and panel body with one rear and two side drop gates.

For a combination open and panel body with one rear and two side drop gates the width, Fig. 2, is 50 inches, and the length outside its posts is 9 feet. According to these dimensions there is only about 1½ inch playroom between tires and body, therefore a recess on both sides of the body is a necessity for a 4 foot 10 inch track center to center and 5 inch tires. Besides this there must be cross-bar risers 6 inches high to raise the body 6 inches above the chassis. The recess is just as deep as the posts are thick and the inside is covered with ⅛ inch thick sheet iron or sheet steel. The dotted circular lines on the side view shows the position of the wheel, the circular fender and the recess over which the fender is placed.

As the body is 9 feet long and the length of the chassis 8 feet 6 inches, there must be 6 inches overhang as shown by dotted lines on the rear end.

The construction of the body with drop gates is similar to the closed bodies. The loading space of this body is obtained by deducting 3¼ inches from 50 inches, which is the thickness of all the posts, and for length deduct the thickness of the rear drop gate from 9 feet. The size of the front corner posts are 1⅝ by 1¾ or 1⅞ inches; the rest of the four posts are 1⅝ by 2⅛

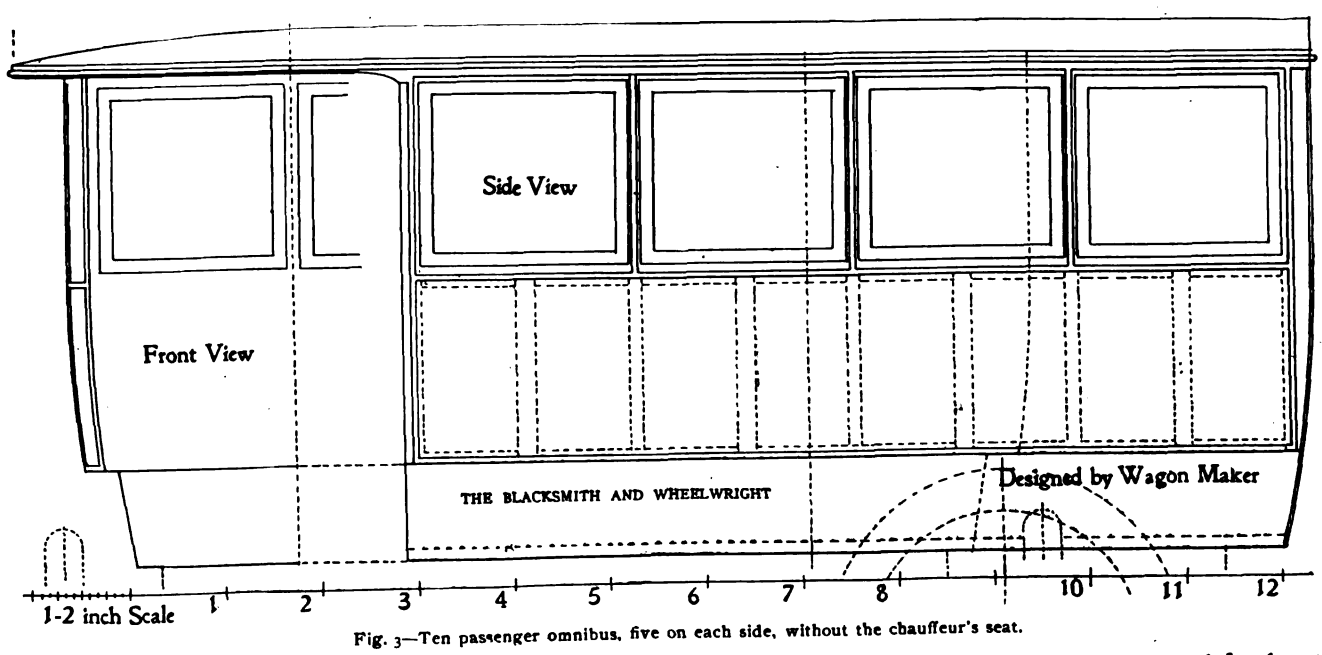


Fig. 3—Ten passenger omnibus, five on each side, without the chauffeur's seat.

or 2¼ inches. The inside posts, four on each side, are 1 inch square. If the moldings are ¼ inch and panels ⅜ inch thick, the inside surfaces of the inside posts will be level with the inside surfaces of the corner posts. The four rails, two on each side, above the belt line, are same size as the inside posts. The thickness of the top rail is 1¼ or 1⅜ inches, the front cross-rail the same and the rear cross-rail is 1½ inches thick. The size of the sills for thickness is from 1½ to 2 inches and across from 3½ to 6 inches.

Fig. 3 illustrates a ten-passenger omnibus, five on each side, without the chauffeur's seat. The peculiarity of construction of an omnibus is a great advantage in fitting the same to a chassis, because the seating capacity is on the side of the body and therefore can be narrowed down to 40 inches or less across the bottom of the sills, and not affecting the leg room in the least, which can be seen at the front view. The width across the chassis is 34 inches and the recess 3 inches on each side on the sill. This amount of recess could be reduced to 2 inches without interfering with the leg room nor its solidity or carrying capacity.

The width across the top rail is 56 inches. The amount of turn under on each side is 2 inches; amount of recess 4 inches each side, making these cross widths 52 and 44 inches. The elbow room in this body is 9 feet, divided in five parts making somewhat over 21 inches, which is considered a full size seat. The outside length is 9 feet 6 inches from post to post, and the length of the top from front post is 4 feet, extending somewhat over the wind shield.

In fitting this body to the chassis no cross-bars nor risers are needed and when used for public use 30 inches from the road to the bottom of the body is a very convenient height to step in or out. The advantage is also with the length of the body. A 9 foot 6 inch long body for 10 persons inside is a long one, but the weight of the ten passengers is well distributed on the four wheels and not a great deal of overhang is back of the rear wheels. On this bus there is 8 inches overhang back of the chassis and 4 inches turn under, making the overhang on top rail rear of the chassis 12 inches. The length of the body is divided in four parts, that is, four windows to drop on each side level with the fence rail, dropping down to the recess, or the height of the seat.

Fig. 4 illustrates a three-seat sight-seeing motor car without the chauffeur's seat, fitted with extension top. This body is designed to suit the length of the chassis from the back of seat to center of rear wheels to balance the two rear wheels on each side. Note the rear wheels which are directly between the two doors, which is a great advantage. The space between the two front seats is 35 inches, which gives comfortable seating room, but the space on the rear seat is 38 inches, or 3 inches longer. We give this seat 18 inches, with the addition of the trimming, 17 inches is left for the knee room, which is considered full size. For front seat there is more room than needed but there is the gasoline tank, as indicated by dotted lines. On this space another seat can be placed to seat three passengers, riding backwards. The back for these could be a double one trimmed on each side, serving the chauffeur and the three passengers. Suppose there are three passengrs for each seat, including the one over the gasoline tank; it would make 12 passengers. If we seat four or five on each seat, there would be 16 or 20 passengers. The advantage of the carrying capacity is in the width of the body. This body is calculated to seat four passengers for each seat or a space of 15 inches for each.

The risers on this body must be from 8 to 9 inches high, and besides there must be a recess as shown in the dotted lines on the back view, which is just sufficient space between tires and body and not cutting into the sill. If built for five passengers on each seat the body must be built without doors and the seat must be outside of the body line to obtain the necessary width.

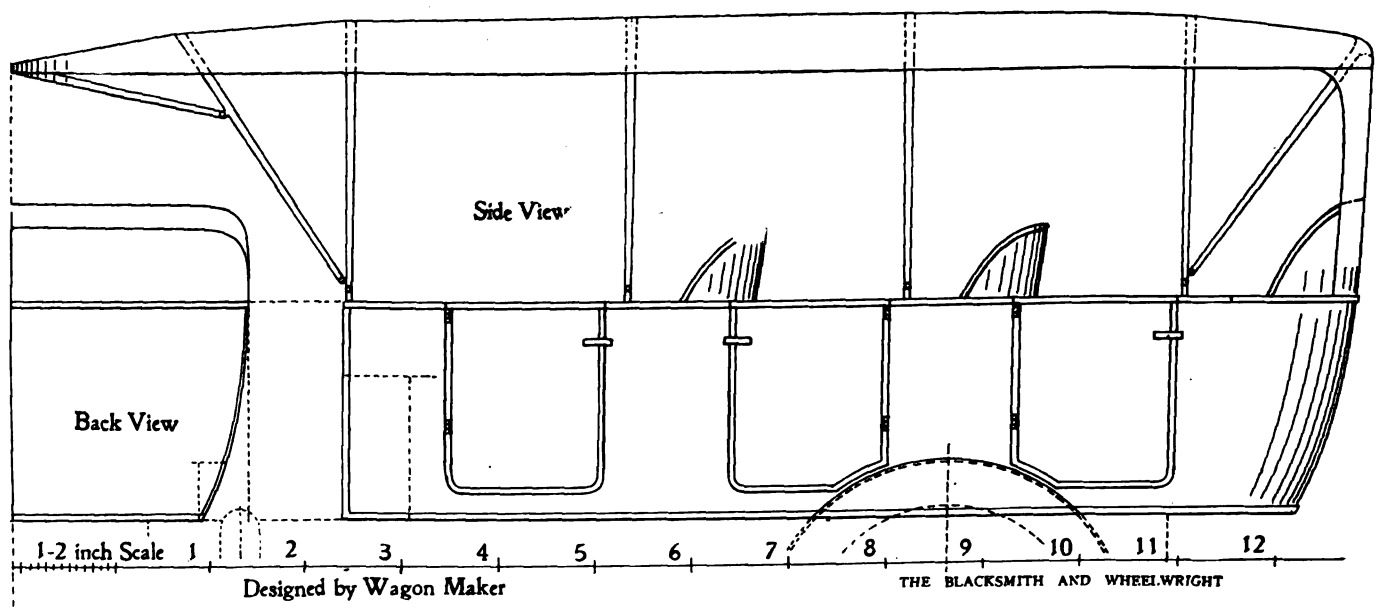
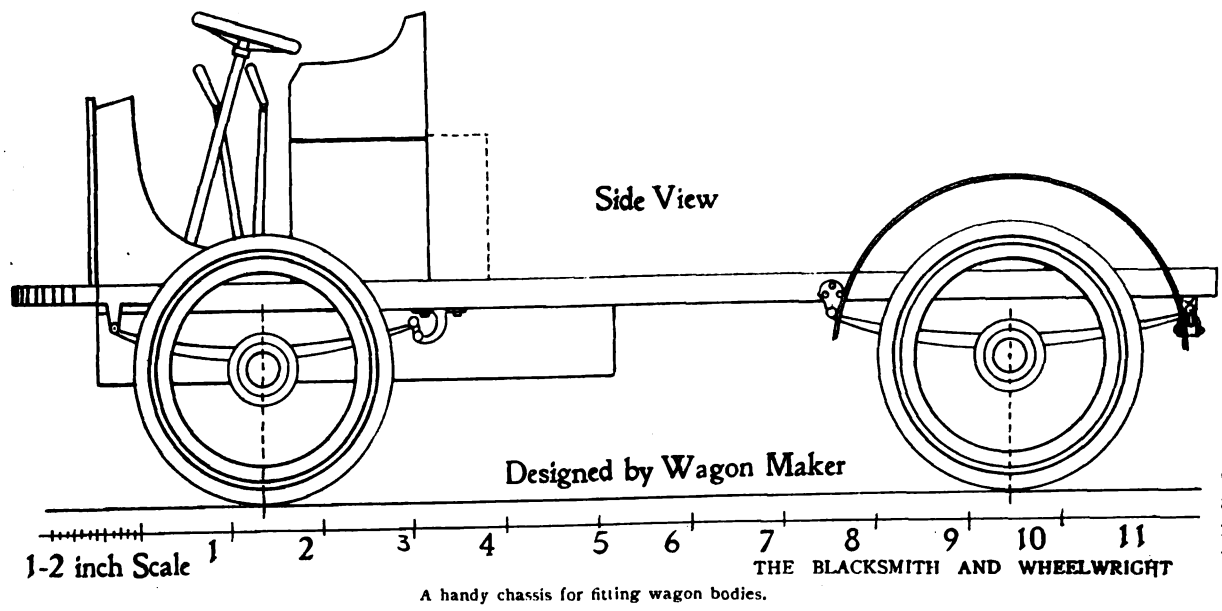


Fig. 4—Three seat sight-seeing motor car without the chauffeur's seat, fitted with extension top.



A handy chassis for fitting wagon bodies.

"I had a watchmaker once," said the head of the watchmaking department in a large jewelry store, "who thought he knew so much about his business that he didn't need his trade paper. I eventually let him go. Though I have been a watchmaker for twenty years I do not dare let a single issue go by without careful examination, for fear I may miss something of value to me."

It is a whole lot easier for an experienced man to sit down and make ten rules or commandments for the care of a machine or the doing of a certain kind of work, than it is for him to always follow the rules himself.

GLANDERS AND ITS CONTROL.

From a Paper by C. E. Cotton, V. M. D., Before the National Owners' Convention.

Glanders is a contagious disease of horses, cats, lions, tigers, camels, man, and rarely dogs. Its possible transmission from the horse to man renders its eradication as important to human as to veterinary medicine. It has been known since four hundred years before the birth of Christ. The fact that it is transmitted by one animal to another was known in the fourth century, and in the seventeenth and eighteenth centuries it was recognized as an infectious disease. In 1784, the French government enacted stringent police laws for the prevention of the spread of the disease. At this time it was known that glanders or the nasal form and farcy or the skin form were identical.

Glanders has appeared and occurs in practically every country inhabited by the horse, with the exception of the islands of Australia, New Zealand and Iceland, where it has has been kept from gaining admission by rigid quarantine and inspection of all imported horses. In all the European countries it is very prevalent, particularly in Russia, where four per cent of all horses are infected and over ten thousand are officially destroyed annually.

It is widely distributed over our own continent and there is no section where horses are found entirely free from the disease.

In the western part of the United States and Canada it is more or less prevalent, but not so much as in the larger cities of the East, where conditions are more favorable for its spread.

Writers claim that the disease has been noticed to have increased in prevalence after great wars, this being particularly true after the close of our Civil, Mexican and Spanish-American wars, when it was carried to many districts, previously free from it, by diseased horses and mules. New York veterinarians claim that the disease increased to an alarming extent in their city immediately after the Spanish-American war and to-day it is their greatest scourge and they are at a loss to know how to control it, with the means at their disposal. Chicago, and to a less extent Kansas City, are also badly infected, and as both of these cities are large horse markets, naturally they are the source of spreading it to wide districts, covering the surrounding States.

Cause of Glanders.

The cause of this disease is due to the growth in the animal of a certain germ, the same as diphtheria and typhoid fever in man are due to the growth in the body of certain specific germs. The germ of glanders is a microscopic organism of vegetable origin—called the Bacillus Mallei. This germ gains entrance into the animal body through the mouth and digestive tract by the ingestion of food or water, contaminated with the infected nasal discharges and the secretions of skin ulcers of a diseased animal. The food and water is often contaminated by the virus being coughed up out of the lungs and lower respiratory passages and by the urine and manure of infected animals, even when they show no external signs of the disease. Accordingly the disease is most apt to spread when healthy horses feed from the same manger or drink from the same trough to which glandered

horses have access. Infection rarely takes place through the uninjured membranes of the nose, mouth or respiratory organs or through the skin, unless it is wounded or broken.

The glanders germ, after entering the mouth, passes through the stomach into the intestines, from which it is absorbed into the blood, as food is, and carried to the lungs or other favorable developing ground, where it continues to grow and produce the disease.

Destroying Agents.

The germ of glanders, when outside of the animal body possesses only slight powers of resistance to the influence of external agents; sunlight will destroy them in twenty-four hours. In damp places and decomposing substances they retain their vitality for fifteen to thirty days only. Carbolic acid in three to five per cent solution destroys them in five minutes; one to five thousand solution of bichloride of mercury destroys them in two minutes; ten per cent solution of chloride of lime destroys them quickly. They will, however, resist extreme cold.

The public watering trough, blacksmith shop, feeding stables, and hitching posts to which infected animals have had access, are the important communicating mediums for this disease.

Symptoms.

For years past it has been the custom to divide the symptoms of this disease into pulmonary, or that in which the lungs were affected, nasal and the skin form, farcy. It should always be borne in mind that these forms merge into each other and that the animal may show any or all of them at the same time. However, this affection usually begins in the lungs while the disease of the nose and skin are secondary and follow the lung lesion.

Pulmonary glanders develops very slowly; months may elapse before a horse that is affected with glanders in the lungs begins to show the first observable symptoms of lung trouble and these will be so slight that they will for a long time excite no suspicion of the glanderous nature of the trouble; in the meantime the horse in question may be the source from which other animals have become infected with the disease. In some cases your attention is attracted to the animal by sudden bleeding at the nose or he may discharge bloody mucus, following a coughing spell.

The first symptoms are generally a "run-down condition," and a dull, dry cough. This condition generally continues for some time or if animal is subjected to hard work or poor care, it is gradually aggravated. Breathing becomes labored, the temperature at times is high; moist sounds can be heard over the trachea or windpipe, and there is often a noise in breathing showing some obstruction or swelling in the lining membrane of the upper air passages. After these symptoms have existed for some time the more characteristic lesions of glanders make their appearance, either on the membrane of the nose or on the skin or in both regions; previous to this a dropsical, painless swelling of the sheath or udder and of the lower part of limbs may be seen, which may disappear and then reappear from time to time.

Nasal glanders begins with slight symptoms of catarrh. The lining membranes of nose are reddened and there is a slight watery discharge, generally from one side, but it may be from both. This discharge later becomes thick, more copious and purulent, or it may consist of a mixture of a greenish-yellow watery material with white masses resembling coagulated white of an egg; oftentimes there are streaks of blood. The discharge sticks to the wings of the nostrils and forms dry crusts. After a time gray or yellowish nodules, the size of a hemp seed make their appearance in the lower part of the nose; these soon break down into small ulcers with sharply defined borders, which spread rapidly, run together and assume ragged outlines with raised borders and a greasy base. The lymph glands between the lower jaws are always enlarged on the side of the affected nose. These enlargements are at first soft, painful and indefinitely outlined, much the same as in distemper, but later they become painless, firm and knotty like a bunch of grapes. In the beginning they are movable, but soon become firmly united with the bone, surrounding skin and tissues. In rare cases these enlargements break and discharge a sticky, yellowish, purulent material and then gradually heal. Oftentimes the eye on the affected side shows a catarrhal inflammation.

Cutaneous glanders, or so-called farcy, may develop in the skin or in the connective tissue immediately under the skin. The skin nodules, the size of a pea or bean, soon break open and form typical ulcers. The nodules in the tissue immediately under the skin usually appear on the legs, on the sides of chest and under the abdomen; they become the size of a walnut, are not painful, and later, after becoming adherent to the skin, break and discharge a sticky, yellowish-gray and sometimes reddish pus, later forming the crateriform ulcer, with grayish-red, easily bleeding borders and greasy bottoms. Dropsical swellings on the abdomen and of the affected limbs follow—often the hind limb will be so large as to interfere with movement of the animal and the tense skin shows the nodes and ulcers.

Course.

The course of this disease is variable, extending over a few weeks or over several years. Cases have been traced back for a period of seven years. At times during its course the disease seems to be excited and the diseased conditions are increased; new nodules form, break and become ulcers. Later the symptoms subside, the ulcers will heal and animal will again pick up in flesh and appear apparently well. Any acute affection or sickness such as distemper will excite the disease and hurry its development. The disease develops more rapidly in animals that are poorly nourished and those that are subjected to hard work.

In some cases in which the lesions of glanders are very small and conditions are favorable, apparently complete recovery takes place. We have records of cases which have reacted to the mallein test and later made apparent recoveries. Recovery should never be counted on, however, in undertaking to eliminate the disease, as oftentimes one disease process may heal while new acute lesions develop in other parts of the body.

Diagnosis.

Because of the fact that the clinical symptoms do not appear until the disease is well advanced, the positive diagnosis of glanders unless the nodules, ulcers and enlarged lymph glands are present, was a difficult task until the early nineties, when the use of mallein as a diagnostic agent was discovered. We now have various other blood tests for the detection of the disease in horses, all of which have their champions among our scientists, and they are proving of practical value when used as a check and as an adjunct to the mallein test.

The value of mallein as a diagnostic agent by the practical experience of the last two decades, has been confirmed. It is an extremely delicate and reliable test and when administered properly and intelligently, is absolutely reliable for the diagnosis of glanders.

Control and Eliminatien.

We can abolish glanders, and, in fact, all infectious diseases of man and animals, only by killing off the germs that cause them. You will perhaps come back and state that is impossible; that germs are everywhere and that they are so tiny that they cannot be found. It is true that germs are everywhere, but not disease germs, not the germ of glanders. There are some fifteen hundred germs that are known; but hardly fifty of these produce disease, and only one produces glanders.

It is true the germs are very small and cannot be slaughtered individually, but they can be slaughtered by the billions, in one operation, if they are only kept together in the animal body.

Outbreaks of yellow fever, typhoid fever, smallpox and diphtheria in the human family have been controlled and stamped out by destroying the germs and the carriers of the germ. Our government officials succeeded in stamping out contagious pleuro-pneumonia of cattle some years ago, when it was imported from Europe and threatened to ruin the cattle industry of this country; they have twice succeeded in stamping out the dreaded foot and mouth disease of cattle; they are ever on the alert and have prevented other infectious diseases of animals gaining entrance into this country by quarantining and destroying the carriers and harborers of the germs that produce these diseases.

The germ that produces glanders is present only in the bodies of a comparatively few horses and when it escapes from these bodies, where alone it finds the proper food, high temperature and moisture which it needs, it dies very quickly or becomes harmless.

Legislation Needed.

Our people do not hesitate to spend millions of dollars annually to increase and improve our waterways and highways for the benefit of commerce, nor to build beautiful parks for the recreation of our populace; then why should they not be willing to spend the necessary money to destroy the harborers of these tiny germs which produce our scourges, destroy the lives of our dear ones, and deplete our finances? It would require comparatively very little money for our various State governments to buy, pay full value for and destroy every horse in their respective States, that harbors the germs of glanders.

The result of the work of the government officials of the Dominion of Canada, where for the past nine years they have destroyed and paid for all glandered animals and where they have succeeded in practically stamping out the disease, and the result of our work in Minnesota, is in my opinion, sufficient evidence that the only efficient method of stamping out this disease is to destroy all clinical cases, test all exposed animals, destroying the reactors, and later retesting all the exposed ones and destroying the reactors together with a through disinfection of the stables, watering troughs and harness; the burning of all brushes, combs and cleaning utensils, and the removal of all refuse and manure from the stables and surroundings. There should be protection against the importation of diseased animals into the State, and the Federal government should require that before any horses are moved into a State, they should be tested for the disease. The owners of diseased animals should be remunerated to the extent of their full value.

Canadian Campaign.

The government of Canada in 1904 undertook the elimination of glanders. The first two years they spent $200,000 annually to carry on the work and for the payment for slaughtered animals; this has gradually been reduced until at present they are spending only $50,000 annually and according to Dr. Rutherford, the former Veterinary Director General of Canada, "glanders is now a negligible factor," except in one province where the provincial authorities were in control up to a short period ago.

The principal trouble in Canada at present, is the watching of the border line of the United States to prevent importation of glandered animals.

Our work in Minnesota was handicapped until 1905, by lack of funds to carry on the work and to remnuerate the owners of glandered animals. During that year our legislature granted us a small remuneration, viz.—an appraisal limited to $75 for each animal, the owner receiving three-fourths therof. I am happy to report that our last legislature increased this appraisal to $150 for each animal.

Work in Minnesota.

I will undertake to give only a short history of our work in this State—with a few tables showing the result of the work of our Live Stock Sanitary Board. One table shows the total number of animals destroyed for glanders throughout the State. The other chart shows the decrease in the number of cases of glanders in the cities of St. Paul and Minneapolis, since our board undertook the work.

During the past 11 months, from July 31, 1912, to June 30, 1913, we have destroyed 128, and have tested 8,000 horses.

In the Twin Cities.

Glanders was very prevalent in Minneapolis and St. Paul, from 1895 to 1907. It had been customary to kill over 100 horses yearly in Minneapolis, while St. Paul provided 50 annually.

Recognizing that the public drinking fountain for horses was dangerous, the board issued an order closing the same and suggested a faucet system which would require teamsters carrying a pail.

The cities obeyed the order, and you will notice a sudden drop for the year 1907, and a gradual decrease in the number of cases each year until the past two years, when we have had a slight increase; this can be accounted for by the very large increase in the number of animals tested and the rigid search for and the

exposure of the hidden cases and sources of infection.

In the course of our investigation it was found that the disease had been introduced among farmer's horses by animals that had worked in the lumber camps. Again, many lumber companies had been in the habit of selling their stock at the end of the logging season. This source of spread being recognized, our field veterinarians some seven years ago began a systematic inspection of all lumber camps in the State, making one or two inspections of each camp during the logging or winter season. The results of these inspections were appalling in some cases. In many cases a number of horses hired from other states were found diseased and were slaughtered.

"Glanders Clause" in Contracts.

In one case no less than 20 horses owned by a non-resident, who had hired them to a lumber company, were found affected with glanders soon after arrival in our State. The loss to the lumber companies in some cases was quite large as they were required to reimburse owners for the animals killed. To guard against this contingency, many companies who annually hired horses were induced to insert in their contracts a provision requiring animals to be tested. In this way diseased animals were excluded and considerable loss avoided.

BUSHING PULLEYS.

The Wrong Way and the Right and Something About the Use of Shims.

BY JAMES F. HOBART, M. E.

Changes in machines frequently require change of driving pulleys, either on line-shafts or on counters and frequently pulleys are found about a shop which would answer the purpose save that the bore of the hub was too large for the new shaft. Often, pulleys thus unusable may be used by bushing the bore to fit the new shaft. The usual way of so doing is to send the pulley to the nearest machine shop and then wait the machine man's sweet pleasure for the pulley —and a bill several sizes too large for the job!

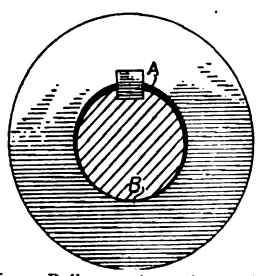


Fig. 1—Pulley too large for Shaft.

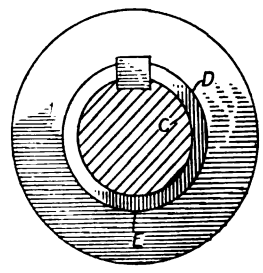


Fig. 2—Properly Bushed Hub.

It frequently is the case that a pulley can be made to answer the purpose without sending it to the shop. One way which occasionally is employed, but which should always be discouraged by the owner and the user, is to put the pulley upon its shaft without any bushing, but with a thick key, and let the pulley wobble around as it pleases. Such practice is not good. It puts a good deal of stress upon the shaft which carries the pulley, and if it chances to be a high speed shaft, running 350 to 450 R. P. M., the centrifugal force of the unbalanced parts will make itself quickly felt, even if it does not actually lead to accident.

Fig. 1 shows a case of this kind, which happily is never followed when the pulley is bored more than 1/16 inch too large. Referring to Fig. 1, it will be noted that shaft and hub touch only at B, all the opening being on the other side of the hub, where the key chances to be located. And the key must be made over and given a thickness additional to its own thickness, equal to the amount the hub is bored too large for the shaft.

Fig. 2 shows a properly bushed hub, when the bore is only slightly larger than the shaft, and this matter will be discussed further as shown by Figs. 5 to 10, herewith. Meanwhile, Figs. 3 and 4 will illustrate two methods of fastening pulleys which require heavy bushings. Fig. 3 shows the quickest method, but like some other quickly done things that method is not as good as the way shown by Fig. 4, but both of these methods, as well as the thin bushing scheme, Fig. 2, all demand that regular bushings be bored to fit the shaft, then turned in a lathe to fit inside the hub to be bushed. The following sketches, from 5 to 10, illustrate a pretty good method for bushing pulleys without the use of a lathe. But this method can only be used when the bushings are quite thin (1/32 to 1/16 inch), which seems about the limit for this method, though the writer has in cases of necessity, bushed pulleys by this method which were ⅜ inch too large for their shafts.

But the bushings shown by Figs. 3 and 4—these bushings are turned and bored exactly alike—are only different in the keyway, and this difference is all there is between a poor job and a good one. Fig. 3 shows a thick bushing which has been cut clear across to let the key reach from hub to shaft. It is the great depth of the key which constitutes the weakness of this method of bushing. A key to best resist turning stress should be nearly square—the width and depth should be nearly equal. This causes the

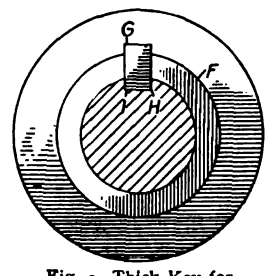


Fig. 3—Thick Key for Wide Bushing.

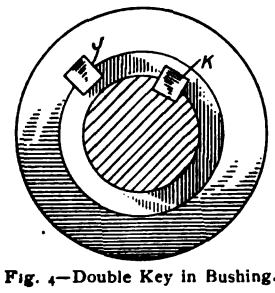


Fig. 4—Double Key in Bushing.

stress to be pretty evenly divided between vertical and lateral stress, but when the key is so very deep and narrow, as in Fig. 3, then the lateral stress becomes very much greater than the vertical stress—so much so that the key rocks and digs into the shaft and pulley hub, making the most of every bit of lost motion to burst the hub, batter the key and to deface the keyway in the shaft. The leverage from G to I is opposed only by the short leverage from L to H, and like the long leverage with a crowbar, this form of key "has an awful lift," as the Irishman aptly put the matter.

The proper way to fasten a bushing of this kind is shown by Fig. 4, the bushing having two keyways cut in it, one at J, the other at K, and two keys fitted properly therein will hold the bushing forever, without danger of defacing either key or keyway. Referring again to Fig. 3, should there be a slight looseness at F, the thick key, swinging from G to L, will get in its work to rock the key in spite of all that can be done, and the constant rocking can only have one result—the fit of the key is destroyed and the hub gets loose on the shaft.

The same thing can take place at D, Fig. 2, but as the bushing is very thin, the extra thickness of the key is negligible, and a thicker key answers the purpose satisfactorily. But don't try to save a little of the machinist's time by having him put in a key, as shown by Fig. 3 Such practice is bad, and never proves satisfactory unless the bushing has been fitted better than is usually done, unless, indeed, the bushing has been made a force fit on the shaft and also in the hub, and even then, the thick key cannot be trusted in an emergency.

The method of preparing bushings without the use of the lathe is sometimes called "shimming." This may be a pretty good name for the process, still the writer much prefers to call it "shim-bushing," and thus the process will be known in the following paragraphs.

Fig. 5 shows an example of poor shim-bushing which should always be avoided. In this example, a narrow strip of thin metal is bent to fit the shaft and placed inside the hub, opposite the key. Then the hub is gently placed in position, taking care not to dislodge the narrow shim, after which the key is driven and the pulley is put to its work.

This method is very bad for the reason that the shim-bushing does not back up or support the key at all. It really gives the shaft a two-point bearing—one from L to M, the other at key N—and under heavy work I will defy anybody to keep a pulley tight which is thus fitted to the shaft. It will "work" and "crawl" in spite of all that can be done, and it is this way of fitting shim-bushings which has brought this excellent method into disrepute.

Fig. 4 shows a job of shim-bushing as it should be done, and executed in this manner it will give as good satisfaction and last equally long as the turned bushing methods shown elsewhere in this article. But bushings of this class, in order to give service, must have the thin metal very carefully selected. That is the whole secret of the matter. Procure a sheet of tin, black sheet iron, sheet steel, or almost any other metal, which is of the exact thickness required to fill between shaft and hub, and if inserted according to the following directions, a good and serviceable job will surely result, but if the metal is too thin, it is impossible to do a good job, no matter how great the skill of the workman, therefore, measure the diameter of shaft and of hub-bore very carefully indeed, and select the shimming sheet so that it is about 2/1000 of an inch thinner than half the difference in diameter, found as above.

Fig. 7 shows a shim-bushing improperly made. As described and shown by Fig. 5, the shim fitting only a small space opposite the key, the distance, R S, corresponding to width of shim, L M, in Fig. 5. A shim-bushing properly made is shown by Fig. 8, the edges, T U, coming snugly against the key as shown by Fig. 6, at P and Q. In forming a bushing of this kind, it is well to roll it up if possible, in a set of tinner's bending rolls, but when this is impossible, as is usually the case, the thin metal may be bent around a shaft, usually by the bare hands, but a mallet is often necessary for bending the edges, T U, into place.

Be sure to form the bushing on a shaft a little smaller than the one it is to fit when finished, for it is impossible to bend the metal down to exact size and have it stay there. Use a smaller shaft and have the shaft just small enough so that the spring of the sheet, away from the shaft after bending, shall bring it to the exact size necessary to fit in the hub to be bushed.

A little care is necessary in bending the shim-bushing, to make the ends come even, as shown at T U, Fig. 8. Unless care is taken, the edges will offset each other a bit, or lie "skewing," as shown by Fig. 9, where, instead of coming flush with each other, the edges, V W, are from 1/16 to ⅛ inch offset. This is because the thin sheet was not started evenly when the bending commenced. Instead of starting along a whole side, a corner was bent first, and the resulting offset was the result. Bushings thus bent can sometimes be brought back to proper shape, but frequently they are spoiled during the attempt and it is very much better to always start the bending fair, then it will come out true and even as shown by Fig. 8.

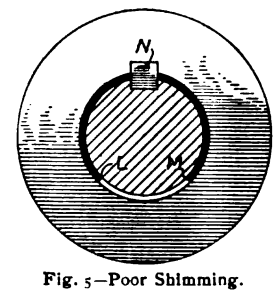


Fig. 5—Poor Shimming.

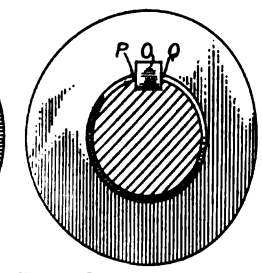


Fig. 6—Good Job of Shimming.

Having made a shim-bushing to suit all requirements, the next thing is to put it in place between shaft and hub, and here, many and many a good shim-bushing has been spoiled, and many more will be spoiled in the same manner. It usually is found that if the bushing be put into the hub, it will be pushed out by the shaft, particularly if there chance to be a little burr or roughness at the end of the shaft where it was cut off. The person unacquainted with putting a bushing of this kind in place is sure due for trouble the first time he tries it, but let him do as shown by Fig. 10 and he will soon learn the knack.

As shown by Fig. 10, place the bushing part way through the hub, then insert the shaft, and with a twisting, pushing motion, work the shaft into the hub as far as it is to go. If it is found that the bushing will go too far, then pull the shaft out and start over again, with the bushing inserted a less distance than before.

On the contrary, if the bushing seems to be falling behind, begin again with the bushing farther advanced in the hub. A little practice will enable a man to set the bushing about right after a trial or two, also to so set the bushing that it will go into position with the key-way in the right place.

Dirt in the Shop.

During a recent country trip, a slight accident made it necessary to stop at a roadside smith shop to borrow a screwdriver for a few minutes. The request was granted with alacrity by the smith, but we didn't get the screwdriver. The smith stopped his work to hunt for it, the assistant also hunted and the man from the second

forge also joined in the search, but no screwdriver was forthcoming!

The work-bench was covered fully two inches deep with tools, bolts, nuts and pieces of wagons and scrap iron. I never before saw such a litter on any work bench in my life! "I don't see where that screwdriver is," said the smith; "there's three of them around here somewhere!" I gave one more look at the cluttered bench, at the man trying to work there, and picked up a fragment of hoe-blade in front of the shop, used the blade to turn the screw and proceeded on my way.

The greasy wipe-rag, piles of junk or of supplies, in corners, and similar articles on shop

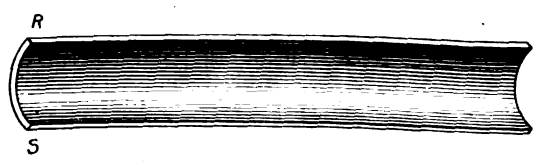


Fig. 7—Shim Improperly Made.

floors are evidences of dry-rot and inefficiency. Shops containing such incriminating bits of evidence are never up to date. They are managed by incompetent men or by those who have so lost interest in their work that the shop is not paying as it should.

No man can do his best work when surrounded by dirt—and dirt is only "matter in the wrong place"—therefore to get the best results, both from men and from factory inspectors, the shop must be kept clean! It is all right to keep a man on the go all the time, picking up things and putting them where they belong. In some jobbing shops, such a scavenger is in a measure necessary, but a good deal of the throwing things down can be prevented by the vigorous

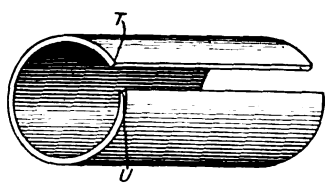


Fig. 8—Properly Made Shim.

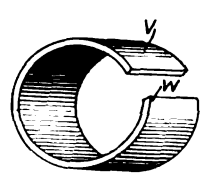


Fig. 9—Shim bent "skewing."

application of a little plain English by the foreman.

As an example: There is no need for a man to get a bar of steel from the rack and saw off 12 inches and throw the rest of the bar on the floor beside his vise. The man can be taught better than this. If he can't, then let him go to shoveling coal instead of trying to work in the shop. But there is another man as much to blame as the man who cut off and threw down the key-steel. In that case, the man to blame is the shop owner, or whoever the "man higher up" may have been.

It was the business—or should have been the business—of that man to have so arranged

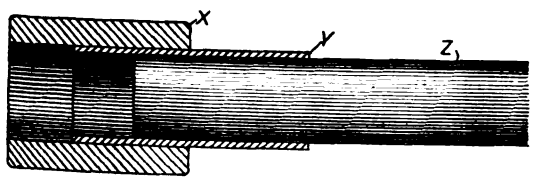


Fig. 10—Inserting a Shim Bushing.

things ahead so that a 17-cent boy should have cut off the 12 inches of steel required and brought it to the 40-cent mechanic, instead of that high-priced man having to leave his work and go after the steel.

It is the same with all the rest of the "dirt" which all too often is to be found under foot. If the owner and shop foreman do their duty, there never will be any greasy wipe rags thrown down in corners to become danger spots for spontaneous combustion.

And so with all dirt. When I find a dirty, cluttered-up shop I know where to look for the cause of it—not to the men, but to the owner, foreman, or whoever is responsible for the management of the shop.

Moral—A good manager always has a clean shop.

Storage batteries should fit or be held tightly in their box and all connections made secure. Sheet rubber is a good material for packing batteries. It deadens the vibrations and is a non-conductor of electrical currents.

Be always ready to show the other fellow, just as you would desire him to show you were your positions reversed.

NEWLY VARNISHED VEHICLES.

Preserving the Finish—Practical Data on An Important Subject.

From M. C. Hillick, Pennsylvania.—During the next two or three months the finish on the automobile or other vehicle should have especial attention. The newly varnished vehicle will need frequent water baths. These, during the heat of summer, should be given in the shade and never in the bright sunlight. The water should be clean and cool. The manner of washing a carriage or car has probably been described before in these columns, but this much is pertinent at this time: Use plenty of water, but never from a hose at strong pressure. A gentle flow of water is all sufficient. Soften up all the accumulations and under an easy flow of water let as much of the dirt as possible run away. After proceeding to get the surface as clean as it can be washed with the hose alone, take a soft, fleece wool sponge and, using plenty of water, give the surface a very thorough sponge bath, cleaning off all the sediment and fine dirt. When the water becomes stained change to a clean supply at once, thus insuring a clean surface. Complete the washing operation by going over the surface with a fine rinsing volume of water. Dry off lightly with a nice, lint-free wash leather. Do not attempt to rub the surface with the leather under the impression that all the water drops and moisture must be removed, for no such need exists. Catch off the bulk of the water adhering to the surface with the leather, leaving the mist and water drops to dissipate. Use the wash leather as sparingly as possible on the finished surface. The varnish will be all the better for it, and have a richer, deeper lustre.

Concerning the storage of the automobile or carriage when not in use, practically every owner is a law unto himself. However, this much we may rest assured of: Fairly light quarters, if possible, should be had. The greater the volume of light from the north will result in lighter maintenance cost. Ventilation is a factor that must not be overlooked. Good ventilation should be arranged for in every garage. Good, pure air keeps the lustre of the varnish full and fine, and adds to its life, as every varnish maker and every chemist specializing in paint and varnish supplies will tell you.

Pure, soft, clean water will sharpen the brilliancy of varnish up to a certain stage of wear, and the frequent water baths will develop its wearing properties, but when the gloss of the varnish refuses to respond to the treatment here advised, something more substantial is in order.

This after treatment comes in the form of renovators, cleaners, polishes and go on, some of which are very good and some very bad. Whatever is applied to the varnished surface should contain something to feed and nourish the varnish—give it renewed force and vitality, in fact—and while, of course, it may not, and probably will not, restore the lost lustre, it will give it suppleness and delay the day of re-varnishing to the maximum limit.

Anything applied to the surface of varnish to better its condition and lengthen its days of service should be in the nature of a non-drying material. For example, raw linseed oil is a drying oil, and under no circumstances should it be used as a renewer or polisher for the automobile finish. Best of all, perhaps, is the material which when applied and wiped up today remains in condition to be wiped again another day. Such a medium which cannot be wiped actually dry, although the surface to the eye may so appear, gives the varnish something to feed upon and permits re-wiping when the carriage returns after a trip over the road. Varnish renovators and renewers, etc., are necessary and useful mediums to be employed in the upkeep of the finished surface, but they should be used discreetly and their quality should be above reproach.

Some varnishes respond promptly, and for a long term of service, to the effects of the renewing or renovating medium, while others go to a swift decline, once started on the way, despite the best available treatment with the renewing medium. These latter varnishes are usually devoid of the necessary elasticity or oily nature, and consequently reach the high tide of wear early in life, whereas the varnish containing a high precentage of elasticity has enough of the oil in its composition to respond again and again, and so on through many days, to the renewing and re-vitalizing material.

Occasionally the vehicle becomes saturated with grease and oily substances to such an extent that it becomes necessary to remove this foreign matter before proceeding to apply the renewing material. In all such cases make a scuttle of suds of castile soap, or of some equally harmless soap, and after flicking the grease off with a spray of turpentine, wash off carefully with the soap solution, following at once with an application of the renewing material.

The main thing to be observed is the essential need of painstaking methods of cleaning and renewing the finish. This finish is by nature sensitive, and to produce it has cost a formidable sum of money. Whatever, therefore, is applied to it to increase its efficiency and improve its appearance should in the strictest sense of the term be both suitable and especially adapted to the surface.

An expensive vehicle should under no circumstances be stored or quartered in any stable or barn, or in quarters adjacent to such premises, for any length of time. Ammonia fumes are almost always present in and about such surroundings, and ammonia is fatal to the life of any varnish.

ALL OUGHT TO KNOW.

And Probably Every Good Workman Does Know This.

Joseph Berg in the Manual Training Magazine undertakes to tell what a boy ought to know after leaving the manual training department of a school. Here is what Mr. Berg says the properly informed mechanic should know:

How to read a rule (not ruler).

How to add and subtract fractions of an inch.

That sandpaper is graded numerically, the average being No. 1.

The correct method of tearing sandpaper.

That a block should be used when sanding flat unfinished surfaces.

That sandpaper should be torn into rectangular pieces to fit block.

That a sandpaper block should always be of soft wood.

That no sanding should be done until all tool work is finished.

That worn sandpaper becomes useful later.

To call a bit by name and size.

That a bit is not a bore.

That a bit is not a drill.

That the figure "9" on a bit means 9-16 inch, not No. 9.

That a brace is not an "auger" or "borer."

That bits should never be filed on outside.

That bits should never be filed by pupils.

That direction should not be reversed when drawing out bit.

That a properly filed bit needs little pressure.

That holes are generally measured center to center.

That the use of a file be avoided wherever possible.

That a file when used cuts only one way.

That grinding without water heats to a blue and destroys temper.

That "sharpen" does not mean "grind."

Never use center of oilstone or grindstone for narrow tools.

That flat side of plane blade or chisel should never be ground.

That flat side of plane blade or chisel should never be raised when whetting.

To lay the plane on its side to avoid dulling blade and cutting bench.

That the cap iron, for benchwork, should be set about 1-16 inch from edge.

That a modern iron jack-plane is not a scrub-plane, as the old-fashioned wooden one was.

That the plane should not be held diagonally, except when cutting across the grain.

That good work is impossible with dull tools.

That scraper should be reserved for curly grained wood.

How a rip-saw differs from a cross-cut saw.

That the number on a saw indicates number of teeth per inch.

That a rip-saw is not always numbered 8 and a crosscut-saw, 10.

That the back-saw be reserved for close work.

That it is necessary to have a line squared across two adjacent faces to cut off square.

That no time or labor is saved by sawing around the piece.

That a large chisel will do better work than a small one.

That chiseling across the grain is possible and correct in many cases.

That a mallet should not be used except for heavy duty.

To watch the chisel edge, not the handle, when using mallet.

That mallet or hammer should be held one-third the handle length from end.

That a bevel should not be called a "bevel square."

That gauge and square are useless if not used properly.

That they should be held firmly against the work when testing or gauging.

That the gauge point should be filed like a knife edge and should actually cut a line.

That the gauge point should not project beyond 1-16 inch.

That the gauge should be tilted slightly in direction of motion.

That a screwdriver should never be sharpened like a wedge.

How to determine size of nail or screw.

That "12 D" means 12 penny and is about 3½ inches long, etc.

That screws have a gauge (diameter) as well as length.

That screws should never be driven without first boring through top piece.

That size of bit is determined by gauge of screw.

What "toe-nailing" means.

That a nailset is not a punch.

That a handscrew is not a clamp.

How to adjust a handscrew.

That a vise will hold the work without placing entire weight on handle.

That Le Page's glue is only one kind of glue.

That "the more glue, the stronger," is a mistaken idea.

That a loose joint with much glue is weaker than a tight one with less glue.

That a thick glue is worse than none.

That shellac does not dry in half an hour as is generally believed, it merely sets.

That shellac must be thin and applied quickly.

That wood filler is not intended to fill bad joints and ruts on surface.

That "Sawdust and Glue" is a poor workman's motto.

WHEEL MAKING.

An Old Mechanic Who Claims It Is Fast Becoming a Lost Art.

An "Old Mechanic," in a recent issue of the Carriage Monthly, contributes a few pointers on wheelmaking, in order, he says, that the next generation will not know how carriage wheels were made twenty-five to fifty years ago. He writes:

"It was my practice to examine every set of spokes for each set of wheels carefully. If some had sprung a trifle, but not enough to make them unfit, I used them for the front wheels. Do not attempt to straighten a badly sprung spoke, that is, one of the best quality, either by steaming or by stove or steam heat, as in almost all cases they will spring back again.

"After sorting the spokes I picked out the best for the back wheels, and especially I was very careful if there was much difference in the height; then cut them to the required length, cut also to length of the hub tenon, leaving it about one-sixteenth of an inch longer than required after the wheels are boxed.

"Next I bevelled the shoulders of the spokes, so that they were not liable to check in driving; I bevelled the shoulders with the chisel and mallet, as I found it saved more time than to cut them with a plane. Another point about bevelling is that when I had 'stagger' I always bevelled my back spokes so that the shoulders would bear alike from front to back when the spoke was driven, proving that the rear spokes required more bevel than the front spokes; this is an important point often overlooked. On the back spokes, which had most bevel, I placed a special mark, so that I would not have any trouble in looking for it.

"I now placed my spokes with tenons near the stove and warmed them gently, so that if there should happen to be any dampness or other causes that would admit of shrinkage, it would be removed before I cut the tenons to fit the mortises. While the spokes were warming up and shrinking I trued up the fronts of the mortises in the hubs, always to fit, giving them one-eighth to three-sixteenths of an inch more dish than I wished them when the spoke was driven; the fact is in all bevelled mortises the tenon draws somewhat backward and allowance must be made for it in all such cases. By the time the mortises were trued up, which I did on the driving trestle, the spokes were ready to dress. I started to plane the flat sides of the hub tenon. For this I used a gauge, as they must not only be true, but also exactly alike and the right thickness. If too tight the thickness of writing paper fourteen times would check the hub. This same gauge was used to cut the rear bevel of the spokes. The gauges are made so that they can be set for different sizes of spokes and different bevels, also two or three spokes can be planed at one time. With a box or gauge any mechanic or apprentice can fit spokes after they have been set, and with a little knowledge in handling a jack plane any one can taper a set of spokes in one-quarter of an hour, and have all the spokes of uniform width and taper.

"By tapering the back of the spokes they will not run uniform from the factory, that is, where the spokes are turned, and the taper will run up above the shoulders of the tenon, which shows that the spokes were supposed to be all one size. They were not and, therefore, the joint plane was used, which smoothed off all such deficiencies, so that they would be all the same size when driven.

"Next I roughened the tenons with a saw or rough cut file; after that I clipped off the edges from the ends of the tenons, so they would start easy in driving and not shave the walls of the mortises. After this I separated the spokes for front and rear wheels and put them in a small rack, furnished with a board 9x24 inches and four sticks upward to place the spokes between. The racks were made to hold 32 spokes, but I always put the short spokes in one, and the long ones in the other and placed them near the stove with the tenons near the heat and warmed them up by the time I had the mortises pared on the back of hub to fit the bevel edges of spokes. To do this I used a wedge with a trifle less taper than on the spokes as a gauge so as not to get too much nor too little taper. Some use compasses, other reversed calipers, but I preferred the wedge. This work I did in the vice and not on the driving trestle. After I had finished paring the mortises I bevelled the edges of the mortises to fit the bevelled shoulders of the spokes. Then I banded the hubs, dipped each hub in hot water to prevent checking, after which I was ready to drive, as the spokes were by this time sufficiently hot and the glue had been prepared in the meantime and kept boiling hot. The gauge for the dish of the wheels was set with a screw thread in the gauge so that it could not move in driving the spokes. When all the spokes were driven they were ready for rimming.

"Great care is necessary to have the face side as true as possible, that is, perfectly straight, without the least twist, if you want a true wheel. Also the inside curve must be square with the face side, so that the shoulders of the tenon fit nicely to the rims.

"Also the hole in the rim must be exactly in line with the faced rim, and the spoke tenons on the same line to avoid crooked spokes, which every wheelmaker wishes to avoid as much as possible. Afterward the rims are driven on and finished, that is, rounded on inside and outside surfaces, and last, but not least, comes the planing of the top of rims, known best as the tread, on which the tire rests. This part of the wheelmaker's work is most important and far more so than many imagine, because if a wheel is badly treaded it will be twisted in setting the tires and all the careful work which has been done is thrown 'out of gear' by the tire.

"For example, if the tread is not square around the wheel, the smith has to do his work by a great deal of guessing. By squaring the tread I mean when you put a straight edge on front of rim and square over the tread or surface on which the tire rests.

"There is no telling how much or how little dish a wheel will have until it is tired, unless the rim is true all around the wheel. For instance, take a wheel with one-inch tread and one-inch tire, with the rim out of true 1-64 inch higher on front edge all around the rim. That would make the wheel 1-32 inch higher front by doubling up the two opposite sides. If the smith should put a true bent tire on such a wheel the result would be entirely too much dish. If the rim should be higher on rear side of wheel there would be less dish, and if one-half of the rim should be higher and the other half lower the result would be a twisted wheel, and rim, which would cause splitting near the tenons.

"Another important defect which is caused by out of square rims is that as soon as the rims become wet under the tire, which they will do as soon as the paint wears off, the rims will swell and crowd themselves from under the tire. This I often found the cause of rims shifting away from the tire."

A Big Ohio Plant.

Illustrated herewith is the shop of Waldschmit & Son, Columbus, O. It was founded in 1868 by John Waldschmit and is now operated by Waldschmit & Son, builders of heavy platform wagons and furniture vans, at their plant on Front Street. Dimensions of the woodworking shop are 40 by 63. The painting department occupies the entire second floor of the plant. The blacksmithing shop is in a separate building 60 by 40, near the main building. They also operate a horseshoeing shop, with dimension, 60 by 31, and run four forges in charge of eight expert shoers. In all the firm employs eighteen men the year round and have a growing business.

Shop of Waldschmit & Son.

The person who indulges in digging pitfalls for others is generally, while so engaged, digging his own grave.

Pounded $50,000 Out of An Anvil.

In a recent issue of a Chicago paper, John Kerr, one of the city's best known horseshoers, says:

"I have literally pounded $50,000 out of my anvil as a horseshoer, and I have had a lot of pleasure doing it. For over thirty years I have run a shop practically in the heart of Chicago, and while in late years an elevated train has roared all day just above my doorway, thus serving the purpose of Longfellow's 'spreading chestnut tree,' the sledge on the anvil has always had the same old ring to it that fascinated me as a baby in my father's shop in Toronto, Canada. For I was born above a blacksmith shop, my father was a blacksmith and my mother's folks were blacksmiths. I am afraid I could not live if I had to stay away from a clanging anvil.

"About the first thing I can remember in life was the musical pounding in my father's shop. The flying sparks held me spellbound when I was old enough to creep downstairs to find out what it was all about. When I was five years old I was swinging a sledge from a platform that my father had built for me. I was nine years old when I shod my first horse. No king could have had a happier moment.

"It was my brother, coming back home after the Chicago fire, who told stories of the city that inspired me to come here. I was nineteen years old then and I landed here with about enough money for a week's board. I reached Chicago on Tuesday and got a job Thursday. I held the job seven years, and it was the only job working for another man that I have ever had. As soon as I could I went into business for myself. My shop at 549 West Lake street was the first building in Chicago to be constructed across the river. In those old days it was the farmers' horses that we shod. We used to race horses up and down Canal street when it was a plank road.

"Perhaps the automobile business is going to interfere with the horseshoeing trade in time. It has already, to an extent. I used to shoe a great many fancy driving horses that are seldom brought to the shops nowadays. Our work now is mostly with the heavy truck horses. But I never saw a man in the horseshoeing business who was a good mechanic and who worked hard and looked after his business who didn't succeed. He is not going to be like so many men in the professions—he is sure to have all the work he can do.

"Of course, a man must have a fairly good physique and a good temper, and he must like horses. Young men are not going into the work like they used to, and it is hard to get competent workmen these days. And if a young fellow will serve his four years' apprenticeship and keep himself in shape he is in a way to look the world squarely in the face, and he will always be well and strong. What more can one ask? I am fifty-three years old now, but I can swing a sledge as good as I ever could.

"The good horseshoer must keep himself in as good physical condition as the prizefighter. A man cannot drink and stay out nights and feel fit at the forge the next day. And while a man is pounding away he has a great opportunity to think great, healthy, sane thoughts. I'm glad I've spent my life at the anvil. It has brought me health, wealth and happiness."

High Priced Horses.

As illustrating the continued demand for draft horses, prices recently secured in Chicago, on a sale of Iowa-bred stock, are quoted. Most of these were high-grade Percherons. Within thirty minutes after the first horse was put up the twenty-eight head had been sold, and inside of forty-five minutes all had been hitched, winded and accepted. The first pair sold were black geldings, five and seven years old and sound, weighing 3,750 pounds at Chicago. They sold to a New York buyer at $770.

A handsome big gray gelding standing next sold by himself at $380 to another New York buyer. He weighed 1,890 pounds, and stood 16.3 hands high. A big blue roan standing next sold with his somewhat lighter mate to the same buyer at $645. The other prices for pairs were $635 for two blacks, $630 for blacks, $650 for blacks, sound except one eye, $660 for a pair of grays, one having a hock bruise, $625 for each of two pairs of grays nearly sound and $510 for another pair. A black mare with a small sidebone sold for $312.50 and a sound five-year-old bay sold for $285. Other prices on single horses were $265, $235, $245, etc. The 28 head sold for a total of $8,227.50, or an average of $293.85.

A "Linch-Pin" Wagon.

The Oswego (Kan.) Democrat says that one of the sights of the old settlers' reunion at Columbus, August 5, 6 and 7, for the younger generation to see, were part of an old linch-pin wagon which is over seventy-five years old. This wagon was made in Clinton county, Indiana, and was used by a man named Gray, as a log wagon to which were worked three yoke of oxen to haul the logs to the sawmills. Mr. Gray sold this wagon to a man by the name of Johnson, who drove it from Indiana to Cherokee county, Kansas, and a short time afterwards sold it to Mr. John Amos, who at that time lived in Lyons township. Mr. Amos used this wagon a score of years before discarding it. To the younger generation this wagon was interesting and showed them the way our grandfathers had to get along and also the advancement in the building of wagons.

Mixing of Putty.

The mixing of putty has very much to do with its working properties, its capacity for staying where it is put, and its surfacing quality. Always mix the putty thoroughly, working all the various ingredients intimately together, and into a smooth, clean, uniform mass in which there is no variableness. Inadequate working of the pigment will result in a putty containing, perhaps, dry bits of lead or whiting. These dry particles of pigment, when present in the putty, are worked on to the surface under the knife, and when the sandpapering of the putty occurs they immediately tear out, leaving little holes in the surface which, in order to make a good job of surface filling and smoothing, must be reglazed with putty. These dry crumbs of lead or whiting should never be present in putty. Thorough kneading and mixing is a sure preventive of this bad fault. It is quicker and cheaper than any cure that can be devised. Good putty should be tough and elastic, and never dry and crumbling. It should not only be tough and elastic, but, in addition, it should be adhesive, tenacious, and capable of being worked down under sandpaper or with water and artificial rubbing stone.

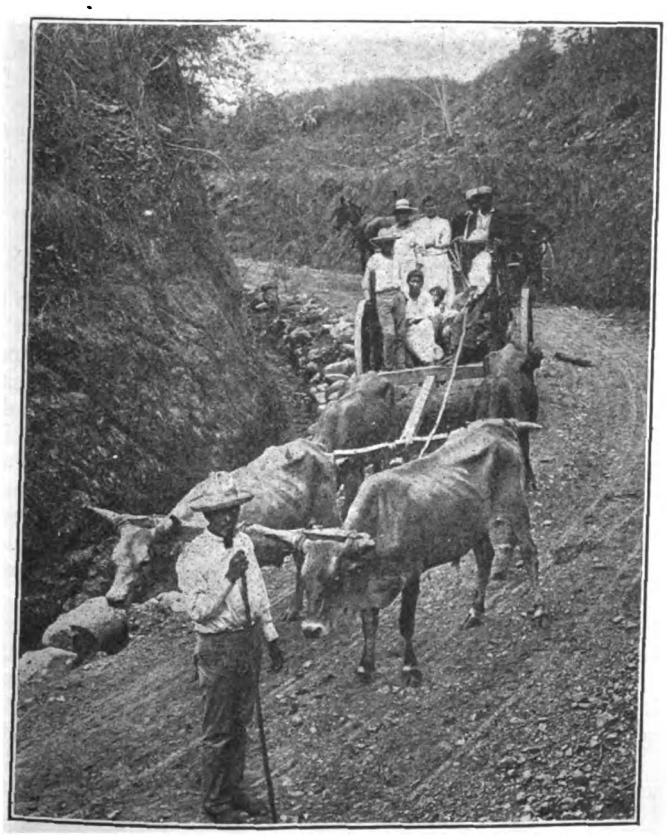
Co-operation and Good Feeling.

The annual joint field day of the employees of Wells Brothers Company, Wiley & Russell Manufacturing Company and the A. J. Smart Manufacturing Company, all of Greenfield, Mass., was held at Island Park, Brattleboro, Vt., July 26. Features of the parade were the lady employees who marched in one body (over 60), each dressed in white with Japanese parasols. An employee's minstrel troupe of 40 also marched in full regalia. Heading the workmen, who marched by departments, was "The Old Guard," membership in which is based upon 10 years' continuous service—regardless of position. The organization now numbers over 100 out of 750 total employees. Some of the men have been identified with these shops for over 40 years—the average length of service being 18 years.

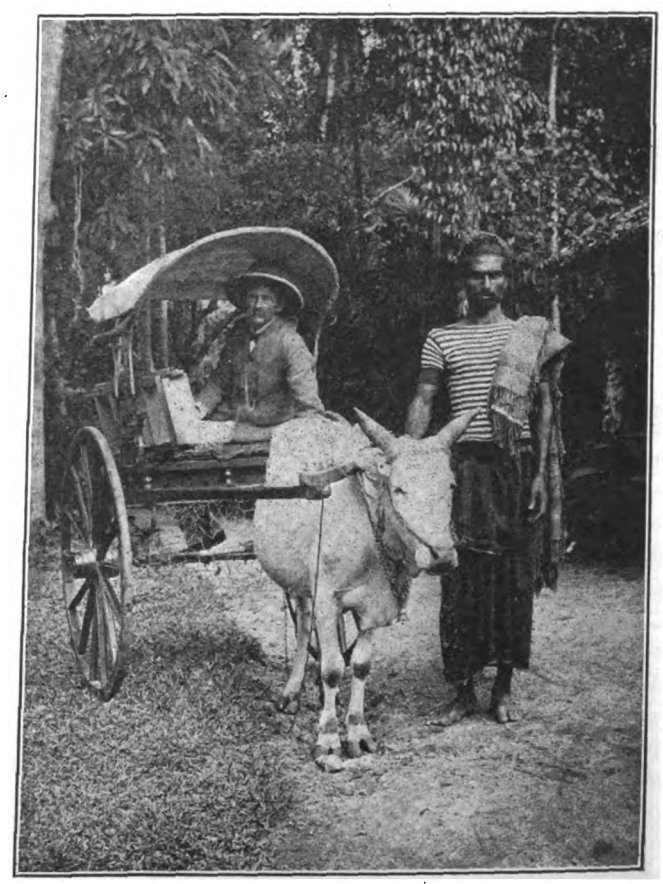
It was a most enjoyable occasion, full of the spirit of co-operation and good fellowship. Greenfield industries have always been noted for their progressive attitude on the all-important labor question; and this day is but the evidence that capital and labor can and do work together harmoniously when once they learn to repose confidence in each other. The three industries represented in the outing are the largest in the immense tap and die industry which has made Greenfield so well known in many countries.

Painting on Copper.

The coppersmith uses sulphuric acid, sal ammoniac and rosin in soldering the copper, and to prevent the copper from being discolored and darkened it is usually cleaned off with paraffin oil. Such a surface would not be fit to paint upon, and it is necessary to thoroughly wash with benzol or benzine, or a weak solution of nitric acid might be used. Copper has been treated successfully by giving it a coat of aluminum bronze, mixed with a first class outside varnish, and this is done on copper work that is to be gilded, and after seven years is in a good condition. Another way is to use Indian red and ochre mixed with one-third linseed oil and two-thirds varnish. It proves successful.



A Horseless Carriage of Porto Rico.



An American in a Ceylon Carriage.

The Blacksmith & Wheelwright

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SEPTEMBER, 1913.

PARTIAL CONTENTS.

DO OUR READERS WANT IT?

Will such of our readers as are interested please write to the editor and tell him whether or not they want us to publish the retail prices of such iron stock as is usually in demand by blacksmiths and wheelwrights? If there is a well-defined call for a price-list of this sort we shall be glad to publish it.

Such a price-list was printed in The Blacksmith and Wheelwright for a good many years and until not long ago when it was discontinued, chiefly because we had never detected any interest in it, and for the additional reason that in the world-wide territory covered by our readers, prices in this city seem often much at variance with those which the blacksmith really has to pay in his own far-off locality. But this magazine is for its readers. What they want, we want; and if any fail to see something they want we hope they will immediately write and tell us. Although it may not always be possible to supply the information that a single reader may wish, inasmuch as the practice must be "the greatest good to the greatest number," yet in case of individual inquiry we are often glad to send the information by letter.

In this connection, it is impossible to invariably determine how much of the reading matter of this magazine should be given to horseshoeing and how much to general blacksmith work; how much to wheelwright work and how much to wagon building; or what proportion should be devoted to woodworking and what to iron working. Even though we had the means of knowing to an absolute certainty just what would be a fair proportion of reading matter for each of these departments, it would of course be impossible to always have it divided up fairly, and were it possible to thus fairly divide the space quite likely some readers would even then not be satisfied.

But it is indeed helpful to get the frank opinion of our readers in matters of this kind. Their criticism and suggestions are not only always welcome but they are considered a favor. No publisher in this wide world has more considerate and friendly readers, and their views are often an inspiration to greater effort as well as to more encouragement.

"THE WHOLE WORLD AKIN."

If any of our readers have occasion to visit the city we shall be glad to have them call and see us at this office. Perchance they may desire information of some sort, or they may feel like calling just to extend a friendly greeting, but in any event we shall be pleased to see them.

Although we do not have as many calls of this kind as might be expected, it happened one day not long ago that we had a call from a reader from South Africa, and at a later hour the same day another reader called who had come from Australia. In the sense of distance, this great round globe is getting to be very small. In fact, a newspaper man from this city has just encircled it in the surprising time of 35 days, if we are not mistaken. But in any case, no matter how widely separated, men are very much the same; they have the same ambitions, the same troubles, the same ideals and the same kindly feelings.

Indeed, the ease and speed of travel and the quick interchange of ideas have wrought such changes that the world is really little but one great neighborhood. Thomas Paine, that philosopher and political writer, who was banished from England because of his book, "The Rights of Man," did not find many to agree with him when he said: "The world is my country; to do good is my religion." But that is to-day good patriotism and good religion, while the book that caused him so much trouble does not begin to go as far as many of the present-day college text-books. To-day the whole world is akin without the "one touch of nature."

A BIG BUSINESS INCREASE.

In some cases blacksmiths who have taken up automobile repair work together with selling supplies, as for instance, gasoline, lubricants, tires and tire repair material, are now making more money in one year than they did in five years under the old conditions. But to do this the locality must be one where automobiles are frequently used, or where they pass often.

We have in mind an enterprising young man of Central New York who makes several thousand dollars a year in repairing, selling oil and gasoline, and in supplying nuts or bolts when they are needed. But something like 200 cars average to pass his shop every day and the sale of gasoline is a source of large profit. Under the driveway at one side of his shop is a tank which holds 10 barrels—about 500 gallons; and a pipe extends from this to a pump inside the building near the front door. From the pump a section of gas pipe extends out of the building and across the sidewalk, with a hose running down the street. Gasoline which he has been buying at 18 cents he has retailed at 22 cents, which means 4 cents for him every time he winds up the pump crank. During the past June he wound it up 1,800 times, a profit of $72, and much more than he could earn by much harder labor of some other kind. His oil average is about 100 gallons a month. The expeditious delivery by pump and hose, instead of by pail and funnel, is a trade getter. He said he hesitated to buy the outfit, but never has had any reason to regret it.

Realizing its advertising value, he installed a small air tank on wheels, with a hose, in front of the store, and anyone whose tires need inflating is welcome to take all he wants. As an example of the man's business and mechanical ability, when he installed his free air wagon, instead of spending a bunch of money for it he bought the various parts, picked them up here and there or had them made, and built the wagon himself.

At first he had an idea he would put a sign up saying something like: "Help yourself to air," so that passing automobilists might know that they could fill their pneumatic tires easily and without cost, but he finally concluded this was unnecessary. The tank was inviting, and, like most things in this world that cost nothing, it did not take long for passing car drivers to learn it was there for their accommodation. His main object was to get the automobiles to stop and not pass his place rapidly. He knew that if he could get the drivers to stop, he might sell them something or supply something for their cars. And when once stopped and near his shop, they could not very well fail to notice his sign: "Best work and lowest prices."

As stated, not often are conditions for business so inviting as the case in point, but the chances of very much increasing the regular blacksmith business by steps of this kind are frequent.

WORK IN HARMONY.

One of our readers who sends us a photograph of his shop, which we intend to publish in the October issue, says there are but two shops in his town and that "We get good prices and work in harmony."

That's the way to work. Without harmony among the members of the craft business prosperity is impossible. Inspired by selfishness and a desire to get the best of some one, its result is directly contrary to its purpose. Not for years has it been true that "competition is the life of trade." It is the death of trade. It is almost invariably followed by price cutting, and price cutting is followed by quality cutting.

We wish to urge our readers to not cut prices under any circumstances or conditions. It is bad in principle but worse in policy. In the long run nothing is worse for the welfare of a town than to have any kind of a business in it unprofitable, and wherever there is competition there is invariably a lack of profit.

NO ACCOUNTING FOR TASTE.

It is worthy of comment that with all the talk about "the high cost of living," not a word is said about the high cost of beer and whiskey. On the contrary, statistics prove that more of these high cost articles are being made and consumed in this country than ever before.

The readers of this magazine know very well that the editor is by no means wild and extravagant on the drink question. He simply believes that there is nothing on earth for which one gets so little and pays so much as for malt or alcoholic liquors. And this must be admitted, whether it be held that such liquors are sometimes useful or are always a positive injury.

Disguise it as we may, if the average man pays a profit of 20 per cent to his butcher for the meat he takes home to his family, he finds fault and is prone to indulge in talk of "robber barons." If he pays 200 per cent profit on a glass of beer

or whiskey, he makes no protest, nor does he talk about a boycott retaliation.

This is one of the idiosyncrasies of human nature that cannot be accounted for on the basis of reason or logic.

The Carriage Convention.

As has before been stated, the 41st annual convention of the Carriage Builders' National Association will be held in the Colosium, St. Louis, Mo., during the week beginning October 12. The official headquarters of the Association will be at the Planters' Hotel, Fourth Street, between Pine and Chestnut. It may be remarked that the average hotel rates in St. Louis seem to be rather less than in the east, and good accommodations can be had at fair prices. The reception and annual banquet will be held at the Planters Hotel; the reception on Tuesday evening, October 14, from 8 to 11 o'clock, and the banquet on Thursday evening, October 16.

The local committee of St. Louis extend to all members a very cordial invitation to come and see them, and assure all a warm and hearty reception.

There are many things in St. Louis worth seeing, and our people will miss a great opportunity if not present to see the new trade and other things of interest that may be of great use to them.

Trade Press Convention.

The eighth annual convention of the Federation of Trade Press Associations is to be held at the Hotel Astor, New York, September 18-20. The program contains the names of well known publishers and others who are to speak and a wide variety of subjects will be treated. The big north ballroom at the Hotel Astor is to be given over to the mass-meeting scheduled for Friday afternoon, September 19, which is expected to be the most largely attended meeting of the convention. There will be a number of inspirational addresses by representative business and professional men on subjects of live interest to editors, publishers and advertisers.

All the regular sessions of the convention are open. Whosoever will, may come, but tickets must be secured for the inspirational mass-meeting. These may be obtained on application to any member of the Federation or to the Committee on Arrangements. Seats at the annual banquet, September 19, are $5.00 each. Applications should be made to M. C. Robbins, chairman of the banquet committee, 239 West 39th Street, New York.

Carriage Draftsmen School.

The fall term opens on the last Monday in September and closes for the Christmas holidays. Winter term opens on January 3 and closes on April 8, 1914. Correspondence school is open the whole year round. Instruction in this department costs five dollars per term or fifteen dollars for the full course of three terms.

The school has its home in the Mechanics Institute, a fine building devoted to educational purposes and located at 20 West Forty-fourth Street, in New York City. The school is to teach men to design vehicles, and to make working drawings and fashion plates of the same, and only those men employed in carriage, wagon or automobile building, or some of the accessory trades, are admitted to its privileges.

Students in the Technical School for Carriage Draftsmen and Mechanics may, if they choose, take up studies other than those taught in this school, such as the study of engine details, drafting of gasoline engines, electrical work, mathematics, etc.

A Heavy Affliction.

There are some misfortunes that the forethought and care of man seem absolutely unable to prevent. One of these is loss by lightning. One of our readers, G. W. West of Sidon, Arkansas, had his house struck by lightning in July. It killed one of his children, shocked his wife and four other children, and completely destroyed the house by fire. An affliction of this kind is surely one that merits the heartfelt sympathy of all.

Concentration as an element of human character evolves unity of purpose and a consequent subordination of various interests to some controlling effort.

Correspondence

Seventy Years at the Forge.

From Charles Barker, Massachusetts.—When a man has worked steadily at one occupation for fifty or more years, he seems entitled to at least a passing recognition in his favorite trade journal. As I visit many blacksmiths during the year I often meet with "old boys" and many of them look the part, too, who have passed the half century mark as workmen, consequently I was very much interested in Mr. J. B. Gillespie's article in a recent number. Sixty years is indeed a long period to swing the sledge and hold up horses, and Mr. Gillespie no doubt feels proud of his long life of usefulness, as he should.

In the city of Manchester, N. H., I noticed a genial old gentleman pounding out shoes on the anvil, and upon inquiry I learned he was 84 years of age and that he began work in his father's shop at the age of 14, thus exceeding Mr. Gillespie's record by about ten years. His name is Zepherin Tremblay. He was born in Quebec, Canada, and is the father of nine children, five of whom are still living, the oldest being one of Manchester's city officials. Three of his grandsons are employed in his shop, which is now managed by his son, Louis P.

Unlike Mr. Gillespie, Mr. Tremblay has been an inveterate smoker all his life and he sips a little rum when so disposed. Longevity seems inherent in his family. His father died at the age of 103 and his mother at the age of 87. His paternal grandfather reached the remarkable age of 104.

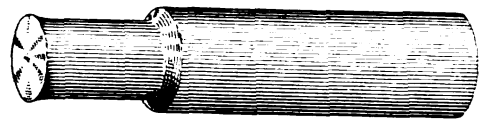
Cure for Thrush.

From Reader, Wisconsin.—The following is my treatment for curing of thrush in a horse's foot: I use one ounce of blue vitriol, one ounce of white vitriol, one-half ounce copperas and two ounces of burnt alum. This is ground into a powder. Clean out the cleft of the frog thoroughly. Then apply the powder deeply into the cleft. Next take pine tar and oakum. Dip the oakum in the pine tar and revolve slowly until it acquires the form of a rope, desirable for the size of the cleft in the frog. Then with the use of a dull tool I push the tarred rope into the cleft of the frog as far as possible. Then I take a thin layer of oakum and cover the foot. Next I apply a small amount of tar on top of the oakum and place a sole leather pad over it. Then I put on a bar shoe so as to hold the foot together. Great care must be exercised not to let the bar touch the frog. Weld on a pair of small side calks and a rolled toe without a calk. If it is a bad case remove shoe after two weeks, then repeat treatment.

I have shod horses for almost thirty-five years in Germany as well as in America, but I feel fully convinced to say that this treatment has proved the most successful.

Making and Tempering Punches.

From B. M. Wentworth, New Hampshire.—I began working on carriages thirty-five years ago. I worked five years on woodwork and ten years at iron work, and since then I have been



Shape of the Punch.

selling carriages on the road. I travel the six New England States. In traveling over my territory I enjoy going into the carriage shops in the different places that I visit. One thing that I notice is that not many blacksmiths have a punch and shear. When I ran a shop my punch and shear was the best tool I had. I had one that would punch a half inch hole in iron ½ inch thick, and which cut ½ inch bar iron 3 inches wide. I find that the chief objection blacksmiths have to them is that the punches break, and I thought it might interest some to tell how to make punches. The first punch I broke I sent to the company for a new one and they charged me $1 for it. After that I got a machinist to turn me out some. He made them for 15 cents each but did not temper them. I started to temper them but found that I could not temper them the same as I did drills, just on the cutting end, but they must be tempered the whole length alike. After trying all the wrong ways, I found the right way. First, be sure and have the punch shaped right. Be sure and have the point of the punch just a little larger than it is farther up. Have it just a little smaller than the die so it will go down in the die free. Now for the tempering. Have about two quarts of raw linseed oil in an open dish on your forge. Heat the punch to a good cherry red. Throw in into the oil and let it stay there until cold. Now some of you wise ones may laugh, but I have tempered hundreds of them that way and they would stand to punch as many holes as any that I ever had from the factory.

Making Bar Horseshoes.

From Robert Donner, Wisconsin.—I will state that the way I make bar horseshoes is to first

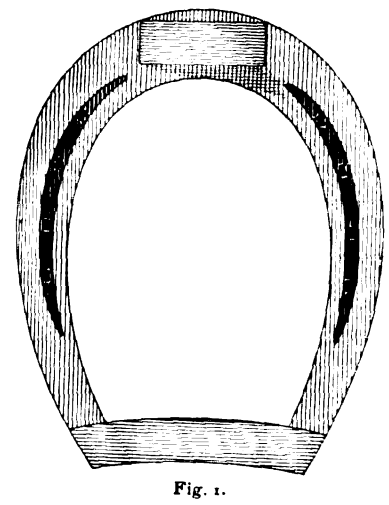


Fig. 1.

point the end of the shoe as if I were going to weld a bar of iron. I weld it the same way as I would a flat bar of iron, as shown at Fig. 1.

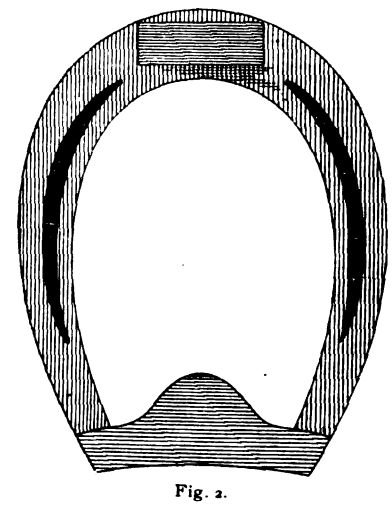


Fig. 2.

Then hammer out as shown at Fig. 2. I then weld the calks, using Vulcan toe calks and welding compound.

A Modest Veteran.

From J. B. Atkinson, Maine.—I have been at blacksmithing ever since 1862 and have been in the shop that I am now occupying for 28 years trying to learn the trade. I work at the fire and on woodwork as well. I made wheels when I was 15 years old and have not learned yet so much as some others have in three months—but I never had a job come back on me.

Fastening a Hammer Handle.

From Popular Mechanics.—The annoyance of having the hammer come loose from the handle may be overcome by using a common horseshoe nail as a wedge. The nail is cut off to make the length a little less than the eye in the hammer. The head of the nail is wedge-shaped and has one corrugated side which makes it ideal for the purpose.

In boring a hole for a stud bolt, it frequently happens that when the drill is removed the chips drop to the bottom of the hole. In such cases the end of a file that has been magnetized can be used to clean the chips out of the hole, which it will do quickly and handily.

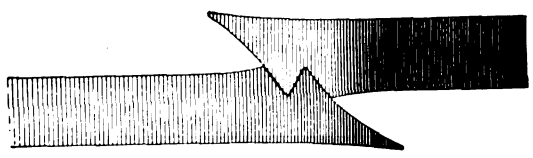
ANSWERS TO CORRESPONDENTS

Under this head will be found each month replies to questions asked in previous issues. Our readers will appreciate the importance to inquirers of furnishing the desired information as promptly as possible.

Welding Tires and Axles.

From C. Smith, Pennsylvania.—A copy of your valuable paper was placed in my hands and the old-time spirit immediately arose to do some good to a fellow smith and the craft in general. A. W. of New Jersey wishes information as to how to weld a wide tire. Years ago you received my article from Wilkes-Barre. A change of residence does not lessen my interest in your paper. Now, A. W., isn't the only smith who has difficulty in welding wide tires and steel axles, and my 45 years' experience is at his pleasure.

First, in preparing to weld a tire or axle, make a long scarf. I will explain the tire welding first. Make it a point to coke a good amount of soft coal and work a liberal amount of coal. Use long fire irons, such as poker, scraper and borax spoon. No short tools for me. This lets you get away from the fire. Have a long handle to the water ladle. After the tire is scarfed, place it together neatly. Then make red hot and open the scarf with a sharp tool, and well flux with 95 per cent of ground rock borax or 20 Mule Team pure borax. Then close the scarf and drive a pin hole in the middle, and drive a 1⅛ by ⅜ sharp pin into the soft iron. This will prevent the scarf from sliding apart. Then remove the clinker and make a good clean bottom to the fire. The liberal supply of coke you



How to Cut the Scarf.

have made will now come into use. You don't lose any time by making a large quantity of good soft coke as it will come into valuable play as the heats are to be taken. Now place the tire down edgewise on the fire and put some fine cut pine or hemlock wood inside and outside the tire, with some small coke, and a sprinkling of soft coal on the top of the coke. Then blow up the fire gently and let the wood burn away. The coke, in combination with the fine soft coal, will form a crust on both sides of the tire. The wood being burned away, you will have a good gas heating oven on both sides of the tire. Then draw on the heat, and when the spoon sticks good to the iron and the iron gets white from the hydrogen gas made by the good coke bottom, the heat is ready to remove to the anvil and weld one side of the tire at a time. This first heat holds the tire together. Then weld the opposite side the same way. The sulphur that has been a cause of trouble to you has by this method been made into gas and blown away and is not allowed to rest on the iron and unite with the melted iron scale and form the pernicious liquid on the iron you speak of, and so prevent welding. Now say that the two edges are welded. Remove the clinker and prepare a good coke bottom to the fire. The reason why we remove the clinker is because the melted clinker will throw off sulphurous fumes in a blacksmith's fire. It must be as pure as spring water to be most beneficial to a welding heat. It is the purest hydrogen gas that we want. As the fire is now well coked, place the tire for the middle weld about ¾ inch above the coke bottom fire. Now place your fine wood about 8 inches long over the place on the tire to be welded, the wood to be about 2½ inches high. Then cover with fine coke, and on top of this fine soft coal, not wet. Then blow up the fire gently and let the iron absorb the heat gradually, so as to well soak it in hot gas. The wood will burn all away and leave a good coke oven over the iron. The sulphur will blow away as it is made into a state of gaseousness. Seal the front opening with a block of wood and some coke; flux the heat with a long borax spoon, and use a little borax and clean sand, if you wish to melt the scale. You will now have a good coke oven over your iron and so draw the heat with a good gas fire, clean and bright and intensely hot like a furnace. Then keep the bottom well filled with hot side coke; draw your heat, and weld. Don't try to hammer in the edges. Cut off the waste with a sharp chisel and finish. If it is a steel tire, you can use welding plates and do the same as explained. Always control your tire by welding the edges first. A steel axle is welded the same way, only cut your scarf as the sketch shows. This prevents slipping. Make a deep wide cut. Upset the ends so as to have stuff enough, and hook together one inch short before you make the weld. Take the heat with the scarf face upward. This heats the body of the metal and lets the sulphur blow past and not stick on the scarf face and thus prevent welding. Stick well with borax or welding material. Make a holding blow with a heavy sledge. Then finish the scarfs separately with wash heats and borax. Take time to prepare your scarfs and heat. Good work brings custom.

Corn Cure and Rock Drill Tempering.

From S. S. Bates, Nevada.—I have been reading your journal for some time and have read a great many good ideas. I see a couple of questions asked in your May number which I will try to answer, to wit:

Brother H. T. Hart asked for a corn cure. I will give you one I got from a good veterinary: Pare the horse's foot ready for the shoe, cutting the corn out well. Then hold the foot up with the sole upturned. Place about as much crystallized iodine on the corn as you could take upon the point of a table knife, and have a small bottle of spirits of turpentine at hand. Apply about a spoonful of this to the iodine. A little flash will be the result. This sears the corn and drives the iodine in. Iodine is a great healing agent. Be sure to use the crystallized iodine. It can be obtained from your druggist. This operation may have to be repeated two or three times in a bad case. Of course the horse should be shod right.

Brother Will W. Olson asked how to temper chisels for cutting stone. I will give my way, which if followed carefully will give satisfaction for drills, chisels, and stone cutter's tools. Do not force your fire while sharpening and making these tools. Let the steel heat slow, taking great care not to heat it over a good red heat, for if a white heat is reached in making a sharpening, your steel is spoiled and will not stand. Here is where the trouble generally is had. After the tools are sharpened, lay them aside to cool for a few minutes. Now have lukewarm soft water with about two pounds of salt to two gallons of water. Next, take one tool at a time and place the edge in the fire and heat about ⅜ths of an inch of the edge just to a cherry heat and plunge in the water, cooling enough so that the temper will not run down. But remove from the water before it quits hissing, and lay aside and let it cool. This is the right temper, but you must take pains at first until you become accustomed to it. If you should get them too hard at first, do not heat quite so hot next time. The degree of success depends upon getting the right heat. You will have no water cracks in the steel with this way of tempering.

Two Methods of Annealing Steel.

From E. C. Lyon, Oregon.—The first method of annealing steel consists of heating it slowly to a dull cherry red and then removing it from the fire and trying the heat with a soft stick. When the steel has cooled so that the wood ceases to char, plunge the steel quickly into a bath of oil and water. When the steel is worked it will be found to be as soft as could be desired.

Another method: Heat the steel slowly to a dull red and then allow it to lie in the ashes for a few minutes until it becomes almost black. Then drop it into soapsuds and allow it to cool there.

How a Lad Would Spring in the Spoke.

From a Boy of 14 Years, Texas.—I noticed in the July number a reader asks how to spring in a spoke to a wheel without removing the felloe. I am a blacksmith's son, 14 years old, but I can answer that question.

First, the wheel must be a sound wheel, or it may be put in and the tire set cold immediately. Drive the spoke as if the tire was off, but not too tight, so that it cannot be removed. Mark it so as to come even with the part of the felloe next to the hub. Then mark ¼ of an inch nearer the end and saw off. Make a tenon the length of the spoke between the two marks. Now drive the spoke back in place (having removed it to put the tenon on) and be sure it is seated well. Now get a good pry pole and a short heavy stick about the length of the spoke between hub and felloe. A piece 2 by 4 inches is heavy enough. Place the short piece on the hub and pry up on the felloe, and at the same time drive the spoke towards the hole in the felloe. When the tenon is under the hole, release the pressure and let the felloe spring back. Then drive the tire over the spoke. When painted it can't be told from a new spoke. This method can be used for both buggies and wagons. If a smith has a light jack which can be raised quickly, use the jack.

QUESTIONS FOR OUR READERS

You are invited to ask questions freely on all points pertaining to your work. Our subscribers who have solved successfully the problems which confront you will take pleasure in imparting the results of their experience for the benefit of their fellow-craftsmen.

The Use of Calks.

From J. C. Dillon, West Virginia—Should horses be shod without calks? Please take notice that we live in West Virginia, where there are plenty of rocks and mountains. If we should have calks on horseshoes, please tell why. I should like to have this explained.

Making a Butt Weld.

From George Bervick, South Carolina.—I would like to know how to weld a rod of any size in a T shape. It is called a butt weld, I believe.

Unusual Case of Forging or Interfering.

From Charles Jenkins, Canada.—I have a pacer to shoe. He strikes his near foreleg just about two inches below the knee on the inside with the off hind foot but does not touch with the other foot. How can I stop it? Will some brother smith be kind enough to tell me?

Wants More About Cold Tire Setting.

From H. F. Myers, Pennsylvania.—I would like to hear more about cold tire setting from some of your readers who have had experience.

Prices in Scotland.

From the Canadian Blacksmith we take the following price list for work in Scotland as adopted by the District Association of Blacksmiths near Edinburgh:

Clydesdales, entire horses, per set	$2.50
Railway and contractors' horses, per set	1.50
Heavy van horses or lorry horses, per set	1.25
Farm horses, per set	1.25
Posting, van or hunting horses, per set	1.25
Ponies under 14 hands high, per set	.96
Bar or trap shoes, each extra	.12
Old shoes, each	.18
Fastening shoes, each	.06
All removes half-price of new shoes (if toed and heeled), extra	.25
Stuffing shoes, per pair	.12
All cog holes, each	.02
New tires, light lorry wheels, new iron, 1¾ in. or 2 in. by ¾ in., per set	9.74
New tires, light lorry wheels, new iron, 2¼ in. by ⅞ in., per set	10.74
New tires, cart wheels, new iron, 2½ in. by ¾ in., per pair	7.35
New tires, cart wheels, new iron, 2½ in. by ⅞ in., per pair	8.25
Tire setting, cart wheels, per pair	1.75
Tire setting, lorry wheels, per pair	1.25
Tire setting, broad cart wheels, per pair	2.00
All jobbing (outside work), per hour	.25
Harrows, laying, per tine	.06
Harrows, sharpening	half price of laying

Do not screw a spark plug in tight while the motor is hot. The result will be stripped threads when removing after the motor has cooled.

GASOLINE PIPING.

Trouble Caused by Expansion Owing to the Heat of the Engine.

A gentleman who had been having all kinds of trouble with gasoline pipes brought his car into the shop recently to have entirely new piping put in place. He removed every particle of the old piping from tank to the carburetor and put brand new pipe in its place, and after it was all done the trouble recommenced just where it had left off. The gasoline pipes in the automobile persisted in breaking, and if they didn't break they would spring a leak, sometimes two and three leaks at the same time.

The writer became very much interested in the conversation between the owner and the garage man, and finally "butted in" in order to better see just what was going on. A little investigation showed that the pipes were connected as shown by Fig. 1. That is, they ran straightway from one vessel to another.

A little study of this matter will show that expansion of the engine would probably cause trouble at A and B, Fig. 1, for when the engine expands and the pipe does not expand there will be undue strain upon the pipe threads. At other

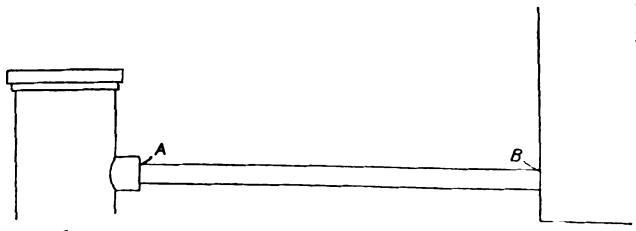


Fig. 1—Direct Connected Gasoline Pipe.

times when the engine is cold and the pipe expands then the pipe must bend sidewise or buckle, thereby causing very severe strain in the pipe thread due to bending stress. Had this automobile owner only put in the pipes as shown by Fig. 2, he might have avoided all the trouble; but, while the pipe should be bent as shown in Fig. 2, the bend should not be sloped vertically upward as shown by that illustration. There would be little trouble from leakage or breakage where pipes are connected as in Fig. 2, but there may be more trouble in getting gasoline to flow through such a pipe. It may puzzle the reader to determine just why gasoline will not always flow through such a pipe. But when the discharge end of the pipe is filled with gasoline up to F and the tank becomes empty, having been siphoned from the pipe by carburetor suction, then a new supply of gasoline placed in the tank, trouble is very apt to show itself.

The gasoline level in the tank could rise to point C, which corresponds to G and F in the pipe. Now if the engine be started, suction may or may not draw gasoline over the high point of the siphon; even if gasoline be placed in the tank until it is filled to D there may still be an air lock in the siphon pipe. It will require a head to D in order that gasoline may flow over the high part of the siphon. But, just bear in mind that from G to F is filled with air and as the height of the gasoline increases from C towards E the gasoline level G is raised slightly and the level is depressed at F until, after sufficient head has been obtained in the tank, the gasoline level F is forced downward far enough to permit level G to rise above D. When this happens gasoline will begin to trickle over the siphon, but it sometimes requires a height to point E in order to get the gasoline started through the connecting pipe.

There is a way by means of which the expansion pipe may be used to advantage, and that is to turn the loop of the pipe horizontally instead of vertically. This being done, the gasoline finds its way along the pipe which is practically level, although very crooked.

Far better than to have the siphon turned upward is to turn the siphon downward, as shown by the dotted lines. This forms an inverted siphon, which, when filled with gasoline, cannot help but drive the air out, either into the carburetor or back into the tank. But there is a much worse form of pipe than is shown by Fig. 2. The pipe shown by Fig. 3 is an exaggerated sketch of a gasoline pipe which the writer saw taken from actual practice. In this pipe the level M corresponds with the level F in Fig. 2. The pipe is shown with three siphons and two inverted siphons. When gasoline flows from the tank into such a pipe the fluid must rise to point H before it can run over the first siphon. While the fluid is rising at H the other end of the air column is depressed until it reaches point I, and the gasoline just beyond I in the inverted siphon is driven up the pipe until it reaches level J and begins to dribble over the peak of the next siphon. Here we have a vertical distance M, and the weight of the column of gasoline of that height, represents the pressure in the gasoline tank above point H, necessary to make the gasoline rise to the top of the first siphon. This height is N at the gasoline tank the same as N between I and J in the first inverted siphon.

The same thing that happened at H is also taking place at J, the air level in the second siphon having been driven upward until gasoline runs over the peak of that siphon. Meanwhile, the gasoline in the next inverted siphon has been driven downward and upward in the three siphons until it reaches point L and flows over the last rise in the pipe. Here we have a height of gasoline called O, which must be supported by additional height of gasoline in the tank. Adding height O to height N in the tank, we reach the level P, which shows the height of gasoline that is necessary to maintain in the tank in order to make the fluids flow through the crooked pipe shown by Fig. 3.

It seems somewhat paradoxical that two or three short columns of gasoline in a single pipe should maintain gasoline at height P in the tank, but such is the fact nevertheless, for the height or head of fluid in the tank must exactly equal the sum of the several heights or heads in the pipe in order to establish an equilibrium in that pipe. When that point is reached, any further additon of height at P will cause gasoline to flow through the crooked pipe. But should the gasoline level fall below P, and curburetor suction be neglected, then the gasoline will cease to flow through the pipe, and the poor auto-man is having trouble from gasoline which a new pipe will not cure unless great care be taken to dispense with bends, or to locate them in such a manner that they will do no harm.

Whenever it is absolutely necessary to do so, gasoline piping with bends as above described, may be made to work by inserting in the pipe one or more receiving chambers, vent cocks or relief valves, whereby the trapped air may be made to vacate the piping and allow gasoline to flow without restriction. But such valves and chambers should only be inserted in case all other methods fail, and then only by an experienced engineer who fully understands the matter. Just as surely as an inexperienced man tries to vent off air from gasoline piping, just so sure is he to have all kinds of trouble for his pains. This is the last word in that direction, for such things never work very well—always give trouble, and the more the engineer is experienced, the more he avoids air chambers, relief valves and similar trouble makers.

The ordinary pet-cock is utterly worthless for holding gasoline, and one might as well try to stop a gasoline leak with putty as to expect the ordinary pet-cock to remain tight and give ade-

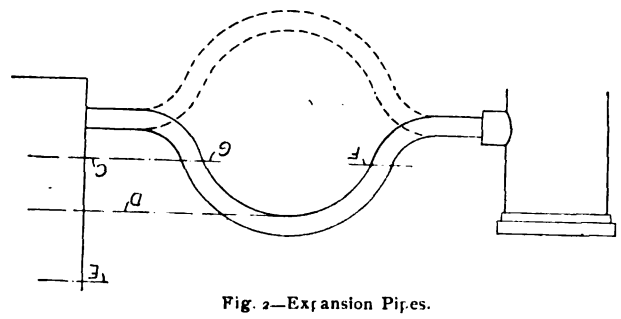


Fig. 2—Expansion Pipes.

quate service in a gasoline pipe. Neither will common screwed fittings withstand the persistent penetrating efforts of gasoline. The refrigeration engineers are "up against it" in handling liquid ammonia and ammonia vapors, and the gasoline engineer encounters a similar obstacle when he tries to make tight between a gasoline pipe and fitting without soldering, brazing or welding the two together.

The writer knows of only one way whereby screwed pipe and fittings may be made gasoline tight, and that way is to fill the threads with soap—common yellow laundry soap, which heads off gasoline perfectly for the time being, but the gasoline immediately gets right to work at dissolving away the soap, which is effected slowly but surely, then away goes the gasoline again, and away also goes the soap, into the carburetor and places where it can do no good and possibly a whole lot of harm.

At best, the soap method of making gasoline pipes tight is but a temporary makeshift, and should always be regarded as such by the person who tries the method. Just solder or braze the parts firmly together and make all takedown connections with big flanges which may be bolted together with ten-horse power through-bolts and with good serviceable copper gaskets between the parts of the connection. Then, and then only, can reasonable tightness be expected in gasoline piping and connections.

There is another point concerning the handling and carrying of gasoline in automobiles, which, though not quite in line with piping, should be considered in connection with the above, and may be stated here to advantage. The matter in question, is the manner in which the gasoline tank is constructed in order to contain the required quantity of fluid and at the same time, to be able to withstand the surging of the gasoline as the vehicle passes over rough roads, railroad tracks or other obstructions which tend to make the gasoline surge back and forth like Lake Erie in a thunder squall.

And there is a good deal of force exerted by gasoline or any other liquid which is thus made to roll about in a confined space. Twenty gallons of gasoline, which can travel a few inches

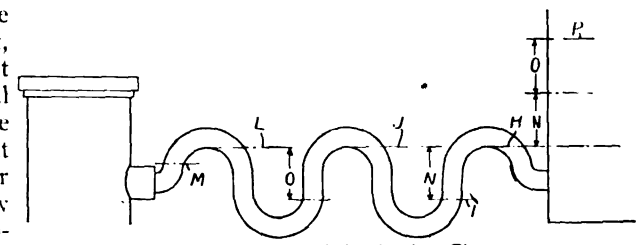


Fig. 3.—Air Lock in Gasoline Pipe.

under conditions noted above, will strike a blow of a good many foot pounds when it brings up suddenly against the side of the containing vessel, therefore this matter should be closely looked after whenever the autoist is troubled by gasoline tank leaks.

It goes without saying, that the cylindrical gasoline tank is the best and strongest form that can be made, unless, indeed, the spherical form be excepted, but it is so seldom that a ball-shaped gasoline tank can be used in an automobile that spherical tanks will not be considered in the discussion save to say that they are the strongest possible, and would be the best ever, save for their awkward shape, which renders them impossible for auto work. But the cylindrical tank, with bumped-up ends—same as the prestolite tanks—these are the best forms for gasoline tanks and the ones which will stand the most use and abuse. With such a tank, well supported, and well connected to the supply pipe, the autoist need never worry about the gasoline tank leaking. But when the attempt is made to utilize some irregular space for gasoline storage, and a tank full of corners and angles is made to fit such irregular space, then, Mr. Automobile Owner, look out for trouble, for it is in that crooked gasoline tank of yours and will break its way out at the very first opportunity, which will not be long in coming. 'Ware of the irregular shaped gasoline tank! Throw it away and put in a plain cylindrical tank—or two of them, if you must have an auxiliary gasoline supply.

One or two more things about gasoline, and then I'm done. Make the gasoline tank in such a manner that should dirt happen to get into the tank, it may be gotten out again. To be sure, it is always expected that gasoline will be filtered into the tank, but there is ever a chance of a filter going bad and letting a little dirt in with the gasoline; therefore, so arrange the tank that there is a wash-out plug, which, if necessary, may be broken open and the gasoline tank washed out at will. Such an arrangement costs very little and does not add to the possibility of tank leakage, for the washout-valve may be a plain bolted plug or cap, with ground bearing surface which, made gasoline-tight by grinding, remains unbroken and tight until an emergency arises which calls for the breaking open of the washout-valve, after which the valve is again ground tight, closed and allowed to remain undisturbed until another time of need.

The gasoline tank should also have a fire cut-off. Such a thing is very easily arranged. In fact the apparatus is simplicity itself, being merely a modification of the Davy safety lamp. The discoverer of that lamp found that flame could not pass through a tube, the length of which was certain times the diameter. Therefore, it is only

necessary to make the filling tube with its length certain times its diameter, and no fire can get into the tank.

When the tube becomes too long, through being necessarily large enough to handle the required amount of gasoline, then it is only necessary to put in two tubes of one-half the diameter, and of course only about one-half the length of the original tube.

And the length of tubes may be shortened still more by making them much smaller—and more of them—until they are made so small indeed that their length is only a small fraction of an inch. This is just what happens when a bit of very fine wire cloth is placed over or across the opening into the gasoline tank. The wire cloth acts as a great number of very small and very short tubes, and flame cannot get through for the reason that so much heat is conducted away by the wire-cloth tubes, and by the air outside the tubes, that the flame cannot support itself and dies out for lack of heat.

Sometimes the flame keeps on burning just outside the wire mesh, but this is not often the case, as the flame soon dies out for the lack of gasoline vapor to feed upon. But where the vapor keeps coming along then the flame will burn outside the screen for some time, but it should be extinguished as soon as possible, for the hot wire screen is soon oxidized by heat and oxygen from the air, and when the screen crumbles, then flame will pass through the opening into the tank, and disaster may happen.

But put in the screen and be safe. With a can—a common gasoline can—thus fitted with a protecting screen, gasoline may be poured from the can in a stream and be set on fire, without igniting any that remains inside the can! It sure is some stunt to safely pour blazing gasoline from one vessel to another. But you can do it with a fine wire-cloth screen soldered into and across the opening into the can.

POWER

In this department an expert will reply to any questions our readers may propound as the result of their experience, or inspired by a desire to become acquainted with the value of power in the shop. All inquiries should be addressed to the Editor of THE BLACKSMITH AND WHEELWRIGHT, P. O. Box 654, New York City

GASOLINE MOTIVE POWER.

How It Compares with the Horse for Farm Work.

E. W. Longnecker, in Gas Power.—In looking over the progress made during the last decade in the establishment of the gasoline tractor and the motor truck as a general farm power equipment, the gasoline engine advocate or gas power enthusiast is inclined to become impatient. He is so thoroughly convinced that it is the power par-excellence for the farm and for every other motive and stationary power requirement that he is compelled to stop and wonder why gas power is not practically the universal power on the farm.

In summing up the situation we are inclined to attribute the cause for this condition not so much to the apathetic condition of the farmer's mind in behalf of his own interest as to the slowness of the manufacturer in bringing out a dependable machine for the purpose. Certain writers appear to look upon mental inertia as the real hindering cause, implying thereby that the mind of the agriculturist is slow in awakening to his real great interest in this matter. The fact is that up until this time every builder who could assemble a tractor that showed even a small degree of dependability had not only an easy sale for it, but a lively and snappy demand confronting him. This shows that mental eagerness on the part of the farmer is "ahead of the game." He is anxious to get away from the slow drudgery, that is, the best that horse power can supply him. No doubt our readers will object or at least take exception to naming the usefulness of the horse, drudgery.

But the government has recently made some investigation and reports some startling facts that we as a people have practically overlooked ever since we were a nation. These reports show that, the year through, the horse does only 3½ hours work a day; that he tires out in 6 hours; that he eats 10 pounds of food for every hour he works; that it takes 27 minutes of a man's time each day to do the caring for or chores necessary to keeping the horse. This is equal to 20 days a year, of 8 hours each per horse. Hence if a man had 10 horses to care for, it would require 200 days of his time each year in chores and would leave him about 100 days, excluding Sunday, in which to do his farming. The chores incident to keeping a horse as he should be kept are at best dirty, disagreeable work, that has never been improved and probably never will be. It is drudgery of the lowest type. Man does it because he has been taught from boyhood that it was necessary; some men delight in it and love the work.

But let us for a moment picture an instance. Two boys in different parts of the country are growing into manhood. One has for his daily work the care of horses and the use of their service. The other cares for a tractor of say ten horse power capacity. The one becomes a finished horseman and likes his horses, the other becomes an efficient mechanician or tractioneer. Now let them move onto adjoining ranches, the one with his horses for power and the other with his motor trucks and tractor for power. Which do you think would envy the other? Surely the mechanician would not desire the horses with which to do his work. But the horse farmer would no doubt cast many an envying glance across the fence while he was sweating and toiling with horses and accomplishing far less work under pain and distress to his horses as well as to himself. Many a wide awake farmer has figured out for himself long ago the facts that the government has reported, but up until quite recently he was helpless. There was nothing better than the horse for him to turn to. Now since the manufacturers are awakening to their opportunity, the transition from horse to gasoline motive power is progressing more rapidly. In fact, in some sections of the country, it's almost a "pell-mell tumble." The change is even more noticeable in the city than in the country.

It is true that mental inertia will hold many a horse lover fast for a long time. And the horse will be a factor in motive power for many decades to come. But gasoline power is beating the horse at every score in such a convincing way that the hostler who has been accustomed to handling the food basket, the manure and hay fork, curry comb and brush, must lay aside these tools and learn to use the wrench, file, chisel, pliers, hammer and tongs, and get into the game that is sweeping down upon us with irresistible force. The young man who would succeed in the motive power field in the future need not waste his time on the horse. There is a world of opportunity open to him in the golden era of gasoline motive power, and it will open best to the man who is awake to the situation first and at once takes advantage of it. The gasoline engine is as nearly fool-proof as it is possible to make any mere machine; but it will respond best to the care of a skilled workman.

SIZE OF THE ENGINE.

How to Get One that Is Fitted to the Work to Be Done.

From Farm Implement News.—The selection of the most appropriate size of engine for general utility work has grown to present considerable complication. When the gasoline engine trade was younger, and when there were neither as many engines nor as many sizes to select from as there are now the choice of an engine did not present so much difficulty. Then, too, the range of adaptation upon the farm had not developed to its present extent, and this, too, simplified the problem. It may seem strange to say so, but it is a fact, nevertheless, that fewer engines, fewer sizes and fewer uses made for greater definiteness in the estimate of what the farmer wanted.

The various tasks which gasoline engines are relied upon to perform naturally divide into two general classes, viewed from the point of view of power required. This, of course, leaves out of consideration such work as the tractor is peculiarly adapted for, such as field work of all kinds from plowing to threshing. Limiting gas engine use, then to those farm tasks which fall within the competency of the stationary or semi-portable engine, the farmer is confronted with two classes of work, tasks which require a minimum of horse power, and tasks that require power up to five or six horse-power.

Always the ideal solution is to fit the engine to the task. To do so, however, has necessitated the employment of more than one engine. If the farmer could own a 1½ or 2 horse-power engine for pumping, household and creamery needs, and for the lighter demands of the farm machine shop, and at the same time have a 6 horse-power engine for the heavier tasks of grinding, shelling, husking, sawing wood, silo filling and the like, his difficulty is solved. But in actual farm practice the farmer who is willing to purchase two engines is the exception. He may recognize the advantage, but he doubts the economy. He may appreciate the convenience, but he hesitates at the expense. Almost his first inclination is to buy an engine with a power capacity lying somewhere along the mean between these two extremes, and to throttle it or strain it according to circumstances.

Recognizing this disinclination of the ordinary farmer to incur the expense of two engines, the retail dealer usually must assume the responsibility of deciding for him. Either he will counsel him to buy the smaller engine, relying upon other sources of power to accomplish the heavier work, leaving the household, creamery and pumping to the old-time hand labor of the women and children or to the windmill. Still another alternative is to meet the farmer's inclination for an engine of mean capacity, trusting to luck that it may not be overloaded and get the dealer into trouble.

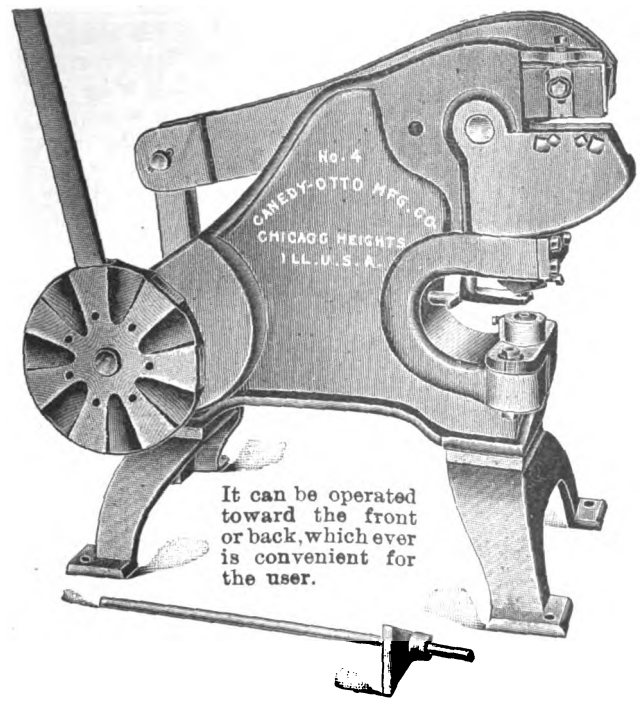
There are two considerations which commonly influence the purchaser of an engine. These are convenience and economy. A fact which is frequently lost sight of is that these are not interchangeable terms. By no means does it follow necessarily that because something happens to be a convenience it is therefore economical. Nor is it invariably the case that an economy is a convenience, although it is far more likely to be so than the reverse. This is a distinction particularly appropriate to the gasoline engine.

It has been demonstrated that economies resulting from the use of gasoline engines, the actual saving money, that is, the saving in time, the saving in hard labor, are more manifest when it is the heavier tasks about the farm which are undertaken. Where the gasoline engine can be substitute for teams and extra men, and where the time element can be taken into consideration, the employment of the 6 or 8 horse-power engine results in a distinct economy. Economy is not so apparent where gasoline power service is limited to the use of the smaller engines which are adapted more particularly for such work as pumping and the household tasks. The windmill is admittedly more economical than the engine for pumping, albeit not so reliable nor so convenient. The separator and the grindstone, the washing machine and the churn, can be turned more economically by hand than by the small engine, albeit more laboriously and at greater disadvantage. Therefore, as far as the popular impression goes, basing that impression upon demonstrable results by comparing the work of small engines with that of large, the economy argument will apply more appropriately to the larger engine. Of course, if the argument for convenience is to apply to all, it will do so with the distinct recognition of the fact that convenience, as an isolated quality, must be paid for if it is to be enjoyed.

Running parallel with the demonstration of the superior economic value of the larger engines, compared with that of the smaller types, there has appeared the conviction that it costs more to operate the larger engines than it does the smaller ones, and that this excess of cost of maintenance is offset only by greater efficiency. It has been asserted, upon the basis of this conviction, that the larger engines could not be operated economically at less than full load, and that to utilize them for water, creamery or laundry, was unjustifiably expensive. Perhaps the time was when this was demonstrably true. In the present state of gasoline engine development, however, such an assumption appears to be doubtful if not entirely unwarranted.

Recent experiments, conducted by the Agricultural Engineering Department of the University of Wisconsin appear to establish the surprising fact that it does not cost materially more to operate a 6 horse-power engine than it does one of half that capacity or less. This is important, if true, and the authority of the University of Wisconsin usually is to be depended upon in all matters relating to farm mechanics. This means simply that gasoline engine design and construction have been developed to such a de-

No. 4 Combination Punch and Shear



Will shear ¼x4-in. flat bars.
Will shear 1-in. round bars.
Will punch ¾-in. hole in ½-in. plate.
Depth of throat 6 inches.
This machine is furnished with ¼-in., ⅜-in. and ½-in. punches and dies, also a lever bar.

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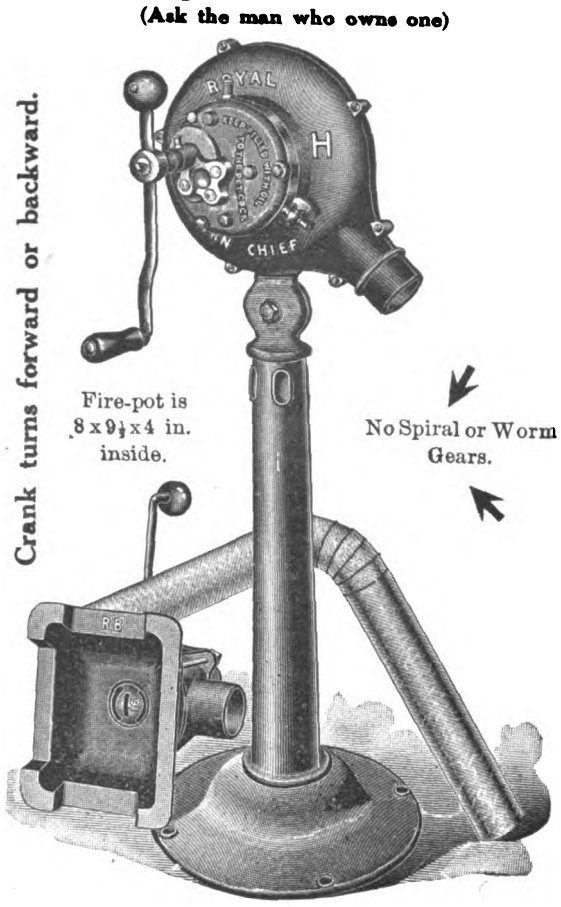
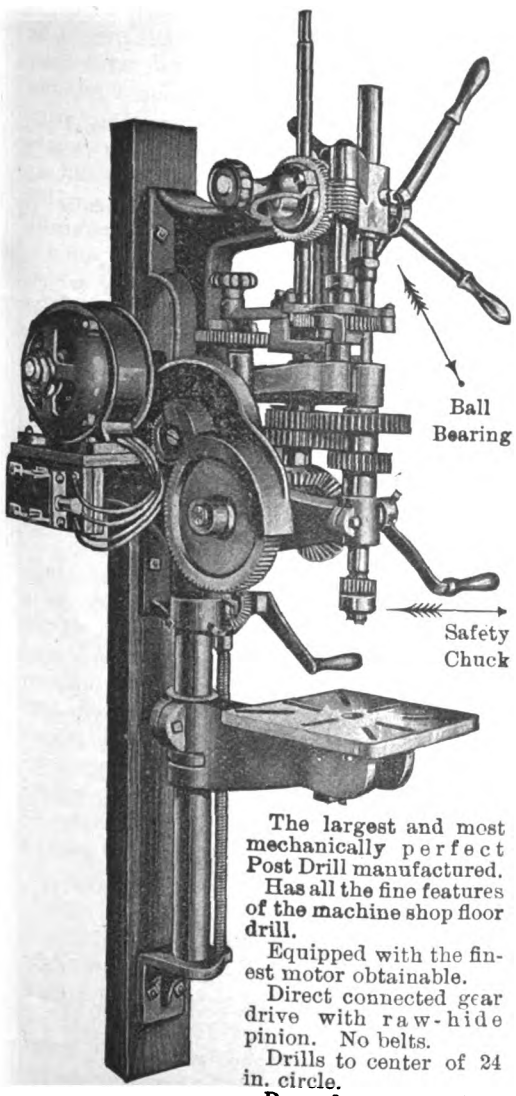


FORGES
BLOWERS

PUNCHES
SHEARS

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 raw-hide pinion. No belts.
Drills to center of 24 in. circle.
Bores from 0 to 1½ in.

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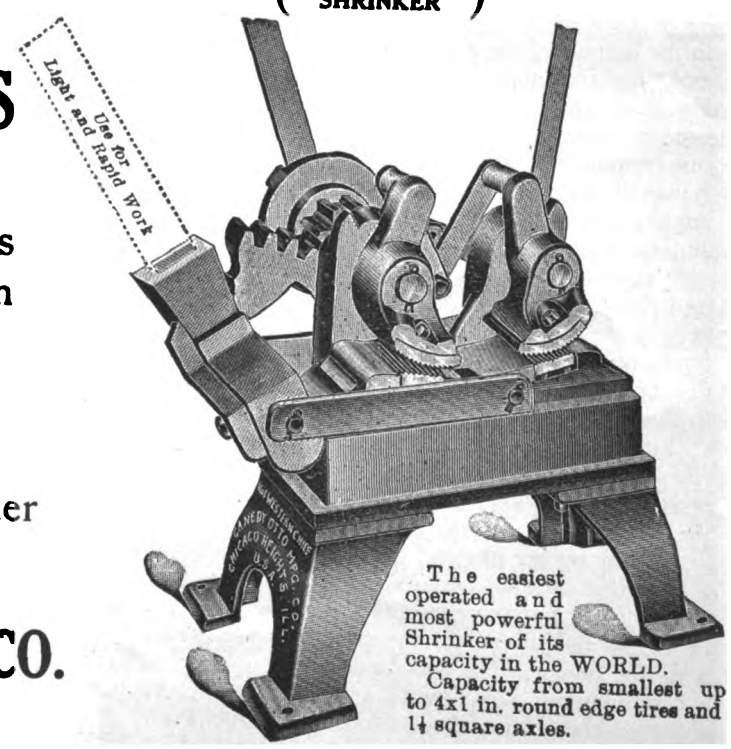

The easiest operated and most powerful Shrinker of its capacity in the WORLD.
Capacity from smallest up to 4x1 in. round edge tires and 1½ square axles.

gree of perfection that the regulating devices upon farm engines of to-day admit of a much wider range of adjustment and adaptation than in the past. Apparently engine manufacturers have specialized along the line of taking care of a variable load economically, so that the spread in actual cost of operation in setting an engine to light or heavy load practically has been eliminated. Furthermore, the cost of operation, due to better construction and design, has approximated rather to the lower expense ratio of the smaller engine than to the higher expense ratio of the larger.

In the light of these recent demonstrations the matter of engine choice, which in the first paragraph of this article was asserted to be of increased complexity, becomes immensely simplified instead. Eliminate the heavy field operations and the ordinary farmer will have very few occasions to use more than 6 horse-power in accomplishing all that he may desire to do. Thus, by owning an engine of this capacity, constructed according to the most recently approved designs, he can employ it at all tasks from the smallest to the largest without losing the advantage of economy of operation, and at the same time gaining in addition all of the advantages of convenience, which hitherto it has been an actual expense to enjoy. The retail dealer should be quick to seize upon the results of these recent experiments and demonstrations, because they furnish him with potent arguments for inducing farmers to buy engines of sufficient capacity to cover all of their ordinary needs.

A BRIGHT REPAIRMAN.

His Labor Saving and Labor Aiding Devices and Methods of Work.

From Motor.—When an automobile owner who has occasion to have done more or less work upon various parts of his car meets with a mechanic of unusual ability he will look, first with surprise, and later with a considerable amount of admiration, for this mechanic is, strange to say, more often found in the small and out of the way garage than in the large city one.

I am a car owner and I appreciate honest work; and having found such a man in the course of my motor wanderings about the country I took occasion not only to question him closely, but to watch his work, until I had learned numberless little pointers and helpful hints that I am not likely to forget and that I trust may be of some assistance to other motorists.

This young mechanic, whom I met in a by no means well-known section, impressed me by the unusual amount of resourcefulness displayed in his mechanical ability and I am certain that some of the "short cuts" and easy methods employed by him have brought up the business of the little shop where he is employed so that the owner may well enjoy the envy of his competitors. I hope that the interest and enthusiasm displayed by this mechanic when he is at work may be an incentive toward better and more careful workmanship upon the part of others.

My attention was first attracted to this young mechanic through the simple manner in which he repaired an annoying leak around a rivet head in the bottom of the gasoline tank, usually a most exacting and unpleasant piece of repair work. He thoroughly tinned the rivet head and surrounding parts, after which he filled a small tin cap from a soda bottle with solder and "sweated" it into place over the rivet head, thus accomplishing the repair in a neat and satisfactory manner and in the quickest possible time. This "short cut" may be better appreciated when it is realized that the work as ordinarly done would have necessitated the delay and expense incident to the removal of the entire body in order to make the tank accessible, since solder cannot be made to flow uphill.

But one day I happened to be in the garage when a customer brought in a motor that possessed a mysterious knock. When operated in the garage idle the motor ran quietly and smoothly, but the owner insisted that it was only under a load that trouble was experienced. This mechanic has a habit of never accepting hearsay evidence, so he jumped in the car and took a ride with the owner. He was back in the garage in a few moments when, with a satisfied smile, he removed the leather boot from the drive shaft and showed the owner a hot universal joint which had run dry and which the application of a little oil effectively cured. This remedy was applied after $30 worth of tinkering had been done by another mechanic, who had failed absolutely to locate the knock. My man of mechanical genius located it in a few minutes by coasting down hill with the clutch disengaged and the motor dead, so that, by a process of elimination, he was able to solve the problem.

At another time, having occasion to use a quantity of flat wire and not having any at hand, he skipped out to a neighboring tin-shop, where he made several feet of it by passing ordinary brass wire through a pair of rollers. If this mechanic had not been above the average he would have told you that he was sorry, but you would have to wait for three or four days until he could procure a supply of wire.

One day I noticed a small block plane upon his workbench and I studied it some time without being able to decide just where such an instrument would come in for work upon a motor car. Finally I asked him and was told that the plane was very useful for reducing the face of a new leather clutch, and I believed him when I saw him jack up the rear wheel of a car and hold the plane against the face of the revolving clutch while a helper turned the wheel.

A hack-saw frame is a useful part of this mechanic's tool equipment, and upon two occasions I saw him complete a small but troublesome bit of work in a small fraction of the time which would ordinarily be consumed. He cut notches with great rapidity in a castellated nut by using two blades instead of one in this hack-saw frame, and I later saw him use a very thin file in this frame so that the file was greatly strengthened and made to be used more efficiently.

A cheap but very useful tool chest is owned by this mechanic and he made it from an old chiffonier by cutting off the legs, so that it fits under his workbench. This makes a veritable chest of drawers and keeps his tools in a convenient position.

I saw him using a very light high-speed breast drill for small work and I found that he prefers this when using very small drills, as it does not break so many. The drill case proved interesting to me and I found that he had made it by procuring a suitable piece of leather and cutting it with flaps to fold over the ends of a small block of wood measuring about 5½ inches by 1 inch by ¼ of an inch. A piece of brass about 1/32 of an inch thick was bent so that it would cover one side and one edge of the block and small holes were drilled through this with the bit which was to occupy the hole. The numbers of the drills were stamped upon the face of the brass and the case proved to be particularly convenient since the proper drill could be found easily without resource to the drill gauge.

Having occasion to use a number of thin shims or washers with square holes, I watched him make them quickly by bending the brass over a round stick and making two cuts with a tubing hack-saw. Then he removed the brass, bent it over the stick in the other direction, and by making two more cuts with the saw, he had a neat, square hole in much quicker time than the same result could have been accomplished with the aid of a cold chisel.

A typical example of this mechanic's quick and sure diagnosis of motor ills was evidenced when he met a car owner who insisted that the only remedy for the trouble to his own particular car was a new carburetor. The old one, he thought, could not be adjusted so as to keep the spark plugs from fouling. The mechanic merely took off the carburetor and replaced it at a different angle, thereby eliminating an elbow in the intake pipe, with a result that proved all that could be desired.

A man who had difficulty in starting his car upon cool mornings wanted to have priming cups put in the cylinder heads which would have proved an expensive and difficult job, as the work would necessitate boring through the water jackets. This mechanic fastened a wire to a butterfly valve in the carburetor air intake in such a manner that the air was cut off when the valve was closed, thereby causing the motor to take in an unusually rich mixture and making it start readily.

A safety cranking device which eliminated the necessity of an automatic starter was devised for a man whose regular habit of forgetting to retard the spark properly had brought him a number of hard knocks and had made him afraid to allow his wife to drive the car. A safety starting crank was too expensive, so this mechanic attached an angle iron to the frame in such a manner that the starting crank could not be pushed into engagement without coming into contact with one arm of this angle iron and moving it a certain distance. This angle iron was, of course, attached by means of a flexible wire to the timer so that before the starting crank could be engaged the timer was instantly and automatically placed in the proper position, so that the motor was in every respect "back-kick proof."

The inventive turn of mind of this mechanic is shown by an instance where it was necessary to insert a cotter pin in a wrist pin. It happened in this case that it would prove an extremely difficult task to split the ends of the cotter so as to keep it in place. This mechanic made what he called a "self-splitting" cotter pin by sawing off about one-eighth of an inch of one portion and bending the other over the end of the cut-off part. A blow on the head of the pin with a hammer after the pin had been placed in position bent the head over to one side so that the bent end was drawn backward, automatically spreading the pin so that it could not work its way out.

Another ingenious bit of work in soldering the gasoline tank, which incidentally saved four or five dollars for a gratified car owner, was performed in a simple manner. The tank in question was built into the front seat in such a way that a leak in the bottom could not be reached without removing the body. This leak was repaired in a short time by cutting a hole in the top of the tank, which, after the leak was soldered, was repaired by a good-sized patch being soldered into position over the hole. This idea, the mechanic confessed, was not entirely original, as it was obtained from the experience of a plumber who repaired an annoying leak in an inaccessible part of a lead pipe by splitting the pipe over the leak, repairing the leak from the inside and then closing and soldering the upper part.

The extreme carefulness and attention to minute mechanical detail exercised by this mechanic, in whom I must admit I have taken an unusual amount of interest, accounts for the fact that men who have the ability to appreciate a good job invariably ask the foreman to let this mechanic do their work. It is said that this man is so deeply interested in his mechanical work that he not only has to be told when it is time to stop, but there have been occasions when he has forgotten entirely to draw his pay.

Whenever he takes anything apart which is composed of a large number of small pieces, he places them all in a shallow box and saves himself the embarrassing confession that a missing nut has been located in a differential case after it has stripped a gear. I really believe he would prefer to mash his fingers rather than a nut or the head of a screw, and for this reason his wrenches and screwdrivers are kept carefully dressed and in good condition. Some of his wrenches have milled or knurled handles, which lessen their liability to slip out of his hand and mar a finished surface. That he is careful is shown by the fact that when he pulls off a wheel he takes the trouble to protect the paint from grit and grease, and he always has a large quantity of clean waste about to keep anything from becoming soiled with oil or dirt.

Oil Prevents Cylinder Wear.

Unless sufficient oil is used, the piston rings will cut the cylinder walls, causing a leak. It is apt to break the rings or score the surface of the cylinder. When the cylinder wall becomes scored there is no other treatment than to send them to the shop and have them rebored. When cylinders become scored and have to be rebored it is necessary to fit new piston rings to insure proper compression. If the scoring is deep and the reboring increases the inside bore of the cylinder to any great extent, it will be necessary to have a new piston.

Paint Hints.

Add aluminum bronze to a white or light paint that is to be used for lettering on a dark ground.

To remove paint from the hands it is better to use horse hair with a little kerosene to remove the paint, and then finish with soap and water.

Hides for Trimming.—In selecting and buying hides it is necessary to bear in mind and distinguish between "quality" and "selection." There are best and second quality, and there are best and second selection.

Quality refers to the natural grain, and texture of a hide, whereas selection refers to its freedom, or otherwise, from holes and cuts, good or bad shape, or other defects. Therefore we may have a hide which is best quality and best selection, or a second quality, best selection, and so on.

A hide which is of good texture throughout will be found to take the graining cleanly and evenly all over, while an inferior one is soft and flabby at the flanks, and takes the grain badly at these parts. The latter cannot, of course, cut out to such advantage as the former—there is more waste, and this must materially affect its price.

The Greyhound Electric Forge Blower.—On another page will be found an illustration of the Greyhound Electric Forge Blower, manufactured by R. Gardner Electric & Manufacturing Works, 1714 Columbus road, Cleveland, Ohio. We understand that this concern will give thirty days' free trial and if not found satisfactory you can send the blower back. Write at once for prices and full description, and mention the "Blacksmith and Wheelwright."

Gillette Horse Clipping Cutters Reduced.—The prices of the celebrated Gillette Horse Clipping Cutters have been reduced. These cutters will fit any make of horse-clipping machines. Send for circular and prices. The same company makes the celebrated Gillette hand and electric power horse-clipping machines used all over the world for the last thirty years. Address all correspondence to the Gillette Clipping Machine Co., 110-114 West 32d street, New York City, and mention this magazine.

The Walle Foot Power Trip Hammer.—For the first time the Madsen-Walle Co. of Ludington, Mich., come before our readers with an announcement of the Walle Foot Power Hammer, which the manufacturers say, ought to be in every blacksmith's shop in the land. They claim that it will pay for itself in three weeks, and it saves a helper's wages and relieves the boss of a lot of hard work. It is built strong and cannot get out of order or wear out. It can be adjusted to strike a hard or light blow as desired. Write at once for further particulars and prices, mentioning The Blacksmith and Wheelwright.

Sample Calks Free.—The American Horseshoe Company, Phillipsburg, N. J., has a full page announcement in this issue of their calks, both sharp toe and heel calks. If your dealer does not carry these calks in stock he can get them for you. If you have never seen them, write at once to the company, as above, for samples and they will be promptly sent to you without charge.

Broken Anvils.—No matter how badly your anvil may be broken, it can be repaired so as to be as good as new by the Columbus Anvil & Forging Co., West Frankfort street, Columbus, Ohio, whose advertisement is on another page. Write to them for particulars.

PRICES FOR WORK.

How Blacksmiths Keep Themselves Poor By Not Charging Enough.

At a small Canadian town a rear spring hanger on the automobile broke. It could not be repaired. The body of the car rested on the rear axle on one side. The only thing to do was to block it up and drive the 60-odd miles to the factory in Detroit. The little town boasts of only one place where help could be secured. It is a blacksmith shop. The proprietor was a white-haired old patriarch with a full flowing beard. He reluctantly consented to help.

He took a block of wood, measured the space, cut it accurately, drilled two holes in it to take care of two bolts on the axle, slotted it to adjust it to other conditions, and then wired it securely on. It was a good job and it stood up. It took about an hour to fix it up, there was so much measuring and fitting to do. "How much?" asked the automobilist, fully expecting to pay a dollar or more. "Twenty cents will be about right, I guess," replied the blacksmith. "Twenty cents!" exclaimed the automobilist. "Why, that's not enough. Here, keep this half-dollar." It was all he could do to persuade the old man to take it.

The old man "guessed it would be about 20 cents." And that is one of the reasons, beyond a doubt, that, at an advanced age, he is still running a country blacksmith shop. And guessing instead of knowing will keep any business man down and absolutely prevent him making money and being hugely successful. There are altogether too many garagemen "guessing." The day of guessing is past; knowing is necessary, if money is to be made. "Breaking even" is not a real answer. You cannot be satisfied with such a tame game. You must forge ahead.

That means one must keep track of things—must get them down in black and white where he can refer to them; must look at the little things as well as the big; must realize that if he makes $400 on the sale of a car he loses, say, 30 cents if he gives a man three gallons of gasoline in his car when it contained only one gallon when he brought it in to have his tank mended. Someone must pay for those two extra gallons. He did not charge the customer for them; who pays? And that rear axle was doped with grease; how much was used? Was it four pounds or five? If it was five and you only charged for four, who pays? And that fan belt you put on the other day; you guessed it was about 50 cents for the belt and about a quarter for putting it on. How much time exactly was consumed putting it on? How much did it cost you?

Was a share of rent and light and heat and selling expense and all the rest that is known as "overhead," added to your cost? Have you got it figured out, or did you just price it 50 cents because the factory listed it at that? It won't "all come out in the wash." To know what a job costs you, you must know every item of time and material that went into it. Not "nearly" every item, but exactly ever item. It is the only way you can arrive at an accurate cost and add a "profit" that you know is a profit.

Half the complaints about unprofitable business can be traced to inaccurate, inadequate records—and records that are not kept up to date. Guessing is a costly procedure in business. The man who makes money these days knows. He doesn't "figure" that things are worth so much; he knows. If you know what labor costs, what your "overhead" is, what material costs, what selling expense amounts to, what your profit should be, and add it to the rest, you will be sure to make a profit. Unless you do know these things it is a case of waiting for the end of the year to find out. You may be too far gone then. You should know what you are doing on every sale. It is the only way you can be sure you are not like the blacksmith.

New Source of Rubber.—A company has been formed for the cultivation of the rubber vine *Cryptostegia Grandiflora* in the Bahamas. The plant grows as a vine and after six months' growth it is from 12 to 30 feet long. Five thousand vines will be planted to the acre, and the first cutting will take place at the end of twelve months. Each vine will yield about two pounds of cutting, containing in the neighborhood of two per cent of rubber, so that the yield will amount to 200 pounds of rubber to the acre. The rubber is of good quality and sells for only about eight cents under the price paid for the best Para product. The bark of the vine yields a cellulose fiber, while the pods contain a large amount of silky cotton suitable for stuffing pillows or even for making cotton thread. It yields a better product than the gayule shrub of Mexico; the yield is heavier and it stands cultivation much better. The only hindrance, it is said, to the cultivation of the rubber plant in the Bahamas is the scarcity of labor.

Profits for the Shoer.—This is to request our readers who have not yet investigated the hoof-pads made by the Firestone Tire and Rubber Co., Akron, Ohio, to turn to the advertisement of this company on another page for full particulars, and then order some from your supply houses. There are large profits in hoof-pads, and it will pay horseshoers everywhere to talk them up to their customers. If your supply house does not handle these pads, write direct to the Firestone Tire and Rubber Co., Akron, Ohio, and they will arrange to supply you with a trial set.

Broken Crank Shafts.—An unusual source of bewilderment to the careless repairman may arise in connection with the replacement of a broken automobile crank shaft. If the flywheel is not assembled in proper relation to the shaft, it follows that the guide marks on its periphery, used in timing the valves and ignition, will be useless. If this fact is not noted and the timing adjusted by the original marks on the gears or else by locating the dead centers and proceeding directly, it is quite likely that the motor will refuse to run when completely assembled.

By treating dead fireflys with a chemical preparation, the composition of which is a secret, Thornton Flower of Mona, West Virginia, says he is able to intensify and continue indefinitely their light giving properties. He uses them to illuminate his house at night, and with 250 of the defunct bugs in a glass globe produces a light surpassing as a luminant a tungsten incandescent electric lamp of thirty-two candle power.

Anti-Chinese and anti-Japanese legislation is not peculiar to the United States. The legislature of Manitoba is wrestling with a bill which, if enacted, will prohibit the employment of white women and girls in any factory or place of business owned or managed by Chinese or Japanese.

Painting Steel.—Iron and steel, while not presenting to the eye the same porous condition as wood, are full of finely divided pores, and the same atmospheric influences which enter the pores of wood and cause it to decay are ever ready to attack the unpainted surfaces of iron and steel; in fact, the metal surfaces more readily combine with the oxygen and moisture of the air, forming what is rust or oxide of iron. Therefore, immediately after the sand blasting and cleaning of the surfaces should come the application of the first or primary coat, as this is the most important one from the preservative standpoint.

In the selection of a suitable primer it seemed but natural for the painter to be guided by the experience gained in the painting of locomotive tenders, and to follow the initial coats with practically the same process as with wooden cars, and so far as the subsequent coats are concerned, this practice was generally carried out in the earlier painting of steel passenger equipment. It is thought that an error has been made in this general practice, as will be explained later.

Goodyear Tires.—Our readers are invited to write to the Goodyear Tire and Rubber Co., Akron, Ohio, for their book on carriage tires, which tells how to increase the profits in any shop by putting on solid rubber tires. The Goodyear Tires have a reputation throughout the world for durability. Write at once for booklet, mentioning the "Blacksmith and Wheelwright."

Whitman's Sultan Engine Book.—The Whitman Agricultural Company, 6926 South Broadway, St. Louis, Mo., whose advertisement of the "Sultan" gasoline and kerosene engine will be found on another page, have brought out a book giving some facts about the "Sultan" engine and a lot of important information as to the running and caring for gasoline engines. It is a book that every reader who has power or is thinking of putting in power should send for and read. A postal card or letter will bring a copy free of charge, or you can cut out the coupon in their advertisement on another page.

Butcher Knives for Blacksmiths.—The Woodward Knife Works of Nunda, N. Y., come before our readers again in this issue with their advertisement of butcher knives for blacksmiths. Readers of this paper can make a neat little sum easily each year by handling these warranted butcher knives. Your name will be stamped on the knife. See advertisement on another page for further particulars and send for one knife blade just as forged, as a sample, which will be forwarded free of charge. These blades are made from the best crucible steel, tempered by a special oil-drawn process. All knives are ground, polished and finished with hard wood riveted handles.

The Wolfe Tire Cooler.—This admirable device is made by the Wolfe Tire Cooler Co., West Carrollton, Ohio. Jobbers and supply houses sell it, or write direct to the factory, as above, for further particulars and prices. See their advertisement on another page, with illustration.

Walton's Vermont Register for 1914.—This work has been published annually for 100 years, and contains everything about that State which a business man wants to know. It is not only the best book of the kind for that State, but it is the best book of that kind which has ever been printed about any State for business reference. Paper edition costs 30 cents, and the substantially bound cloth edition is but 60 cents. The Tuttle Company, publishers, Rutland, Vt.

To Jobbers.—The Common Sense Tire Remover Co. wants your order for just one Common Sense Tire Remover, as a starter. The rest will be easy. The best customers they have, made them prove their proposition first. They say that the blacksmith can remove five tires with their Common Sense Tire Remover to one in any other way. See their advertisement on another page.

Ice Cutting Calks.—No doubt most of our readers will be interested in the announcement in this issue of Henry Wooldridge & Sons, Lye, Stourbridge, England, manufacturers of ice cutting calks, which are illustrated in their announcement. These calks are made from special Sheffield Steel; are said to be unbreakable and untwistable. This firm can supply machine made horse shoes, the usual pattern, ready fitted, with clip at toe and bevelled heels. This firm has had thirty-five years of experience in this business. These calks are furnished only through blacksmith supply houses.

Never-Slip Red Tip Calks.—We publish for the first time in this issue a full page announcement of this well-known line of calks which has been giving satisfactory service for over twenty years. Nothing but the best material goes into red tip calks and only skilled labor is employed in their manufacture. The red tip is a perfect calk, and when you receive a box of these calks you may know that every one in the box is guaranteed. The red tips are for sale by all heavy hardware jobbers, but our readers are invited to get full information by writing to the Never-Slip Manufacturing Company, Home Office and Factory, New Brunswick, N. J. The important thing to remember is that no calk is a Never-Slip unless it has the red tip, which is the trade-mark of the company.

The Witte Engine Catalogue.—Not only is the new catalogue of the Witte Iron Works Co., Kansas City, Mo., a delight to the eye, having been prepared and printed with artistic and practical taste, but it contains much valuable information to all mechanics as well as gasoline engine users. The point about this catalogue, however, that will most forcibly strike the average reader is the remarkable guarantee which the company publishes in it. This guarantee has the following clause: "You are to take the Witte engine of your selection, use it during sixty days after its arrival, to give it an honest, thorough test at your work. Then, if it fails to fulfill our promises and this guarantee, you are to notify us, when we will send you shipping instructions and return to you the full amount you paid us, together with all the freight money you may have paid to the railroad company; and, in addition, will pay you 8 per cent interest on your money for the full time we held it. We even guarantee to you safe delivery by railroad company."

In view of the fact that an opinion is more or less prevalent that gasoline engines often give trouble, the foregoing should be convincing that the Witte engine is surely just about "fool proof." In addition to this, the firm also guarantees a maximum service for five years. Who can ask more? This catalogue is copiously and well illustrated and is well worth careful reading. Quite likely a copy will be sent to any address on application to the Witte Iron Works Co., Kansas City, Mo.

Always Sharp Calks.—These are sold by H. A. Gable, Harrisburg, Pa. See advertisement in this issue, with prices.

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Subscribe for THE BLACKSMITH AND WHEELWRIGHT. $1.00 a Year.

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

will be inserted under this head at 2 cents a word, including the address for each insertion, payable in advance; but no advertisement will be accepted for less than 50 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 FOR INVENTIONS.

H. W. T. Jenner, patent attorney and mechanical expert, 608 F St., 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.

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.

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.

PATENTS.

C. L. PARKER, attorney-at-law, and solicitor of patents. American and foreign patents secured promptly. Handbook for inventors sent free upon request. 926 G street, Washington, D. C.

BLACKSMITH.

Here is your opportunity to be an expert blacksmith without help. As life is short, get Toy's Modern Methods of doing hard jobs easy, forging and welding all kinds of steel solid. Also tempering all tools to a standard by colored charts. This is real plain information, not theory, all for $1.00. Send for free samples first. W. M. TOY, Sidney, Ohio.

MECHANICS.

Send for a circular describing "Mechanics' Companions," a tri-square, a centering square, a caliper, rule and protractor. Address J. O. HESS, Oran, Mo.

WANTED.

WANTED—Traveling men who visit the carriage implement and livery trade make big commissions selling our steel and rubber tired wheels, poles and shafts as a side line. Why don't you try it? THE BOOB WHEEL CO., Cincinnati, Ohio.

CASH FOR YOUR BUSINESS OR REAL ESTATE.

I bring buyer and seller together. No matter where located, if you want to buy or sell, address FRANK P. CLEVELAND, 975 Adams Express Building, Chicago, Ill.

FOR SALE.

McGovern and West power tire shrinker, Moyer and Defiance hub boring machine. All as good as new at one-third the price of new ones. Address, 554 Freeman Avenue, Cincinnati, Ohio.

DON'T PURCHASE A TRIP HAMMER

Until you have asked for a price from the COLEMAN IRON WORKS, Elmira, N. Y., U. S. A.

POWER USERS.

Gasoline Engine bargains from 1 to 100 H. P. Get our big list and state your power requirements before you buy. BADGER MOTOR CO., Milwaukee, Wis.

FOR SALE.

General blacksmith and wagon repair shop; new dwelling house and about an acre of land, located in a thriving German Catholic settlement in a good farming community of Central Wisconsin. Fine chance for the right man. For particulars address A. J. MARTIN LBR. CO., Bloomer, Wisconsin.

FOR SALE.

Guaranteed Brooks Cold Tire Setter; a bargain; cash or part cash and short time on balance. Write for particulars. P. O. Box 325, Wichita, Kansas.

FOR SALE.

Horseshoeing shop; a snap; doing between $600 and $700 per month; reason for selling, other business; three electric fires, one electric clipper; shop first class and up to date. W. A. SCOTT, 409 Minnesota Ave., Kansas City, Kansas.

FOR SALE.

Blacksmith shop, four lots and house, engine and stock; only shop in town. Address for particulars, J. BROWN, Box 24, Bridgeport, Wash.

FOR SALE.

Blacksmith and repair shop in good farming country, equipped with engine and all the tools necessary. Only shop in town. Work for two men. Address E. E. CASS, Clio, Iowa.

FOR SALE.

Lathes, drills, millers, milling cutters, shapers, planers, motors, engines, all kinds of wood working machinery at reduced prices for 15 days. New jointers $65 up; combinations $85 up. Handy shears $10 up. BICKNELL M. & S. CO., Janesville, Wis.

FOR SALE.

General blacksmith, boiler and engine repair shop in good thriving locality. Two lots, tools and stock. Two fires and engine. Work for three men. Address for particulars J. H. BUTLER, Echo, Minnesota.

WANTED.

To sell or rent shop. Will sell stock and tools and rent shop. Two forges. Am too old to run it. Address for full particulars, TOM DINWIDDIE, Jamestown, Ind.

FOR SALE.

Blacksmith and wagon shop, tools and stock; shop will give work for 3 or 4 men the year around; located within 35 miles of Twin Cities, in one of the best farming districts in Southern Minnesota. Can be bought on easy terms or will trade for land. Address H. F. HEITKAMP, Belle Plaine, Minn.

FOR SALE.

One hand power circular rip saw. Will rip 3¾ inches thick, 19 inches wide. One single surfacer. Will plane 5½ inches thick, 24 inches wide. Address for prices, JACOB HERDT, Pewee Valley, Ky.

WANTED.

Blacksmith foreman for carriage factory. Must be a hustler. Send references and salary expected. Address H. C., care of Blacksmith and Wheelwright, P. O. Box 654, New York City.

FOR SALE.

Power blacksmith shop in good town on Cotton Belt Railroad. Good location, good outfit, plenty of work for two or three men. For sale or trade for good outfit in East Kansas. $1,750. For particulars and reasons write to A. C. HILBISH, Grapevine, Texas.

FOR SALE.

One 16 horsepower gasoline engine, one Barnes power drill, etc., extra cheap. Good as new. Address for particulars, H. M. LOWERY, Summit, Georgia.

$3,500.00

invested in an established carriage and wagon works, in one of the best towns in Oklahoma, gives purchaser controlling interest in a business now earning about 12 per cent dividends and management at a salary of $1,500 per year. Equipment new and modern, and our work is superior to similar lines in this section. Will bear rigid investigation. "G," care Blacksmith and Wheelwright, P. O. Box 654, New York City.

BLACKSMITH WANTED.

Horse shoer and general repair man wanted at once. Farm territory. No plow work. Call or write WILLIAM A. REAGAN, R. F. D., No. 2, Nazareth, Pa.

FOR SALE.

A fine chance for a good blacksmith. Owing to poor health I am offering my first-class, up-to-date power blacksmith and wagon shop for sale. Also a well-established side line of heavy hardware and machine repairs. This is an old established and good paying business and will bear the closest inspection. For further particulars write CHAS. REUTER, Enterprise, Kan.

FOR SALE.

Good blacksmith shop. Work and tools for two men; also lot with large and small house thereon. Plenty of fruit. Address JAMES M. ROTHERMEL, Herndon, Pa.

FOR SALE.

Power blacksmith shop, tools and materials. For particulars address G. C. SCHRECK, Paw Paw, Ill.

AUTOMOBILE REPAIRS.

Blacksmiths who own automobiles or repair automobiles in their shops should subscribe for the Automobile Dealer and Repairer, the big 100-page illustrated monthly devoted exclusively to automobile repairs. The only magazine of the kind in the world. The "Trouble Department," with five pages of numbered questions each month from car owners and repair men, which are answered by experts on gasoline engine repairs, is worth many times the subscription price, which is $1.00 per year or 15 cents per copy. The subscription price of this magazine in foreign countries, including Canada, is $1.50 per year. Postal cards will not be answered. CHARLES D. SHERMAN, 52 Windsor Avenue, Hartford, Conn.

FOR SALE OR TRADE.

White oak wagon felloes, $1 per set; 6-inch tire bender, $5. Will exchange for engine, jointer, blower or other machinery. Address E. E. SMITH, R. R. No. 1, Almo, Ky.

FOR SALE.

Full blacksmith outfit, machinery and tools. A snap for any smith. A good territory. Cheap shop rent. Am broken down in the back and can't shoe horses. The only shop in town or for fifteen miles. Address J. O. WILLIAMS, Houghton, So. Dak.

FOR SALE.

General repair shop and house in flourishing community. Shop 20 by 60. House two stories, nine rooms. Going into other business. Good prices; good collections. Address for particulars, CHARLES EBERHARDT, Beaman, Iowa.

FOR SALE.

A power equipped repair shop. Stock, tools and machinery in fine condition. Good trade and prices. Must sell to close an estate. Address Mrs. H. BULLINGER, New Haven, Mo.

FOR SALE.

Large, old-established carriage and automobile business; cause, rheumatism; going south. Big bargain. Address ELI CASSEL, Norristown, Pa.

WANTED.

A first-class horseshoer for country shop as partner, who is an all round hustler, in an up-to-date power shop. Good for $6,000 of business a year. Address for further particulars, B. L. EDWARDS, Athens, N. Y.

LEARN TO PAINT

automobiles and carriages by new, best and latest process. Good money in it. I can teach you how to do first-class work. J. FRAHLICH, Mayfield, Ky.

WANTED.

Second-hand horse shoeing stocks. Please describe and give price. GEO. H. HOLZBOG & BRO., Jeffersonville, Ind.

WANTED.

General blacksmith for country work in small town. Steady job, $3 per day for a good man. Address D. M. LOVE, Winthrop, Iowa.

FOR SALE.

CASTINGS—½ horsepower upright gasoline engine (rough), with drawings, $5. Machined and assembled, $12. Good side line for blacksmiths. Write MUSTIN MFG. CO., Newport, Ky.

FOR SALE.

Blacksmith shop in good locality. Will sell at a reasonable price on account of sickness. Write for particulars to G. E. PETERSON, Box 308, Clinton, Minn.

FOR SALE.

Blacksmith shop, dwelling, twelve acres of land, well improved; good territory, six miles from Lagrange. Am in bad health. Address for particulars, HY REHMANN, Rutersville, Texas.

SITUATION WANTED.

An experienced carriage painter, striper and finisher wishes a job in some quiet country town with some blacksmith building enough work to keep a painter going. Address W. A. RIGGLEMAN, Jamestown, Ohio.

BROTHER,

Accidentally have discovered a root that will cure both tobacco habit and indigestion. Gladly send particulars. No drugs. G. S. STOKES, Mohawk, Fla.

Common Sense Tire Remover.—This very practical and efficient tool is manufactured by the Common Sense Tire Remover Co. of Dowagiac, Mich. It is for sale by the trade generally. If your dealer does not keep it, write direct to the company, as above, for descriptive circular and price. The manufacturers say there is nothing like it for removing tires quickly.

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

Suregrip Calks.—The American Calk Co. of Detroit, Mich., announces in this issue its Suregrip Calks, which are guaranteed. See advertisement on another page for further particulars and a description of the good points of these calks.

Bent Knees, Bob Sleighs, Etc.—The Sherwood Hall Co. of Grand Rapids, Mich., makes a specialty of bent knees, bob sleighs, Success oscillating sleigh knees, etc. See their advertisement on another page, with illustrations, and write for further particulars and price list.

The Little Giant Shoeing Vise.—Every farrier needs a good shoeing vise when sharpening time comes. An excellent vise for this purpose is made by B. B. Noyes & Co., Greenfield, Mass. They also make a line of other tools and machinery for the blacksmith trade. Write for their circular and price list, and mention the "Blacksmith and Wheelwright."

Dayton Fifth Wheel.—Readers who have never tried the Dayton Fifth Wheel should turn to the advertisement of this company on another page and read the description of it. You can get these Fifth Wheels from your supply houses.

Increased Demand for Horses.—Never within the memory of men now living have farmers experienced more difficulty in finding suitable horses for agricultural use or paid higher prices than during the past year. Increase of agricultural operations, and the increased demand for horses in agricultural pursuits has kept pace with increased operations and increased demand for horses in nearly every other walk of life. Notwithstanding the presence of the automobile, the increased demand for horses has, during the last ten years, kept pace with the increased demand of any fiscal decade. This is a thought which should be borne in mind at this season of the year.

Farmers have paid $500 to $600 per pair for horses to work on the farm, and the high cost has stimulated many farmers to buy mares to raise future home supplies. It takes the aggregate sales of many products of the farm to realize the price of a pair of good horses, and farmers will find it economy to raise more horses in the future, as indications warrant the expectation that the demand will exceed the supply for several years.

Horses go into service younger than a score of years ago, and are soon disabled on the hard paved streets of cities. The services of city horses being shorter increase the demand, and if motor vehicles were not largely used we are frank in saying it would be difficult to supply consumers' needs.

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 principles 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
Pittsburg, Pa.....McLean & McGinness	Wilmington, Del.....Delaware Hardware Co.
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New Orleans, La.....Jos. Schwartz Co.	

SHELDON

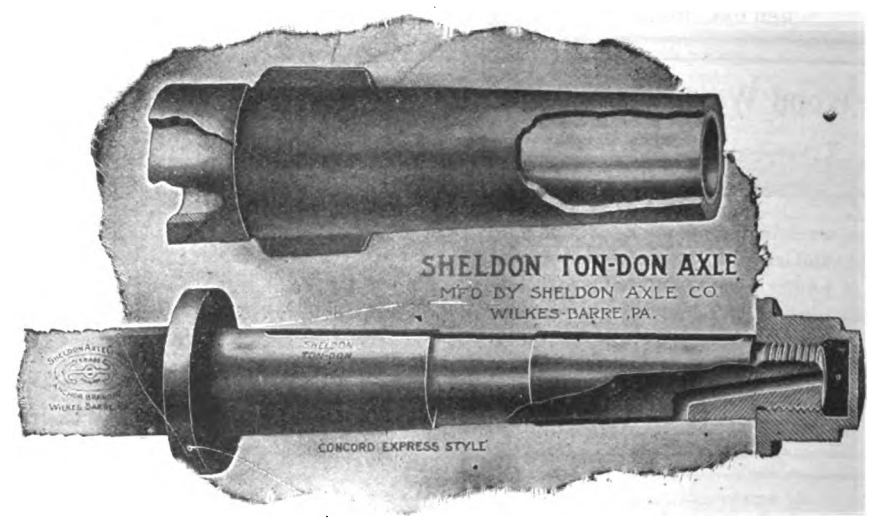
"TON-DON"

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 CO.
WILKES-BARRE, PA.

LARGEST AXLE FACTORY IN THE WORLD.

Business Promotion Through Trade Press Efficiency

is to be the keynote of the most notable gathering of technical, class and trade journal editors and publishers ever held in America. No live manufacturer, sales manager, advertising man, trade paper editor or publisher can afford to overlook the

Eighth Annual Convention of the Federation of Trade Press Associations in the United States at the Hotel Astor, New York, Sept. 18, 19, 20, 1913

Two sessions will be held daily. There will be editorial, circulation, advertising and publishing symposiums under competent leaders. Many of the leading editors, business managers, buyers and sellers of advertising, and authorities on modern merchandizing methods will take part. On Friday afternoon, September 19, there will be a mass meeting with addresses by representative business and professional men, on subjects of timely interest to editors, publishers and advertisers. Distinguished guests and worth-while speakers will be at the annual banquet, which will be made a memorable social occasion. No matter what may be your connection with the trade journal field, if you are interested in the idea of business promotion through trade press efficiency, if you believe in business papers for business men, you will be welcome at all sessions.

Full information may be obtained from

The Committee of Arrangements

WM. H. UKERS, Chairman, 79 Wall Street, New York

The Federation of Trade Press Associations in the United States

President	Secy.-Treas.	Vice-President
H. M. SWETLAND	EDWIN C. JOHNSTON	E. C. HOLE
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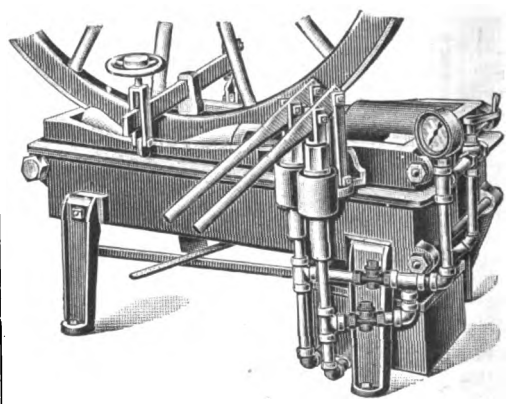
The

LITTLE GIANT



Simple—Reliable—Durable.

The machine that makes tire setting a pleasure.

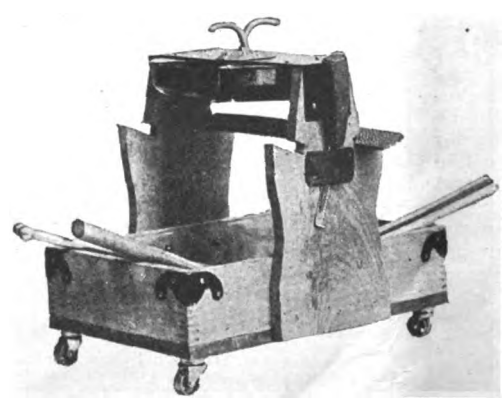
You will need one soon.

Write today for Literature.

Keokuk Hydraulic Tire Setter Co.
29 Johnson St., - Keokuk, Iowa.

THE UNIVERSAL HORSESHOEING BOX

SAVES YOU TIME, NAILS AND MONEY



Five separate compartments for nails.

Only one size can spill out when the box is kicked over.

No dirt or hoof clippings mixed with your nails.

A trial will convince you. Ask your jobber or write us direct. Circulars will be sent free on request.

KRUG BROS., Mfrs., - - Fond du Lac, Wis.

No. 400 BLOWER with its Whirlwind Tuyere has no Equal or Comparison.

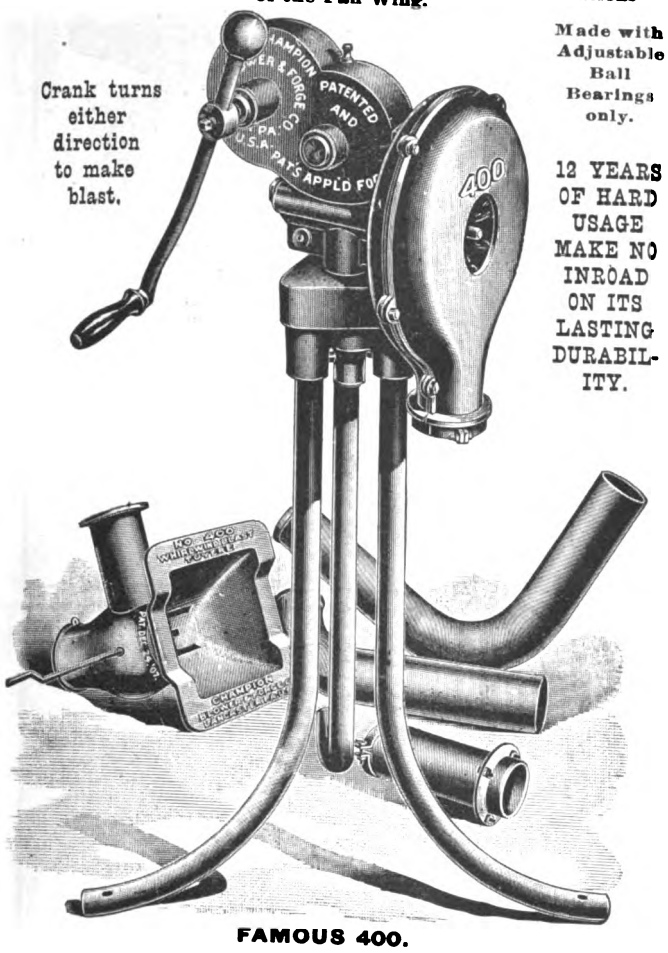
Endorsed by over 600,000 happy users as the Blower that has Multiplied Profits and reduced hard labor to its minimum.

Each turn of the Crank produces 46 Complete Revolutions of the Fan Wing.

Crank turns either direction to make blast.

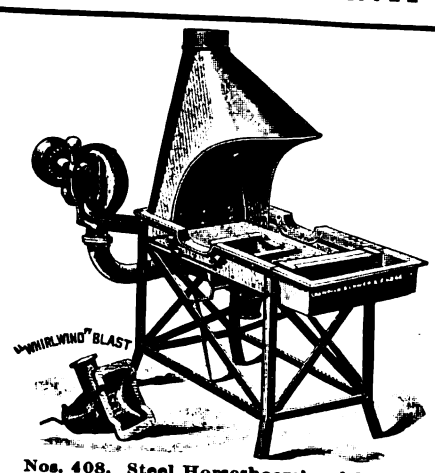
Made with Adjustable Ball Bearings only.

12 YEARS OF HARD USAGE MAKE NO INROAD ON ITS LASTING DURABILITY.



FAMOUS 400.

THE 400 CHAMPION



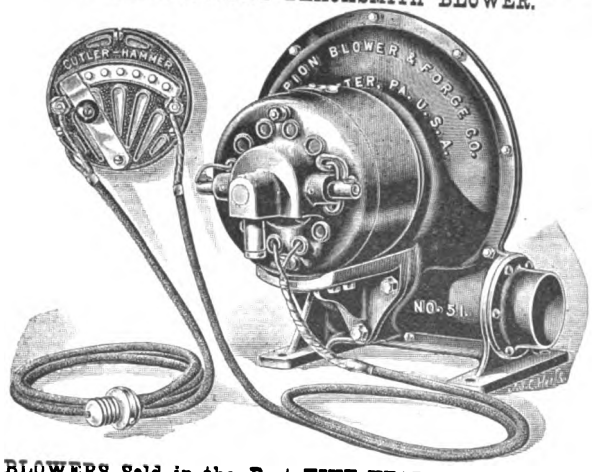
Nos. 408. Steel Horseshoers' and Blacksmiths' Forge with Half Hood. Hearth 30 x 36 in. Fan 12 in. in diameter.

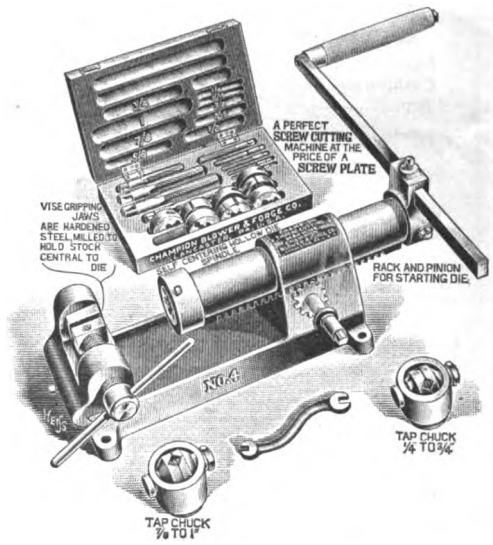
No. 433. Cast Iron Blacksmiths' Forge with Half Hood and Sloped Bottom Coal Box. Hearth 32 x 45 in. Fan 12 in. in diameter.

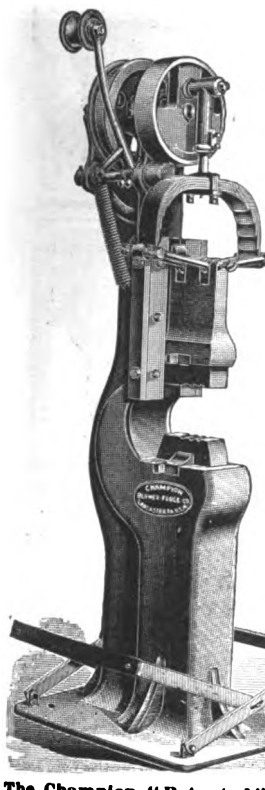
CHAMPION THREAD CUTTING MACHINE.

Made in two sizes. ¼ to ¾ inches, or ¼ to 1 inch

THE CHAMPION ONE FIRE VARIABLE SPEED ELECTRIC STEEL PRESSURE BLACKSMITH BLOWER.



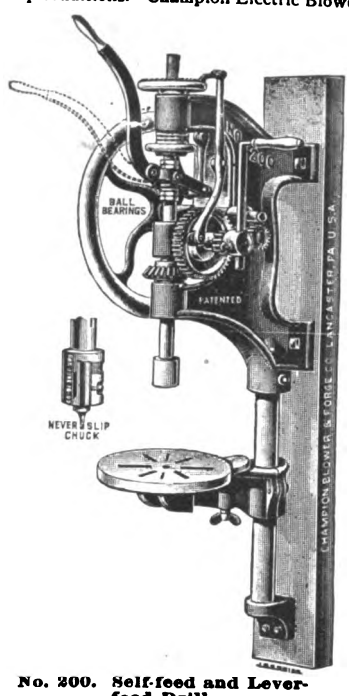




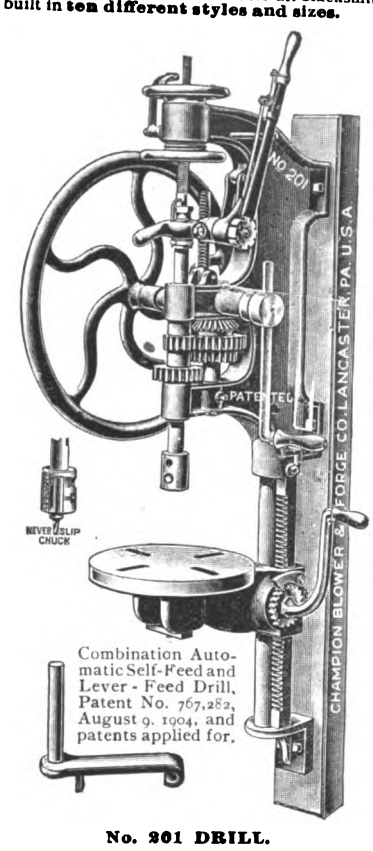
The Champion "Patented" Power Hammer. Weight of Ram 65 pounds.

30,000 CHAMPION ELECTRIC BLOWERS Sold in the Past FIVE YEARS.

Champion Electric Blacksmith Blowers are all tested before leaving our works with a continuous **ten hour, highest speed, non-stop run. Our 40% over-size motor does this with ease,** prevents all over-heating, guarantees endurance and meets all blacksmith shop conditions. Champion Electric Blowers built in **ten different styles and sizes.**



No. 200. Self-feed and Lever-feed Drill.



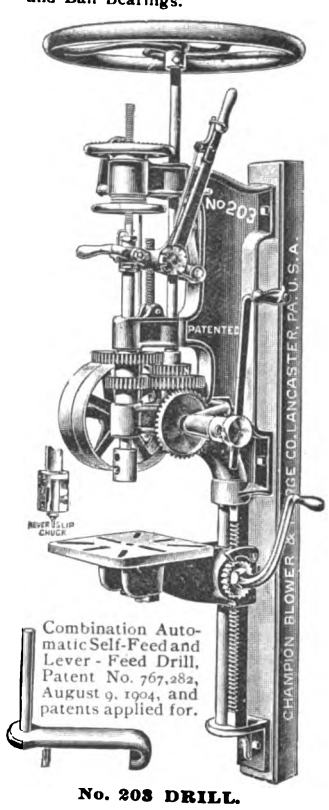
Combination Automatic Self-Feed and Lever-Feed Drill, Patent No. 767,282, August 9, 1904, and patents applied for.

No. 201 DRILL.

THE CHAMPION LATEST INVENTION!

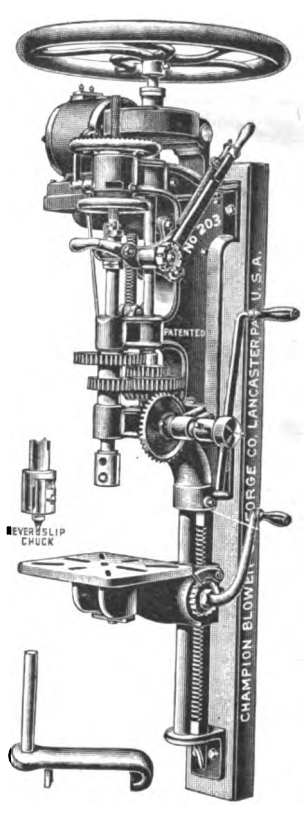
Observe the Double Compound Lever-Feed.

On the **Champion "Patented" Automatic Self-Feed and Double Compound Lever-Feed Upright Post Drills.** Made with Cut Gears and Ball Bearings.



Combination Automatic Self-Feed and Lever-Feed Drill, Patent No. 767,282, August 9, 1904, and patents applied for.

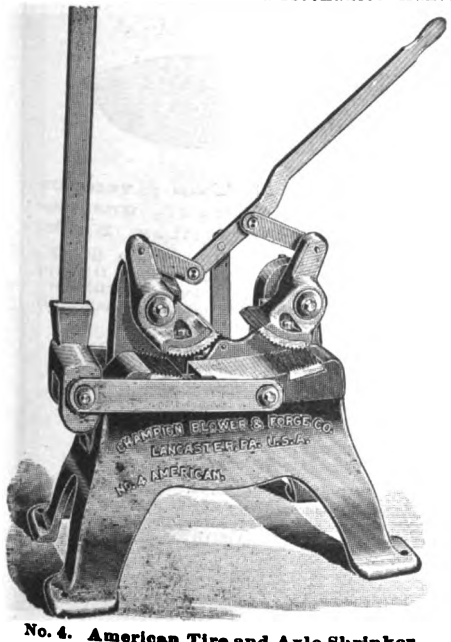
No. 203 DRILL.



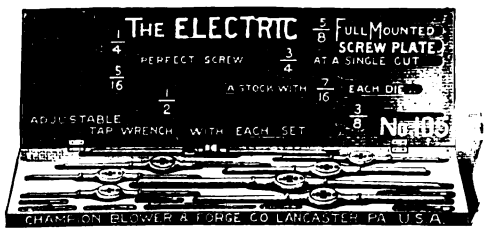
No. 203 Champion Combination Automatic Self-Feed and Double Compound Lever-Feed ELECTRICALLY DRIVEN Upright Post Drills.

This Drill has the motor direct connected to the upright back gear shaft, which represents what we consider a perfect up-to-date Electric Drill and one that is worthy of most careful consideration from the up-to-date mechanic. It represents simplicity, durability, and no loss of power.

THE POWER HAMMER With the Flexibility in Stroke of a Hammer in a Mechanics' Hand.



No. 4. American Tire and Axle Shrinker.
Will shrink up to 4 x 1 inches round edge tire, and axles up to 1¼ inches.



No. 105. Electric Full Mounted Screw Plate. Screw Plates in four styles cutting up to 1½ inches.

Our New Catalogue can be had free upon application, showing the very latest and greatest inventions in the blacksmith line in the world on Blowers, Forges, Drilling Machines, Tire Benders and Shrinkers, Screw Plates, Power Blowers, etc. It will pay you to see our catalogue. Write for it.

The Double Compound Lever-Feed produces 80 per cent more pressure or drills holes 80 per cent larger, with the same labor, than any other Lever-Feed Drill.

Remember

There is no TURNING BACK of the FEED SCREW NUT WITH EITHER FEED.

THE DOUBLE COMPOUND LEVER-FEED SAVES 200 PER CENT.

IN TIME AND LABOR in drilling holes, reaming, countersinking, etc., and makes the drill a first-class Wood Boring Machine.

THE CHAMPION BLOWER & FORGE CO., Lancaster, Pa., U. S. A.

Sole Agents for Great Britain and Ireland, PFEIL & CO., Clerkenwell, London.

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

THE

BLACKSMITH AND WHEELWRIGHT

Vol. LXVIII. No. 4. NEW YORK, OCTOBER, 1913. TERMS: ONE DOLLAR A YEAR

ICE WAGONS.

Detailed Construction of the Latest Designs for City or Country Use.

BY WAGON MAKER.

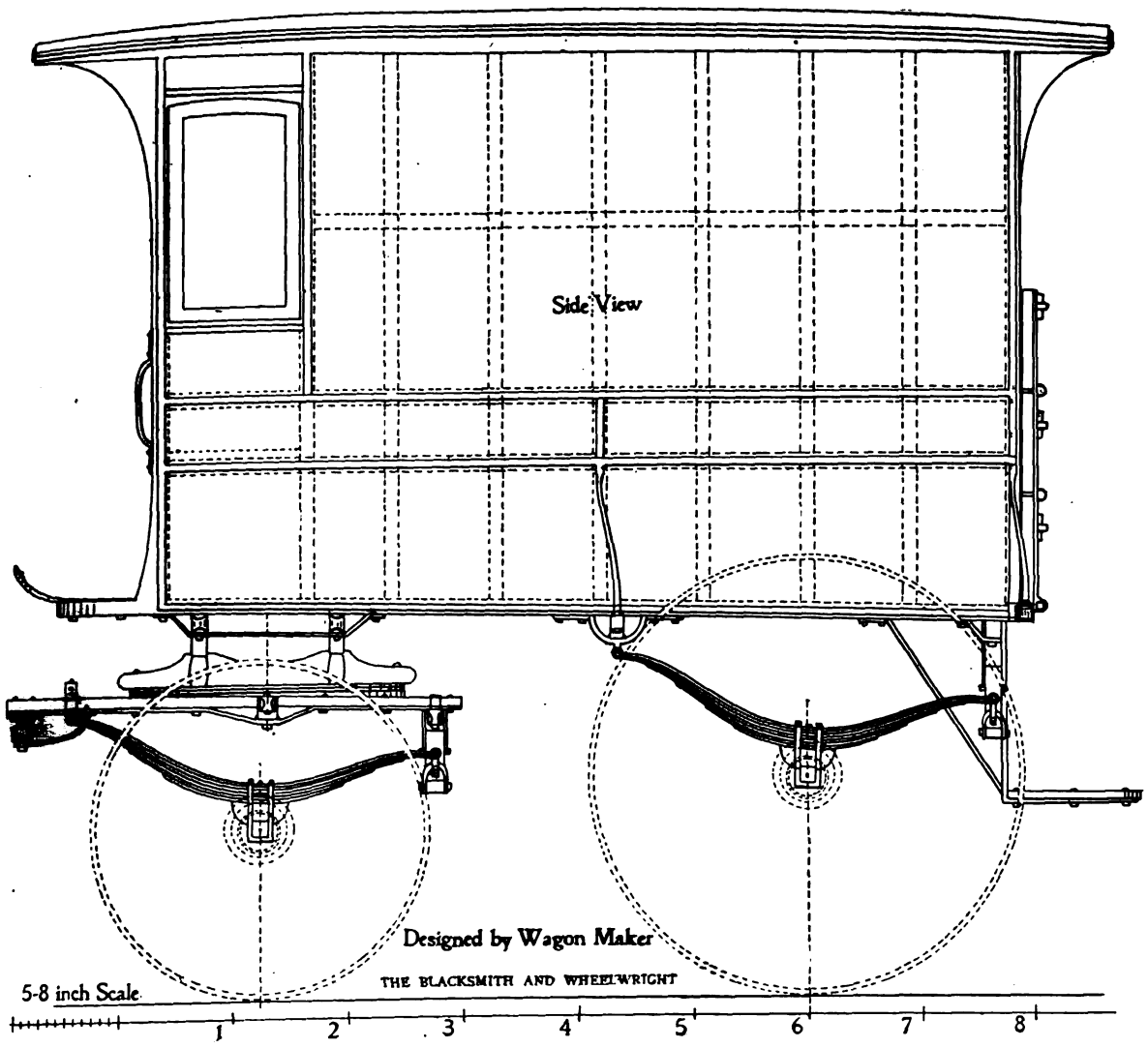
Ice wagons are built in different sizes and carrying capacities, and are drawn by one, two or three horses. Some are built for city delivery and others for suburban or country use. For city delivery they are generally built heavy. The lightest have 1⅝ inch spokes and 2⅛ inch springs, but for suburban and country use they are built lighter. The general proportions are about as follows:

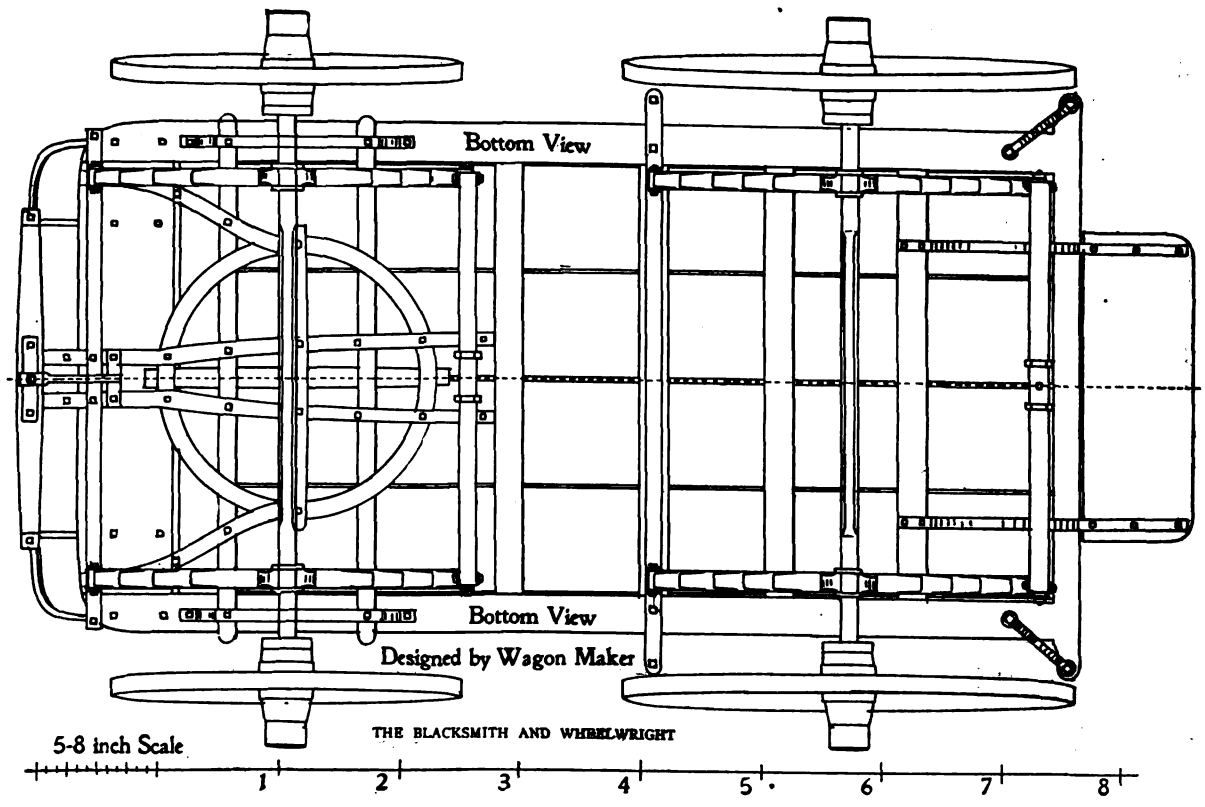
For length of body from front edge of seat to rear end, for medium size, 7 feet 6 inches; for large size, 8 feet 6 inches, and for extra large size, 9 feet to 9 feet 6 inches. These last are drawn by three horses. Across the body they are 46, 48, 50 or 52 inches outside. For medium or large size they are not less than 45 inches across the inside. The artificial ice blocks are generally 11 by 22 by 42 inches, and the width and length of the body is made to suit the size of the blocks and the number for one load. Four sizes of axles are used: 1⅜, 1½, 1⅝ and 1¾ inches. The carrying capacities are calculated for the four sizes of axles as follows: 1500, 2300, 3000 and 4000 pounds.

The weights of the wagons complete are about 1200, 1500, 1750 and 1900 pounds, respectively. It is very difficult to give the correct sizes and it can only be done approximately, because two wagons built exactly the same dimensions vary from 25 to 50 pounds.

Construction of the Body.

The manner of construction varies considerably; some have the lower part of the body covered with ⅞ inch thick boards, four or five bows or posts for the top. When built with sharp round cornered bent bows the top is finished with slats about ⅜ by 1½ inches, 1 inch apart. They were formerly covered with imitation leather cloth, but this practice has been discontinued because the imitation leather cloth does not retain the cold, causing the ice to melt quickly. Panels have been substituted to prevent the melting somewhat. This is done for the sides and the top. Another practice and a more practical one is to have the posts on the outside and board it with ¾ or ⅞ inch thick boards on the inside. This makes a very solid construction and as light as it possibly can be made. The sills are generally 1½ by 3½ inches; the cross-bars 1½ by 3 inches, except the end bars which are 2⅛ by 3½ inches. On this frame the bottom boards, which are ¾ inch thick rest on cross-bars and sills. While its construction is all right the trouble with all such wagons has been that the water from the melted ice rots the wood in a very short time. The water enters into the sill mortises and under the bottom boards. All the bottom boards are painted but the weather soon destroys the paint and the boards. A new method is now employed.





The sills have 1¾ inches drop; that is, the body is suspended 1¾ inches lower in the back than in front, but the rest is square; the lower edge of the top rail is level with the base line and the drop is in the sills only. The posts are 9½ inches apart, 1¼ by 1⅝ inches mortised into the sills and lapped into the top rail. The entire outside surfaces are covered with ½ inch thick poplar panels. Between the posts is a space 1⅜ inches thick; that is, the thickness of the posts which is filled up with cork. Over this ½ inch thick panels are fitted on the inside surfaces; that is, the sides only. The front back of driver's seat is closed with ⅞ inch boards. The bottom boards are ¾ inch thick and rest on sills and cross-bars as usual.

The top has 1 by 1⅛ inch curves, covered with 5/16 inch panels, close jointed. Give two coats of lead color and when dry cover with imitation leather cloth. Board the top from the inside, and paint also with lead color so as to keep out the dampness. Over the side surfaces the front and bottom are fitted copper sheets, fastened on the top edge and the rear end edges only, thus preventing the water from getting into the framework.

The trap-gate is covered from the inside with the same metal, but as there are two joints which have at least ⅛ inch opening across the width, the metal laps over the joints to prevent the hot air from entering. On top above the drop-gate is a leather curtain, which instead of rolling, slides sideways if required to be opened, and is 3 inches lower than the drop-gate. On account of the sills slanting toward the rear end, no water can accumulate and will run off as soon as the ice melts under the corner jamb of the drop-gate.

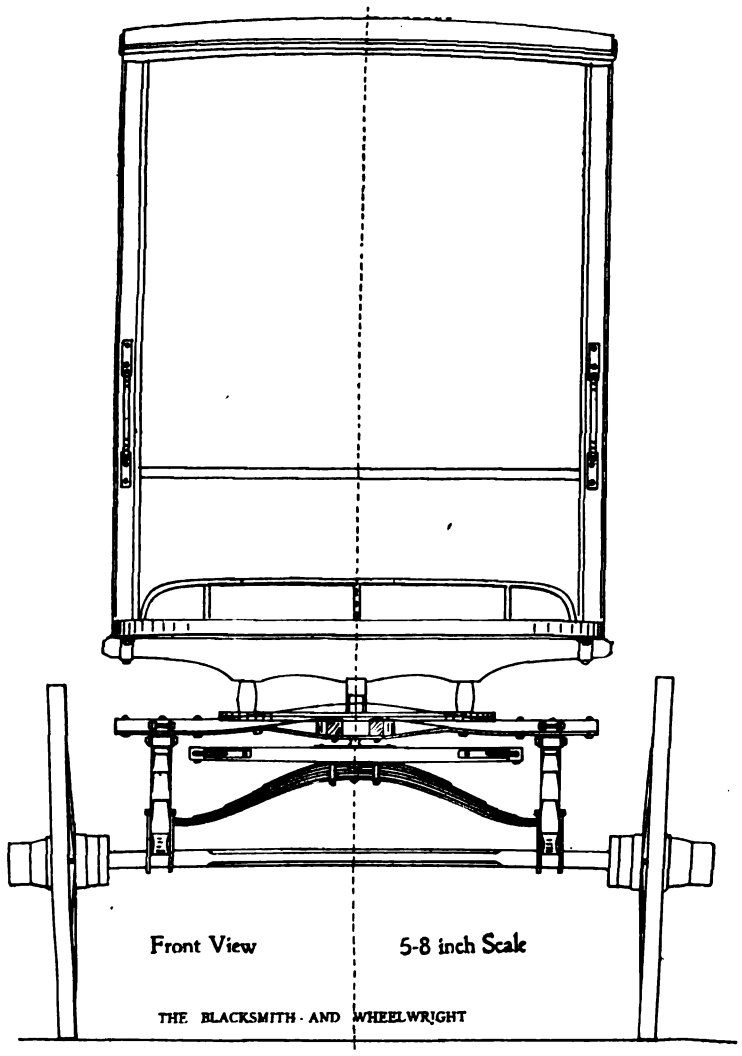
The ⅞ inch thick board for the driver to sit on is done away with and replaced with a framed seat, and the space between the four pieces is supplied with a lid. The same is done with the heel board, so that the driver can reach, whatever is placed under the seat, without mounting the seat.

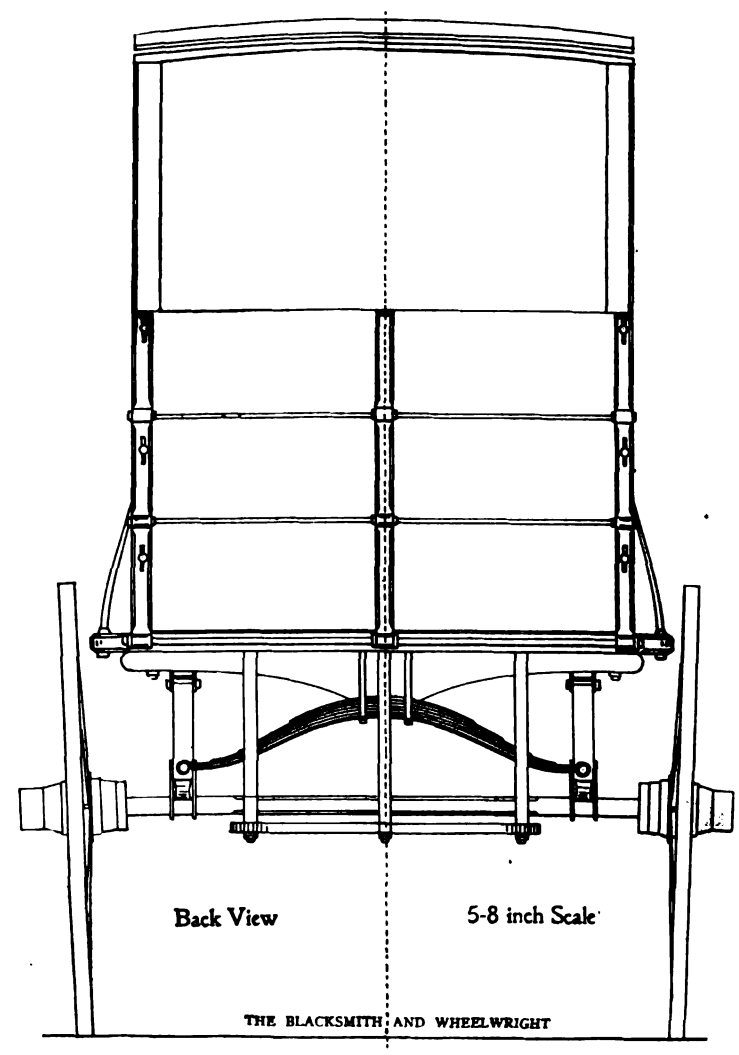
The two glass frames are made to drop level with the fence rail and there is no back for the driver to rest against but there is a 3 inch high cushion.

The rear step board is 1¼ by 15 by 30 inches supported by heavy double iron braces. The scale is generally fastened to the extended rear top and lowered inside a way that it is most handy for small or large ice blocks, without much lifting. On some of these wagons the lower part of the drop gate rests on a step when in a horizontal position and the ice block is pushed on it before weighing, bringing it directly under the scale.

The body is suspended front on two transom

cross-bars, strengthened on each side below the sills with a brace on each side. The shape can be seen on the front view. Below the bars are four spools resting under it and on top of the fifth wheel. At the center is a futchel resting at the fifth wheel and under the transom bars, which is heavier at the center than at the ends to strengthen it, because the fifth wheel goes through this futchel. The pole futchels and side futchels are best seen on the bottom view, making one of the most simple and strongest gears in use. Dimensions for a medium size gear Warner wheels:





Diameter of front and rear wheels, 34 by 44 inches.
Diameter of hubs, 5½ inches.
Length of hubs, 9½ inches.
Width of spokes, 1⅝ inches.
Thickness and depth of rims, 1¾ by 1⅞ inches.
Thickness and width of round edge steel tires, ⅝ by 1⅝ inches.
Number of spokes front and rear, 14 and 16.
Two side and one cross spring front:
Length from centers of bolts, 30 inches.
Open out to center of eyes, 7 inches.
Width of plates, 2 inches.
Number of plates, 6.
Thickness of main plates, No. 2.
Thickness of other plates, Nos. 2, 2, 2, 3, 3.
Clipped to axle.
One cross spring:
Length from center of bolts, 39 inches.
Open out to center of eyes, 7¼ inches.
Width of plates, 2 inches.
Number of plates, 7.
Clipped to head block.
The rest same as side springs.
Two side and one cross spring back:
Length from centers of bolts, 40 inches.
Open out to center of eyes, 8 inches.
Width of plates, 2 inches.
Number of plates, 7.
Thickness of main plates, No. 2.
Thickness of other plates, all No. 2.
Clipped to axle.
One cross spring:
Length from centers of bolts, 39 inches.
Open out to center of eyes, 8¼ inches.
Width of plates, 2 inches.
Number of plates, 8.
Clipped to cross-bar.
The rest the same as side springs.
Width of springs across, outside, 41¼ inches.
Width of track, outside, 62 inches.
Length of body outside of posts, 7 feet 7½ inches.
Length of body on top rail, 9 feet 6 inches.
Height of body, outside, 5 feet 3 inches.
Width of body, outside, 4 feet 2 inches.
Width of body, inside, 3 feet 9 inches.
Thickness of sides each side, 2½ inches.

THE CARRIAGE BUILDERS.

The National Association One of the Oldest of the Kind in the Country.

Not only is the Carriage Builders' National Association one of the oldest trade associations in the United States, it having been organized Nov. 19, 1872, but it has a history which is both interesting and a credit to its members.

It was organized in the city of New York by a small number of carriage makers from different parts of the country, not only for trade betterment through the usual business channels, but likewise through the cultivation of a fraternal social spirit, and this last named purpose has never been neglected.

Although the carriage trade has passed through many vicissitudes since the association was organized, notably the panic of 1893, which extended to 1896, making that year the darkest and most disastrous in the history of the carriage business, yet there has always been strong and energetic business men in the association—men to advise and speak words of encouragement—and no one can attend one of its annual conventions without coming away more hopeful as to trade outlook and more inspired by the expressions of rational co-operation which are always noticeable. In a recent booklet issued by the association the secretary gives the following concrete instances of its advantages and benefits:

"Aside from the great work done by this organization in bringing members of the vehicle industry together for better acquaintance and consequent harmonious and friendly relations, it has always been active in initiating and encouraging movements for the advancement and uplift of the industry.

"The work of its freight committee alone has saved to the membership more money than has been paid to the association several times over. Its committee on good roads did pioneer work in agitating for better highway conditions many years ago, and has continued actively to interest itself in this important subject, which to-day has become one of national concern. The matters of fire insurance and fire prevention have received intelligent study of the committee appointed each year to investigate them, and the recommendations of this committee have done much to minimize fire losses and reduce premium rates for many of our members. The remaining committees have done equally creditable work for the association.

"The association has always deeply interested itself in the subject of technical education for vehicle mechanics and draftsmen, and early organized and continues to conduct in the city of New York an excellent institution for the furtherance of this worthy object.

"The annual exhibitions, which are held at the same time and place as the conventions, have been the means of introducing to the trade the newest parts, materials and inventions of the accessory members, and have kept the trade informed and reminded of what is being produced for their use."

Although to-day there are literally hundreds of organizations in the United States of similar import, there is none in which a more fraternal spirit exists. Outwardly there is and has never been the slightest indication of business mistrust, and still less of what may be termed jealousy, nor is there anything of the sort apparent when one gets below the surface.

Looking back through the files of The Blacksmith and Wheelwright and making a hasty scan of the reports of the annual conventions, some unusually fine addresses appear, and they have invariably been by men of high ideals and culture. It will be interesting to many of the younger and later generation to know that in its early days it was the custom to make honorary members of men who were distinguished in literature. At all events, it appears that the poets, Longfellow and Whittier, were made honorary members in 1881, and from each an appropriate letter of acknowledgment was received, that from Longfellow being characteristically dignified but cordial, and the one from Whittier being humorous, as likewise indicating the Quaker poet's occasional lapse. The letters follow:

Nahant, July 28, 1881.

DEAR SIR: Your letter and the diploma of "The Carriage Builders' National Association" have been forwarded to me at this place, and I hasten to acknowledge their safe arrival.

I beg you to express to the members of your Association my cordial thanks for this mark of their regard and consideration, and the gratification I feel in being chosen an honorary member of their body.

I am, dear sir, with best wishes, yours very truly, HENRY W. LONGFELLOW.

Amesbury, Mass., Oct. 8, 1881.

DEAR FRIEND: I have received the certificate of membership of the Carriage Builders' Association of the United States, so kindly forwarded by them as the organ of the Association. Many of my immediate neighbors and friends are car-

riage builders, and I feel a natural interest in this important branch of industry, and am proud of their well-earned success; but I have a little doubt as to my deserving the honors conferred upon me. I am not a builder in the sense of Milton's phrase of one who could "build lofty rhyme." My vehicles have been of an humbler sort—merely the farm-wagon and buck-boards of verse, and are not likely to run as long as Dr. Holmes' "One-Horse Shay," the construction of which entitles him to the first place in your Association. I should not dare to warrant any of my work for a long drive. Nevertheless, permit me, through thee, to thank the Association for a token of generous appreciation which I shall highly prize. With hearty good wishes for the prosperity of its members in contributing to the material wealth of the country and the comfort and convenience of the people, I am truly thy friend, JOHN G. WHITTIER.

The convention will this year be held at the Coliseum, St. Louis, Mo., beginning Tuesday, October 14. The program is as follows:

First Day.

Tuesday, October 14, at 10 o'clock in the morning:

It is the desire of the President and the Association that the proceedings shall open promptly at the hour named.

And to this session all the ladies visiting the Convention are most cordially invited.

The meeting will be called to order by the President, Mr. Charles C. Hull, Connersville, Ind.

Address of Welcome by His Honor Henry W. Kiel, Mayor of St. Louis.

Response on behalf of the Association by Mr. E. M. Galbraith, Cincinnati, Ohio.

Opening Address by the President, Mr. Charles C. Hull.

Short address and talks by our members and other representatives of both the Vehicle and the Accessories Trades on the condition of these industries, and what can be done for their benefit.

Nomination for President for the ensuing year.

Appointment of a Committee on Resolutions.

Appointment of a Committee to Recommend Officers for the ensuing year.

Appointment of a Committee on the Exhibition.

Appointment of an Obituary Committee.

Adjournment.

The Reception to the members and ladies will be at the Planters Hotel, from 8 to 11 o'clock. All members and their ladies attending the Convention are invited to be present. Tickets for this Reception will be furnished free to members and their ladies.

Second Day.

Wednesday, October 15, at 10 o'clock in the morning:

Meeting will be called to order by the President, Mr. Charles C. Hull.

Address by Mr. Russell E. Gardner, St. Louis, Mo.

Address by Mr. H. P. Bope, First Vice-President of the Carnegie Steel Co., Pittsburgh, Pa., "The Future of Steel, with Incidental Reference to Allied Trades."

Report of the Executive Committee, Charles A. Lancaster, South Bend, Ind., Chairman.

Report of the Secretary and Treasurer.

Report of the Committee to Recommend Officers for the ensuing year.

Election of President.

Adjournment.

Third Day.

Thursday, October 16, at 10 o'clock in the morning:

Meeting will be called to order by the President, Mr. Charles C. Hull.

Report of the Committee on Statistics, Mr. O. B. Bannister, Muncie, Ind., Chairman.

Report of the Trustees of the Technical School, Mr. Charles J. Richter, New York, Chairman.

Report of the Committee on Freight and Classification, Mr. Theo. Luth, Cincinnati, Ohio, Chairman.

Report of Committee on Abuses in the Carriage and Accessory Trades, Mr. Perrin P. Hunter, Cincinnati, Ohio, Chairman.

Report of the Committees on New Members, Mr. W. H. Roninger, St. Louis, Chairman, Central Division; Mr. C. O. Wrenn, Norfolk, Va., Chairman, Southern Division; Mr. W. H. Son, Wilkes-Barre, Pa., Chairman, Eastern Division.

Report of the Committee on the Press, Mr. J. Frank Hutcheson, Cincinnati, Ohio, Chairman.

Consideration of the Report of the Executive Committee.

Unfinished Business.

New Business.

Election of Officers.

Report of the Committee on Resolutions.

Report of the Committee on Exhibition.

Report of the Obituary Committee.

Selection of the place for the next Convention.

Adjournment.

Annual Banquet.

Planters' Hotel, Thursday, October 16, at 7.30 o'clock in the evening:

Tickets for the Banquet can be obtained from the Secretary at St. Louis.

At the Annual Convention, held in New York, October 9, 1907, a resolution was passed "that the Secretary be required to charge for all extra tickets the cost of the same per plate." As this Banquet will cost slightly over $7.00 per plate, the extra ticket will be $7.00 per ticket.

This does not concern the members' own tickets, as they are all entitled to one ticket free. Only applies to the extra tickets any one may wish to have. Please note this so there will be no misunderstanding.

For the accommodation of the members of the Association, the Secretary will be at the Exhibition Hall on the afternoon of Tuesday, Wednesday and Thursday, October 14, 15, 16, from 2 until 5 o'clock, for the reception of new members, giving out Banquet tickets, and such other business as may be required of him. The members are earnestly requested to procure their Banquet tickets as early as possible, so that we can tell who will be present at the dinner.

To prevent mistakes and misunderstandings, the Executive Committee has adopted the following rule: Members of the Association who desire their representatives to use their Banquet tickets must give an order for the same in writing to the Secretary.

As the Secretary has to be in St. Louis some days before the Convention dates, all letters to him requiring an answer should be mailed so they will reach him at Mount Vernon, N. Y., on or before October 6th.

CERTAIN MECHANICAL MATTERS.

Feed-Knuckles—Hack-Saws—Ratchet Drills —Forge Fans—Letter-box Turntable.

BY JAMES F. HOBART, M. E.

A machine recently came into the shop for repairs in which the feed works were driven by a sort of universal joint arrangement, consisting of links and knuckles, as shown by Fig. 1. This device was attached to two small short shafts and permitted considerable lateral motion between the shafts as required by position of the main cutters. Upon taking down the knuckle, the sockets presented the appearance about as shown by Fig. 2. They had been very badly worn on the inside edge of both lips. This was caused by the knuckle bar grinding into the socket. Evidently the pins used in the sockets had become worn out or lost, for small carriage bolts were used instead of pins when the device came into the shop. This permitted the knuckle bar to dig and grind into the socket, wearing away that bit of apparatus, as shown by Fig. 2, and likewise cutting the knuckle bar to pieces, as shown by Fig. 3.

It will be noted that the pin holes in the knuckle bar are badly worn, also the sides of the knuckle bar have been cut away. The quickest way to cure the knuckle bar was to make a new one. This was done by cutting off a piece of 1-inch key steel, rounding both ends, as shown by Fig. 4, and drilling holes for the pins. The old knuckle bar could have been repaired in a manner similar to that employed for repairing the knuckle socket, but as the new parts should be made much cheaper the old ones were thrown away.

Fig. 5 shows how the knuckle socket looked after it had been repaired. The repairing was done by melting in new metal by the oxy-acetylene process to fill the worn places A and B, Fig. 2, which repaired parts, as shown at C and D, Fig. 5, and care was taken to build up these parts so they formed a very nice fit against the new knuckle bar. In fact, the bar was fitted at A and B so there was less than .001 inch play between the new bar and its socket.

Special attention was then given to reaming the holes E E, Fig. 4, and these holes were made .002 inch larger than the pins, which were ⅜ inch cold rolled. The holes, F, Fig. 5, were also reamed but were made a drive fit for the pins which were forced in so tightly that there was no danger of their ever falling out or becoming loose and giving wear in the sockets. In this manner the action of the knuckle was made to take place not only on the pins but upon the sides of the bar, thereby preventing undue wear on the pins and giving a strong, even action to the knuckle.

Making the Most of the Hack-Saw.

The writer once had charge of a small shop which was fitted with tools of rather ancient design—"hand-me-downs" in fact, which though serviceable and capable of good work, were never guilty of exceeding the speed limit. The power hack saw—and every smith shop should have one—ran its daily and never-ceasing course at the rate of 60 strokes per minute, and work was always waiting for that hack saw—as also, usually was the boy who operated it.

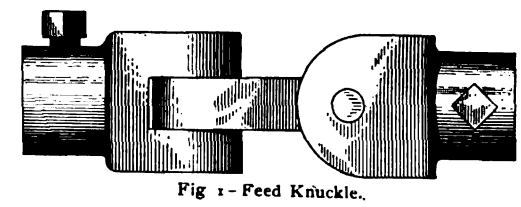


Fig 1 - Feed Knuckle.

The saw was of very light and obsolete construction, did not lift the saw from the work during the return stroke, and in other ways was of the hack-saw vintage of 1890. It was determined to make this saw do more work, for it was morally certain that another saw would never be forthcoming as long as this one could cut off a bar of iron, therefore, the speed was increased by changing the drive pulley, making the saw run 80 cutting strokes per minute.

Some high-speed saws were procured and the old saw took a new lease of life and cut off work in a hurry. The Indiana floods of March, 1913, covered the generators from which this machine shop drew its operating current, and after things had been dried out, it was noted that every tool in the shop was running faster than before. This was finally traced to the fact that the company supplying current had put in a new generator, the current had changed a little, and our old hack-saw was now running 90 instead of 80 R. P. M.

Protest was quickly entered by the saw to the excessive speed, and every pin and joint began to knock and remonstrate. But I wanted to get out lots of work and the sooner the old saw was used up the sooner would a new one be forthcoming, so it was kept running and tuned up to

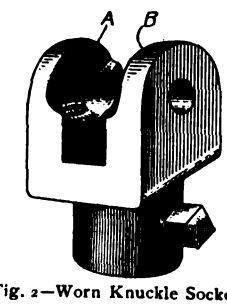


Fig. 2—Worn Knuckle Socket.

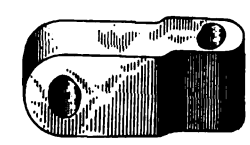


Fig. 3—Worn Knuckle Bar.

get as much knock out of it as possible. It was found that by crossing the driving belt, the saw ran much easier, as, due to the great angularity of the very short connecting rod, the out-stroke was made in about one-half the time required to make the return movement. Crossing the drive-belt caused the long stroke to be the cutting stroke and left the return for the short or quick stroke. This, as stated, caused the saw to run earier. It was also found that by giving the saw all the feed it could carry—and a trifle more—it would run steadier and with less knock than with a light feed.

Power-Driven Ratchet Drill.

There is a "cub" in our shop who has excellent inventive faculties, or else he has been reading how the first valve motion was devised and attached to a steam engine. At any rate, this cub has beaten the ratchet game a mile and drilled a whole lot of holes in a very short time with very little labor on his own part.

It happened thus: A considerable number of ⅞ inch holes had to be drilled in the frame of a machine which could not be well placed under any drilling machine in the shop, therefore the cub in question was put in charge of a ratchet drill and the "inch an hour" operation. The boy,

being naturally lazy, as are all who devise improved machinery, I shortly found the embryo inventor running the old ratchet at the rate of 100 strokes a minute, while he did nothing but follow up with the feed.

He had found a slotted crank, somewhere in the junk pile, mounted the crank shaft in a couple of bearings and rigged a pulley and belt to the line shaft in such a manner that the crank made 100 R. P. M. A connecting rod of round iron had been rigged, with a turn-buckle in it for easy adjustment. The ratchet end of the connecting rod was merely an eye, turned in the round iron and welded. In fact, a common eye-bolt, thread and all, had been placed in the connecting rod and made the right-hand end of the turn-buckle connections.

To form connection between connecting rod.

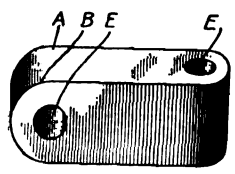


Fig. 4—Knuckle Bar.

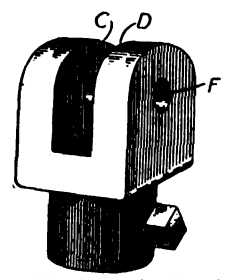


Fig. 5—Knuckle Socket Repaired

and ratchet handle, the cub had simply slipped a set-collar up in the handle, slipped on the eye of the connecting rod, then another set collar, and tightened the two collars at the desired distance from the end of handle to give the required stroke. Then the little crank-shaft was set agoing, and the manner in which that ratchet drill broke all records and made new ones was a caution.

Forge Fans.

Trouble with a blast fan supplying forge fires, led to overhauling the blowers and the vanes were found to be like A, Fig. 6, herewith. The manager expressed surprise at the appearance of the vanes and ordered a machinist to make and put on some shaped as at B and E. The machinist objected to the change with remark that the fan would not run as well and would require much more power after the change was made.

The change was made, the new vanes of No. 14 black steel were cut out and flanged over about one-half inch and placed to run concave side ahead, as at E. After the fan was put to

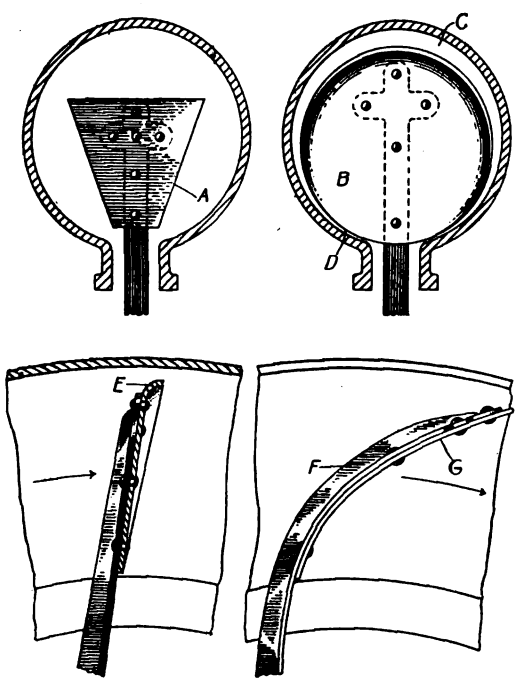


Fig. 6—Fan Changes.

work it rattled as though loose in the bearings, although such was not the case. The machinist tinkered half a day with that fan, but could not make it run quietly, whereupon the manager told the machinist to "fix it up somehow," and the machinist quickly took off the new vanes, turned them around so as to run convex side first and riveted them on again. The result was remarkable. The fan went right about its business with never a rattle or a shake. It delivered about twice the air it put forth with the vanes like those at A, but the fan consumed more power than with the old vanes, although not as much as before the new vanes were turned around.

What caused the trouble, with the new vanes sharp edge foremost, is left for the wise men to determine, but the writer has had similar trouble with some threshing machine blowers, which were made with runner-arms somewhat as shown at F, and with vanes still more curved, as at G. The trouble met with, in using this fan, was something horrible. Every few minutes the fan would become clogged with straw, or the pipes leading to the stack would become jammed full, necessitating a stop to clean things up. A very simple change cured the trouble. The fan runner was taken off its shaft, and turned the other side to, so that it practically revolved in the opposite direction from what it did before. But not in opposite direction as regards the casing. The machinist evidently was wise to the same thing when he reversed the vanes, as shown at E. He might have secured the same results by reversing the runner, but he preferred to reverse the vanes only.

It was noted during the making of vanes B E, that the machinist worked to secure a pretty close fit against the casing at D, a nut kept the vanes away a considerable distance at C. The reason for this could not be given by the machinist. He only knew that "it had to be so" in order to work well with the least power expenditure. Probably skin friction of the body of air contained in the casing had something to do with the machinist's ideas of vane shape. It may be that he filled the section at D, because the air was being drawn in at D, and had a radial velocity which rapidly changed to circular instead of radial direction, but at C the volume of air was all being forced ahead, inside the casing, and must necessarily

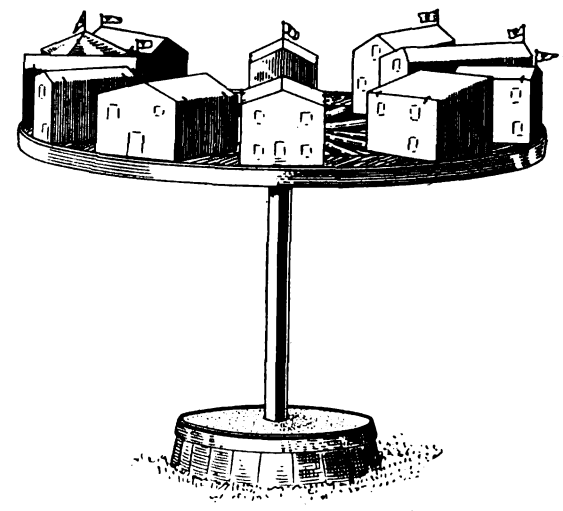


Fig. 7—Rural Delivery Turntable.

impinge against the casing. Had the vanes been made to sweep the casing cleanly the friction of the air against the casing would call for a lot more power, but with a lot of space at C the body of air could slip around the casing upon itself instead of upon the casing; that is, the most of the air slipped around upon a layer of air close to the casing, instead of upon the casing itself, thereby lessening the skin friction and permitting the fan to run quietly and with a minimum of driving power.

A Letterbox Turn Table.

Out on route 11, Rural Free Delivery from Fort Wayne, Ind., about at stop No. 4, Fort Wayne and Springfield, Interurban Railway, is a whole bunch of letter boxes which have been arranged by a genius in a manner to save steps for the postman and for the owners of the boxes. Fig. 7 show how the stunt was pulled off so the postman could stand right in his tracks and serve all the boxes.

An old wagon wheel and its axle served as the base of the device. A hole was dug in the ground, a barrel placed therein and tamped solid. Then the axle was set on end in the barrel, projecting about three feet therefrom, and stones and cement grout were shoveled into the barrel until it would hold no more. The cement was smoothed off nicely on top of the barrel and care taken to keep the axle upright so the wheel could lie level.

The cement was allowed to harden over night, then the wheel was fastened in place and the mail boxes bolted to the spokes and rim on the wheel which had been painted and varnished in great style. When the postman places mail matter in the boxes he has only to revolve the wheel to bring any one of the receptacles within reach. The barrel was left outside the concrete, but after the barrel decays and falls to pieces, the concrete base will show all the way down to the ground, giving a more pleasing effect than the barrel presents.

It is suggested that the farmers install a telephone on top of the hub whereby the carrier may call up one of the farmers and give a list of the names of those who have letters in the boxes, then the one receiving the list may call up the others and tell them that mail is waiting for them.

TEMPERING A HAMMER.

How an English Mechanic Says He Does It Successfully.

To temper a smith's or fitter's hammer properly is one of the jobs which many an otherwise good forge-hand either never acquires or foolishly forgets.

First assure yourself the steel is good; next, in the making, take care not to overheat or to hammer when black-red. Assuming this to have been attended to, the next point is to slowly heat the hammer-head to a fairly rich red, and dump into red-hot ashes placed in a pit scraped in the hearth as near as convenient to the fire, and cover up tightly and soundly with fine hearth-ash dust, and allow to remain till cold—say, all night. Dress up.

Now make a hollow fire by the simple expedient of allowing a chunk of wood to burn out in the center of a heaped fire, so as to form an arched cave with an opening towards the front of the hearth. Into this insert your now annealed and finished hammer-head, holding it on a stiff rod flattened at end to loosely fit the edge, and with blast at half-cock let the heat soak well in. While this is proceeding, fill the water trough to within three inches of the brim, flinging into it a handful or two of cheap salt, if it is procurable. When the work is at a rich red heat remove, and by letting the rod rest on the edge of the trough allow the peen end to dip into the water taking care not to allow the eye part to be touched by the bubbles thrown up.

As the peen end contains much less material than the face, it will be cooled almost sufficiently for tempering purposes before the heat of face shows signs of lessening. When this part has been sufficiently long submerged, and only practice and size of job can determine this, twist the supporting-rod so as to bring the face end into the water, always taking care to keep the eye above surface. During this part of the cooling keep a strict watch on the temper color of the peen part, which now begins to creep up, and should it show signs of arriving too quickly it is arrested by a quick twist of the rod on the trough edge, bringing the face momentarily out of the water and the peen in. Usually, however, when the face has had sufficient first dip, the peen is ready for cooling out, while the truly business end of the hammer is closely observed for the correct temper color, and as soon as this arrives twist rod again so as to immerse that end. When the face temper is right, all that is necessary is to continue to rotate the supporting-rod slowly, dipping "heads and tails" alternately till the eye has arrived at a safe heat for cooling—i. e., when it is black-hot. This method of tempering hammer-heads with good steel correctly handled cannot fail as care is taken to keep the eye-walls soft, and the hot-red end, which fits in the eye during the operation, allows of sufficient heat being retained in the job itself to run the temper-color to the ends. Though long in the telling, the job is simple in execution, and may be logged as under:

Tempering Hammer-Heads.—Take good tool-steel, do not overheat nor work when black-hot, anneal and finish, heat slowly on rod placed in eye, lay rod on water-trough edge and by revolving same cool ends alternately, commencing at peen, never allowing eye parts into water till black-hot, when cooling-out can take place.—English Mechanic.

Iron Enough To Last 300 Years.

The supply of iron ore available under present methods of mining in the entire world has been stated by geologists of international reputation at 22,000,000,000 tons, from which it is estimated 10,000,000,000 tons of iron may be produced. At the present rate of consumption, this supply would last the world about 60 years. There are, however, more than 123,000,000,000 tons of ore not now commercially available, which, with improved methods of production, may be made to yield in the future an additional 53,000,000,000 tons of iron, which would run the world along for another 300 years, if no more iron were used annually than at present.

SEAMLESS TUBING.

A New Invention Which it is Claimed Saves Largely in Labor and Cost.

Representatives of seamless tube manufacturers, the first of last month, inspected in Detroit, a new invention for the production of seamless tubes, which does away with the 100 or more distinctive operations in their production and combines all in one continuous operation without waste.

The invention, if it proves successful, threatens to revolutionize the industry, in which there is now invested some $200,000,000 in manufacturing plants.

The machine is so compact it occupies but 3 feet by 20 feet of factory space. A double machine, producing two tubes at once can be operated by two men. The hot or cold rolled steel is fed into it at one end and the tubing comes out at the other end. Every step is automatic and radically different from anything now used—forming, welding, straightening, sizing, polishing, drawing and even cutting being performed by the machine without deterring the forward progress of the steel. The machine turns out the finished, polished tube at a rate of 4,000 feet a day in any size, weight, form or length desired.

Advantages claimed for the tube produced are: No waste—the only waste in the entire operation is 1/16 of an inch in the cutting of the tube into the desired length. Present production methods incur waste of as high as 30 per cent. in some processes.

The thinner the tube, the cheaper. This reverses the present best basis, which is based on the greater amount of labor required to draw the tubes to finer sizes. As the size of the automatically machined tube is determined by a simple adjustment of the machine, the material used alone regulates the cost.

Uniformity of thickness, molecular tension, and resistance are assured, a variation of only .001 to .0005 inch in thickness was recorded by the micrometer in testing the tubes made by the machine while under inspection of experts.

Irregular shapes: By ready adjustment, any desired shape of tube is made; standard forms as oval, round, square, hexagon, etc., and irregular shapes, such as grooved round tubes for automobile wind-shields, etc. No additional expense is incurred in the production of the irregular shape; no more time is required for its production.

Any size: Tubing from one to seven inches diameter can be turned out by the standard machine by making adjustments. Larger tubing can be produced by building a special machine.

No weak point: The method of threading the automatic tubing converts the weakest point of present tubing into the strongest point of that produced by the new invention. Instead of cutting threads into the ends of this tubing, the threading is built onto the ends of the new tubing, thus increasing its capacity to withstand pressure.

The machine as demonstrated saves about 90 per cent. in labor in the production, and reduces the total cost of production by about 50 per cent.

As the machine is so compact, it can readily be set up in the shop of any manufacturer using seamless tubes in his products.

The company organized to market the invention announces that it will not sell its machines but will license manufacturers to their use on a royalty basis.

Marshall B. Lloyd, president of the Lloyd Manufacturing Company, Menominee, Mich., is the inventor of the new process. Mr. Lloyd was the inventor of the woven wire fabric weaving machine, the first in the world, still in use, some fifteen years ago. A score of other inventions have made his name widely familiar to mechanical engineering circles.

Strain All Gasoline and Water.

It is not generally known that gasoline, as a rule, is filled with infinitesimal particles of dirt, and in filling the gasoline tank of an automobile it is extremely necessary that the fluid should be strained through chamois skin to catch any dirt or water that may be in it.

If the gasoline tank and feed pipes are provided with settling chambers, by all means do not neglect to clean them occasionally as water in the gasoline is sure to cause trouble, and so is dirt.

SHOEING CONDITIONS.

Work in Different Parts of the North and South.

Eugene Dooley, in Canadian Blacksmith.—To help pass what would otherwise be a very lonesome Sunday afternoon, spent in a small town in Western Canada, the writer thought that the following article pertaining to the various ways of conducting shops, methods of doing work, material used, etc., in different cities in many parts of the country, might be of interest to the many readers of your valuable paper. In carrying out the work which I am employed to do by a large manufacturing company, I have called on many blacksmiths throughout the western half of the United States and Canada, and I have been surprised many times by the ingenuity displayed by men in doing practically the same kind of a job and particularly in the horseshoeing line. In my travels this year I have called on shops scattered between Chicago and the Pacific Coast, and from Mexico to Edmonton, Alta. In Chicago, where many heavy draft horses are used, very skillful shoeing is necessary owing to crowded streets, so many paved thoroughfares, and so many different kinds of paving.

A great many of the various kinds of patent shoes and pads are used, and on many of the horses shod with rubber pads I noticed three clips, toe and two side clips, and they were absolutely necessary owing to the uneven condition of much of the pavement.

In the City of Denver, Colorado, many fine mechanics are to be found from the fact that it is the city midway between the East and the Pacific Coast.

On account of the dry climate of Colorado, the different makes of pads, rubber and rope shoes are very popular and in addition to these they use lots of what they call spring bar shoes, a shoe with a bar, but instead of the bar resting on the frog it is sprung off the frog from a half inch to one inch to provide for expansion of the quarters and that the bar may receive the impact of the horse's heels when they strike the pavement, thereby breaking the concussion.

It doesn't require very much money to commence a small shop, and the climate being nearly perfect the year around in Denver, the result is that there are too many shops there, consequently the prices for shoeing are lower than they should be. Passing on from there to Salt Lake City and Ogden, in Utah, I found conditions much the same with prices not up to the standard. Montana I found in a prosperous condition, and, I think, the most progressive State so far as the horseshoeing business is concerned. The prices are among the highest, the hours of work are shortest, and wages the very best. In San Francisco a great deal of work is done, and also some very poor work. In the organized shops, hours and wages are very satisfactory, and the list of prices for shoeing fairly good. San Francisco is a great rubber pad city, and I was told that upwards of 30,000 pairs of rubber pads were used in the city each month, in addition to various rubber and rope shoes.

The streets of San Francisco are nearly all paved with asphalt, and crowned high in the center and this, together with the great number of autos used there, and the fogs which come in from the ocean, makes the pavement very slippery and shoeing a serious problem both to the shoer and horse owner as to what is best for the horse to prevent slipping and falling. The less said of Southern California the better. Although a delightful place to live in, it is a hard matter for a good healthy horseshoer with a full grown appetite to make enough to satisfy his hunger, the prices being so low.

In a few places in Arizona there is considerable shoeing done, while prices are good and help scarce. In the City of El Paso conditions are fine, prices good, very few shops, lots of business and a splendid feeling of confidence exists among the shoers. Although the days are very hot the nights are cool and it is always possible to sleep well, also there are neither insects nor flies to dusturb one's slumbers. The altitude of El Paso being very high, the nights are cool and bracing. During the past winter snow fell at intervals in that city, and the shoers used adjustable calks for three or four weeks, the first time in the history of the place. Across the Rio Grande River, in Old Mexico, shoeing is a slow, laborious task, the natives bringing in any old piece of iron for the shoer to make shoes from. Sometimes a piece of inch or ¾-inch round iron is brought in to make about a No. 0 or No. 1 shoe from, for a small burro. These burros are a species of small donkey, used mostly for packing freight in the mountains.

Of all the other large Texas cities, and also New Orleans, there is not much to say. Although there are some good shops, the majority are very poor and conducted by negroes, poor lazy whites, or "Greasers"—a class of low-bred Mexicans—and the prices are so low that a good hustling white man could hardly be encouraged to engage in the business in those cities at the present time. Most of these Southern cities are growing rapidly; more pavement is being laid, better shoeing will be required, and the bungling, shiftless class conducting shops at the present must pass, giving place to more skillful and energetic mechanics.

Passing from the extreme South to the far Northwest, I found many fine shops in the Twin Cities, good work being done, many adjustable calks used, both screw and drive calks, with hours and prices very good. In the cities of Duluth and Winnipeg, hustling, fast growing cities, shoers are prosperous and general good feeling prevails, prices are good, and working conditions above the average. In Spokane, Seattle, Portland, and many smaller coast cities, rubber and rope shoes are being used extensively and have proven to be the best of all anti-slipping pavement shoes. The trade is in good condition generally in these cities, prices good, but help scarce. In Calgary I found something different from anything I have ever before seen for winter use. They use what is called the frost cog, a chisel shaped calk made abroad, and for which they make shoes by hand out of special imported iron. They punch a square hole in each heel of the shoe, and two for toe calks, and into these holes they drive the square shank of the cog or calk and it is said to make a very satisfactory job. Calgary is truly a wonderful city, with splendid municipal owned public service plants, and everything which goes to make a first class, up-to-date city. I expect in the next three weeks to visit most of the remaining western Canadian cities, and hope my impression of them will come up to or exceed what I have seen so far on my journeying, and I am truly surprised to find so many well constructed, well conducted, well equipped and well stocked shops, in so new a country as Western Canada. I am pleased to see the sign "Terms Cash" in so many shops as too much credit has been the rock on which many a blacksmith's hopes have been wrecked!

I would suggest that in a country where material, coal, rent and living are so high, an advance in prices would be in order, and although such a course may cause some complaint, matters would soon adjust themselves, and there would be no decrease in the volume of business.

Should this article prove interesting to your readers or of any benefit to one at least, I will feel highly gratified in knowing that its writing was time well spent.

Making Malleable Iron.

The malleable iron process is conducted in two steps, the first of which consists of melting gray pig iron upon the hearth of an air furnace, when a certain amount of the original silicon, carbon and manganese is oxidized, and thus removed from the iron while it is being melted and subsequently raised high enough in temperature to run the castings successfully. It is an easy matter to start with pig iron that is gray in fracture and in which all or most of the carbon exists as plates of free graphite, and end with an iron that is white in fracture and in which all of the carbon is combined chemically with the iron. It is a question solely of getting rid, in the air furnace, of such an amount of silicon as will accomplish this end. Many years ago it was discovered that if hard, brittle white iron were surrounded tightly by an oxidizing packing, such as iron oxide in any form, and then raised to and maintained at a temperature of about 1500 deg. F. for a few days, it would not only be changed into very soft and ductile iron, but some of its carbon would be removed during the interval. This constitutes the second step in the malleable iron process. Consequently, the first step toward getting soft and ductile castings in the malleable iron process, is to get hard and brittle castings, in which all of the carbon is combined chemically with the iron as carbide of iron, the hardest constituent in either iron or steel. The second step is to break up carbide of iron into carbonless iron and free carbon, both of them soft.

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OCTOBER, 1913.

PARTIAL CONTENTS.

TO SPEND NOT AND TO SPARE NOT.

In relation to the purchase of tools and machines for the shop, the old adage is a good one to follow: "Spend not where you may save; spare not where you must spend."

In other words, saving is a duty where it does not lessen net income, and spending a duty where it increases net income. If a new machine will add to the net income of a man's business, he cannot afford to do without it.

In too many cases blacksmiths get only "a living." We have had personal knowledge of several instances where the smith had a good business as far as the amount of work was concerned, and where he worked year after year industriously, and finally when the end came he left just about enough to be buried decently, but with little provision for his family. In many cases the reason for this is that the smith has not been mindful of the injunction, "spare not where you must spend."

The worst and most dangerous policy that a business man can pursue is to refuse to purchase whatever tools, machines or power are necessary to enable him to do work easily, quickly and at a low cost. Without them, the smith is pretty sure to make "a living" only. With them, there is no reason why he should not be able to lay up something against the inevitable "rainy day" that comes to us all.

BOOKS AND READING.

Now that the long winter evenings are at hand we trust that subscribers to The Blacksmith and Wheelwright may find time to do a little systematic reading of an educational kind. There are now well prepared books on almost every conceivable mechanical subject, and if read carefully and thoughtfully—and re-read if necessary—a fairly good practical knowledge can be obtained of almost any of them and of the subjects treated. We would not counsel the neglect of other kinds of literature—fiction, travel, biography, science, religion or whatever individual taste may desire—but the kind referred to should not be ignored. Any reader who wishes a mechanical book upon a special subject may inform us what he wants, and if he desires, we will first tell him something about its contents; then if he wishes to purchase it, we shall be glad to procure it for him at the publisher's price.

We are all more or less subject to rambling and aimless reading, and much valuable time is lost by it. In these days of a multitude of books and periodicals, there is not much excuse for reading anything that is at hand simply "to pass the time away." If one would give a little thought to a systematic course of reading, more could be gained in a month in the way of both instruction and recreation than in a year of the desultory practice.

Write and tell us any book or subject you have in mind and we will try to get it for you at the publisher's price. Or, if you prefer, you may yourself send to the publisher for it. The matter is immaterial to us, the main purpose being to be of as much service as possible to our readers.

PRIZE FOR A NON-SLIPPING SHOE.

Although in this age of mechanical wonders and inventions, one should refrain from being too sure in relation to things to come, yet not much is hazarded in saying that no horseshoe or non-slipping device will ever be found to prevent a horse from slipping when drawing a load on a smooth pavement. Something may be found to minimize slipping, and indeed, rubber and rope have been successfully used for this purpose. But they are palliatives only and not preventives. On the other hand, calks will prevent slipping where the surface of the road or street is soft enough for them to sink in and thus get a foothold, but not otherwise.

Overshoes have also been invented which help to give the draft horse foot security. But when on concrete streets or roads a horse leans forward in his harness to pull a heavy load his foothold will invariably give way, no matter how he is shod.

We believe, then, that the horseshoe competition which is soon to take place in England will not be productive of the desired results, although widespread interest has been aroused by it. Evidence as to this has been received not only from all parts of the United Kingdom, but from the United States, Australia, South Africa, and many European countries. Upwards of 10,000 copies of the details of the competition have been issued, of which 30 per cent. have been in response to individual requests. Entries close on December 31st, but no entry will be received before December 1st.

In case any reader wishes to enter this competition, it may be stated for his information that the enterprise is the work of the Roads Improvement Association of England, and that the prize for the acceptable shoe is to be $500 or 100 pounds sterling. Applications for entry forms, for which there is no charge, should be made to Wallace E. Riche, 15 Dartmouth street, London, S. W. Applicants should enclose a stamped addressed envelope. The judges committee has recently been strengthened by the addition of delegates from the Worshipful Company of Farriers and the National Master Farriers' Association.

DISCOUNTS FOR CASH.

How would it work for blacksmiths who suffer from bad bills to insure prompt payments by offering a big discount for cash, the same as is done in many other kinds of business?

It is true that this would have little or no effect upon the customer who never intends to pay his bills, but we are inclined to think such patrons are uncommon; or rather, if so disposed their credit would be so poor that even the good-natured blacksmith would refuse to trust them.

We recall one blacksmith who started in business not long ago with small capital, and although he could not make a sufficiently impressive financial statement to secure much machinery and tools on credit, he soon found that some of his own customers did not think it made any particular difference when they paid their bills, so long as it suited their own convenience. The result was that he soon found his small working capital invested in bills receivable, and yet he did not like to run the risk of offending them by demanding prompt payment.

He noticed that in the case of his own debtor bills there was a pretty large cash discount for paying on or before the 10th of the month, and he made quite a struggle to get the money, pay the bills and take the discount. Thinking that his customers were made of about the same clay as he himself, he began to invariably make out bills to them at the full amount, and then add "Cash discount before (a named date) 5 per cent." and in some cases, he threw off as much as 10 per cent. In this way he made it an object for his customers to pay cash, and he found the plan worked well.

WHY THE WORK IS ATTRACTIVE.

One of the strongest reasons why the automobile field is an attractive one for the blacksmith is due to the fact that the average repair man is incompetent. In many cases the business was "picked up" by some pseudo-mechanic simply because it was attractive. He had little or no mechanical experience or knowledge, and possibly may have drifted into this repair business simply because of the demand for his work.

An experience that has recently come to the notice of the writer is that of a car owner who twice at different times paid for having his motor cleaned of carbon. He paid to have the work done well, but having a little leisure recently he had the car taken down by a mechanic under his own supervision and to his astonishment he found that the carbon had not been removed from the cylinders since the car was first assembled. He very much doubts if even any attempt had been made to do this. The repair man simply took his money and he may about as well have stolen it. He also learned by examination of other parts of the chassis that every well paid for job he had ever had done had been bungled or slighted shamefully.

The mechanic who did this last work and helped him to find out the extent he had been swindled charged only $10 for the work. If it had been done by the ordinary repair man the charge would probably have been as much as $75.

Quite naturally the result of this unfortunate experience is that the car owner referred to has now a deep-seated distrust of all repair men. Hereafter he says he will trust no one to repair or overhaul his car unless the work can be done under his own eye.

This is not an isolated instance of dishonesty and incompetence. It is something that quite frequently occurs, and the situation is such that an

experienced blacksmith who knows how to handle machinery and has always done just as he agrees to do, will naturally be turned to with confidence on the part of a good many car owners.

No doubt the incompetent and untrustworthy repair man will finally disappear under the law of "the survival of the fittest," but thus far he seems to multiply as automobiles increase in number and use, and the average blacksmith will find that it is easy to get the work and that it is both profitable and desirable.

VEHICLE SELLING.

The Carriage Dealers' Journal for August has a symposium on "Should the Vehicle Dealer Handle Automobiles?" the views of those only who speak from actual experience being given. While the weight of testimony is in the affirmative, there are given strong letters against the proposition.

Summed up, the favorable testimony is mainly that the automobile is a vehicle, and the vehicle dealer is the man to sell it, that the business is profitable and growing, and that something should be done to take the place of the waning horse-drawn vehicle trade.

The opposition is to the effect that the successful dealer has not the time to attend to it, that it requires too much capital, that there is more profit in horse-drawn vehicles, and that an unfortunate selection of cars to handle will entail great loss.

Of course local conditions must largely determine anything of this sort. In some localities the automobile has to a much greater degree displaced horse-drawn vehicles than in others. Indeed, this displacement has gone so far in some cases that the vehicle dealer has no choice but to either take on automobiles or go out of business altogether. In other districts where the roads are especially bad and the average of general welfare is low, few want automobiles who can afford them or few can afford them who want them.

But be all this as it may, far more business failures have resulted because of sticking to the old methods than owing to attempts to keep in the van of progress. The automobile is here to stay and to multiply. The first stage of its use was to enter the field of pleasure driving, but in our opinion it is far less desirable than the horse for such purpose. It is in the line of business and for commercial transportation that it will finally be the more formidable rival of the horse. For carrying great loads and in business travel, and for the purpose of "getting there" quickly it has its decided advantages, but for pure pleasure riding, the horse will always remain supreme. In this last assumption we, of course, do not consider speed, nor should we. There can be no pleasure in riding at high speed. The art of riding for enjoyment does not consist in the distance covered but in the opportunity for observation and for enjoying the fresh air with the least expense of attention and care.

While we would not urge all of our vehicle dealer readers to embark in automobile selling, we do earnestly advise them all to give the matter their most careful consideration, and to not forget that while the automobile is bound to constantly increase in use, the horse-drawn vehicle will slowly but surely be crowded to the rear.

PRICES OF MEAT.

If we tried to run down all the errors of opinion and of fact that are extant, it would take about all the time of the editor and all the space we can afford for reading matter. An esteemed reader has taken us somewhat to account for not denouncing the "beef trust," claiming that if the hard-working blacksmith can't get meat to eat and thus maintain his physical strength, he may as well go out of the business.

It is thus in order to state that the high cost of meat is not so much due to beef trust monopoly as it is to lack of supply. In 1900 there were 50,500,000 head of beef cattle in the United States to a population of 76,000,000 persons, an average of two animals for every three persons. To-day there are 36,000,000 head of beef cattle to a population of 96,000,000, or an average of one and one-eighth animals to every three persons.

This being the situation, the surprising fact is not that beef should be so high in price but that it should be so low. It doesn't take much of an excess of demand over supply to make prices soar skyward, nor of supply over demand to depress prices far below profitable production.

Although meat is a good food for those who do muscular work, the workers of nations where very little meat is consumed are quite as strong and enduring as our own meat eaters. By the time our readers get this issue, the bill putting meat, meat products and live stock on the free list will probably have become a law, but this will not greatly reduce prices, and quite likely it may have no appreciable effect, one way or another. With a shortage of meat all over the civilized world, and prices in Europe so high that for the common people beef, pork and mutton is almost beyond their reach; while horse meat is being sold at a high price; with a high price for cattle feed of all kinds, and breeding stock reduced to an alarmingly low figure, there is but one way to increase the supply for many years to come.

This is simply to reduce the demand. If every meat eater would but resolve to get along with one-half what he now consumes, it would not be long before the supply and prices would be within the bounds of reason. Meantime, it shows a painful lack of judgment and well as of justice to attribute the high prices of meat to anything but a lack of supply.

A Half Century in Business.

Fifty years is an unusually long life for a business concern. When a firm has reached that age there is therefore reason for pride and a suitable commemoration. The firm of Felton, Sibley & Co., the well-known varnish and paint manufacturers, celebrated this event at their new varnish factory in Camden, N. J., Friday, Sept. 5, and it was done appropriately, not the least of the interesting features being a distribution of cash among their employes according to years of service, and a dinner to those directly connected with the firm.

From small beginnings the business has grown steadily so that today its products are among the recognized standards of the trade. Starting with the grinding of colors and the making of varnishes and Japans, other kindred lines have been added from time to time. The output now covers essentially the complete list of goods handled by the dealer or used by the consumer, such as ready mixed paints of all descriptions, enamels, stains, fillers, finishes and specialties of various kinds.

Of the original partners only Mr. Samuel K. Felton remains. In the year 1849, at the age of seventeen, he entered the employ of Messrs. C. Schrack & Co., the oldest varnish house in America, his connection with them continuing until 1863, at which time he withdrew, having been a member of the firm for two years. From the days of his boyhood down to date he has been in the same line of activity for sixty-four years in the same block. The junior officers have been connected with the concern for the past twenty-five years, starting as clerks after the completion of school days. Following the death of Mr. Edward A. Sibley in the year 1910 the concern was incorporated January 1st, 1911, under the Laws of Pennsylvania.

Horse vs. Auto in Chicago.

"The impression most people gather from being in the business section of a city," says Farm Implement News, "these days is that the automobile has become the dominant factor in street traffic. Whether one takes his stand down town, or on the boulevards or in the parks, it is all the same—the automobile seems to dominate the scene. That it is very much in evidence there is no doubt. In Chicago, for instance, traffic experts say automobiles daily in the loop district have increased in number by 600 per cent. during the last five years. This in a way accounts for the popular delusion that the horse is disappearing from the city streets. Upon the contrary, actual investigations of traffic conditions in Chicago show that the number of horse-drawn vehicles in daily service in the down-town district has increased by 30 per cent. during the last two years, and that there are daily 130,000 teams on the central business streets of this city.

"What the automobile truck may do eventually to drive some of these horses off the streets still is problematical; surely up to the present time the use of mechanical trucks has served hardly to check the normal annual increase in the number of horse-drawn vehicles.

"Incidental to this subject, the Rush Street Bridge in Chicago is the most crowded thoroughfare in the world, by actual count 9,000 vehicles of all kinds passing over it every business day, thus taking the reputation of London bridge away, which, with its 7,600 vehicles, is a poor second, although even so the most crowded of any other place in Europe."

Production of Nails During 1912.

Statistics in regard to the production of wire nails and cut nails in the United States in 1912 have just been issued by the bureau of statistics of the American Iron and Steel Institute. The output of wire nails during the past year amounted to 14,659,700 kegs of 100 lbs., as compared with 13,437,778 kegs in 1911, an increase of 1,221,922 kegs, or a fraction over 9 per cent.

The production of cut nails and spikes cut from plates in 1912 amounted to 978,415 kegs of 100 lbs., against 967,636 kegs in 1911, an increase of 10,779 kegs. In 1912 a little over 78.8 per cent. of the total production was cut from steel plate, and almost 21.2 per cent. from iron plate; while in 1911 almost 79.2 per cent. was cut from steel plate, and a little over 29.8 per cent. from iron plate.

The maximum exports of wire nails was reached in 1912, when 1,530,353 kegs, or over 10.4 per cent. of the total output, were sent abroad.

Exports of cut nails in 1912 amounted to 208,568 kegs, compared with 255,854 kegs in 1911, and 352,473 kegs in 1898, the maximum year.

American wire nails form an important item in the exports from this country to all parts of the world.

Some time ago the then president of the New York and New Haven Railroad offered a prize of $10,000 for the best automatic stopping and speed-control device which would safely arrest trains disregarding fixed signals. On July 1, 2,816 persons in all had entered the competition. The applicants represent every country, including China, Japan and Australia. Thus far not a single idea submitted is worth considering. But why should any such thing be needed? If the engineer pays attention to his duty no train will disregard fixed signals, and if he does not pay attention to his duty he should be displaced at once by an engineer who will and does. The position of engineer of a swift moving passenger train is one of great responsibility; those filling it should be liberally paid and those incompetent or careless should be discharged instantly.

Quite likely many of our readers know that the new tariff law materially reduces the duty on iron and steel products. The natural result will be that the prices for cutlery, for instance, will be less. But we are unable to see why it will not result in the purchase of imported goods and at the expense of having our own raw material unused and our own workmen unemployed. We do not believe that our readers, blacksmiths and wheelwrights, care to get things cheap at such a cost. And right here we may also say that we do not believe they want the low prices that proceed from the purchase of foreign made goods.

Is an automobile company responsible for an accident due to defective materials in one of its motor cars? A case has been carried to the Supreme Court at Washington to decide this matter. In the lower court the company's defense was that it had bought the defective spokes that caused the accident (oddly described by the complainant as "dead and dozy" spokes) from a reputable wheel manufacturer and had no further responsibility in the matter.

The newest field for the moving picture is the broad one of agriculture. Assistant Secretary of Agriculture Galloway announces that educational films illustrating the work of the Department of Agriculture are to be prepared for use through the regular moving picture circuits, and for universities, colleges and public schools.

Last year 143,220,000 gallons of whiskey and brandy and 65,246,000 barrels of beer, porter and ale were consumed by the American people—a heavy increase over 1911.

A million dollars a day is now the export record of the iron and steel manufacturers of the United States.

Correspondence

BUSINESS MATTERS.

Something About the Desire for Change, Prices, Credit and Advertising.

From A. C. H., Texas.—I believe that I would be safe in saying that you could not find a county, or even it would be hard to find a town of any size, where there are not one or more blacksmiths who have the emigration fever.

Is this fever caused by the fact that the ones who have it are not mechanics, or have not the ability to go ahead and get business?

In the majority of cases I think these are far from the causes, as we find some of the best mechanics and business men are the ones most infected with this trouble. Is it because they all have bad locations and bad prices?

If we were to come to these last conclusions, we would have to conclude that these conditions were bad all over the United States, as there are east and west, north and south men who wish to change. I do not believe that there is as much difference in different locations as many imagine, as much the same conditions as exist in one locality exist in many others, with perhaps some little variations. Neither do I believe that there is so much difference in prices between the majority of places, as we may imagine at first thought, when we consider everything. In the first place, while some prices may be a little cheaper than in another place, other prices will be higher there than in the other locality, which balances things up about even.

Again, I will say that in locations where prices are extremely high, the price of living and all other expenses are correspondingly high. And, on the other hand, in the localities where the prices for our work are miserably low, living and other expenses are low. Again, we find in large cities prices are usually some higher than they are in the smaller towns of the same locality, but we also find expenses are higher in the cities than in the smaller towns, which goes to prove what I have already said, conditions considered, prices do not vary as much as many imagine.

If this be true, the question naturally arises, are so many blacksmiths justified in having their property on the market, trying to sell it in order to try a new locality? In order to settle this question, we will look a little into some of the causes of their dissatisfaction with present locations, which I believe, like other conditions, are much alike all over the country. A few men, of course, are of a roving disposition, and will not be satisfied and will not make good at any place they go; others want a change of climate, possibly hoping to improve the health of themselves or of some member of their family. Others seek a change on account of school advantages, thinking that a change in schools will be an advantage to their children, which in many cases it may be. And last, but not least, the credit system causes many men to want to move, and I believe this is one of the most justifiable reasons for a blacksmith changing locations.

In fact, I have always advocated that it would be better for most of us not to stay in one place more than five years. Without due consideration, some will say that five years is barely long enough for a man to get acquainted in a place. My contention is that it is possible for a blacksmith to get too well acquainted. I believe that it is a common belief among many of our customers, especially among the farming class, and more especially in the older settled sections, that the blacksmiths are all getting rich and, therefore, do not actually need money.

If they are not too well acquainted they will pay much more promptly. How many, many times have I heard a customer say (and you have heard the same thing, too, I know, as I have worked in the North, South and West, and conditions are the same everywhere) after I had sweat out a lot of work for him, "What is my bill?" and after I had named a low cash price, thinking that I would get the cash, something like this often follows:

"If you don't need it, just charge it," or "I will settle with you some of these days," or if you are very well acquainted with him probably he will just walk out with it without saying anything.

Then, one, three or six months later, after the account has grown large, and you have been studying and scheming your head off to keep stock to work on, this same man will possibly meet you with, "If you ever get to needing that little amount, let me know, and I will try and give you some of it."

Now, this is what I call a case of being too well acquainted, and many a good and useful man is handicapped simply because he is too well known. Who would wonder at there being so much blacksmith property on the market?

And now we come to the real subject of this article, that is, a good plan for blacksmiths to pursue who wish to change locations. We will first notice what they usually do. They usually after placing on their property what they think to be a reasonable cash price, either list with a real estate man, or send an advertisement to some paper. The first plan seldom brings satisfactory results, and often the last does not. It is hard to find an ordinary blacksmith with the cash to buy you out, as he must sell his property before he can buy your property. My plan would give us full value for what we have, with no commissions to be taken out and at very little expense either. It is that we stop advertising so much in the dailies and other newspapers, which are only local affairs, and use one of our trade journals, like The Blacksmith and Wheelwright, which goes into the hands of the very men all over the country whom we wish to see our advertisement. I would suggest that we use a page as a kind of Exchange Bulletin, and in place of advertising for strictly cash, as we usually do, advertise for cash, or trade for other shop property, and name the State and location preferred, and the chances are that many times your advertisement, put in this way, would be read by some smith in the very location where you wish to go, who is trying his best to sell in order that he may move to the very location which you wish to leave. I think this plan is worth trying, and I am certain we could make it a success, if we went at it in earnest, with the assistance of the editor. We could ask and allow a reasonable cash value, and would not need to add on an extra per cent. to try to cover real estate men's commissions, as there would be none; $1,000 in property in Michigan would be equal to $1,000 in property in California, no more or no less. I would like to hear from others of our craft on this question, and would also like to have the editor comment on it.

Note by the Editor.—Although we should be glad to agree with all the conclusions of our friend as expressed in his thought-provoking contribution, we cannot quite assent to his view that change is often advisable. Other things being equal, a change simply for the sake of a change does not pay. One of the undoubted assets of any business man is his reputation—the reputation he has gained in a certain locality for honesty, for industry, for sobriety, for doing absolutely as he agrees to do, for public spirit and loyalty to his own community or town. Now the reputation for these things is something that must be earned before it can be enjoyed, and a certain duration of time is always required to earn it. And we have known of instances where newcomers in a community have been given an unfavorable reputation when they did not deserve it, and where had the same circumstances taken place in the case of an older resident, they would not have had the slightest unfavorable effect.

On the other hand, it is undoubtedly true that blacksmiths as well as other business men have often made a mistake by tolerating a familiarity that among a certain class leads to imposition in the sense of not paying bills and not being willing to pay a fair price for work. This must be guarded against in all cases, but the blacksmith who has fallen into that condition in one locality is liable to do the same in a new one.

But we quite agree with A. C. H. as to the inexpediency of putting property for sale or exchange in the hands of real estate dealers, and if such sales or exchanges are to be made, this publication is the cheapest and best medium through which to accomplish it. In a matter of this kind we are glad to assist in any way possible, but it seems to us that about the only and the essential thing to do is to make each advertisement strictly conform to the facts in statement.

Have you ever thought, dear reader, that there is no good bargain, sale or exchange, unless it is good for each of the parties concerned? A man may sell or exchange a thing for more than it is worth, but, strictly speaking, it is not a good bargain unless it is good for the other party as well as for himself. The business world is living nearer up to the golden rule than it used to do, and business is sweeter and better for it. So in the purchases and exchanges suggested by our correspondent, there may undoubtedly be cases where both parties to the transaction would be gainers, but never unless each had good business reasons for changing and unless each made representations of absolute fact only.

As to low prices and the credit system, there are none to blame for them save blacksmiths themselves, and none can remedy them save blacksmiths themselves. Yet it must as readily be admitted that one single smith in a given locality will so demoralize business that nothing short of the most drastic steps will again put it on a living basis. The blacksmith's work is not a luxury, it is not an extravagant or lavish outlay on the part of the customer, no matter if he pays top-notch prices for it. The patrons of the blacksmith are invariably of the middle or higher class—using those terms in the sense of material welfare. They can afford to pay fairly for their work, and they should be required to do so. Prices should be raised all along the line. The average customer knows so little about the business and is so utterly inconsiderate of the interests of the smith that he is as likely to find fault with a charge of $2 for shoeing a horse as for a charge of $3.

With a little effort, accompanied by a sensible spirit of business loyalty, prices can be easily raised 25 per cent. in most localities to-day, and such prices would be far more just than at present. Let us repeat, no bargain is a good bargain unless it be good for the both parties to the transaction.

A Good Screwdriver.

From Jewel Howd, Idaho.—I submit the following for publication: Take a 1½ inch flat file and forge a screwdriver, as shown in Fig. 1.

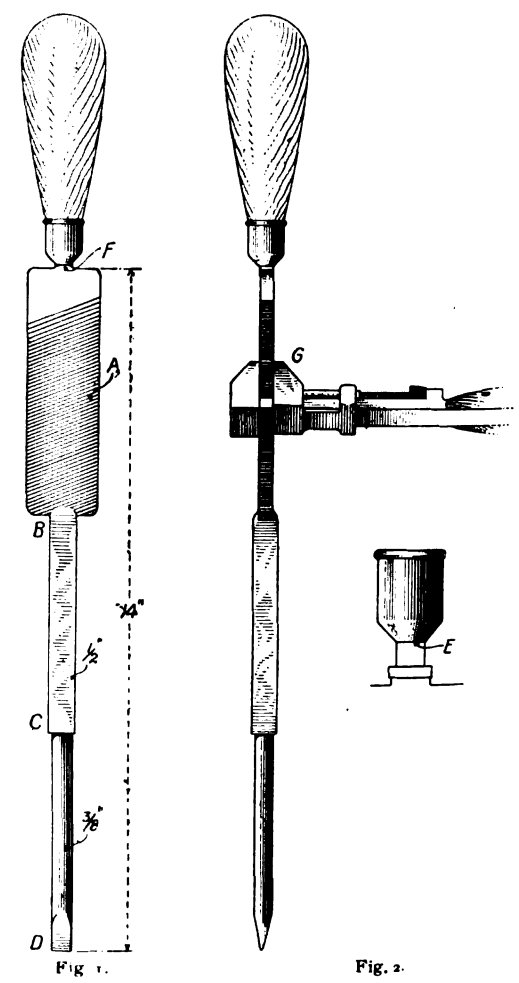


Fig. 1. Fig. 2.

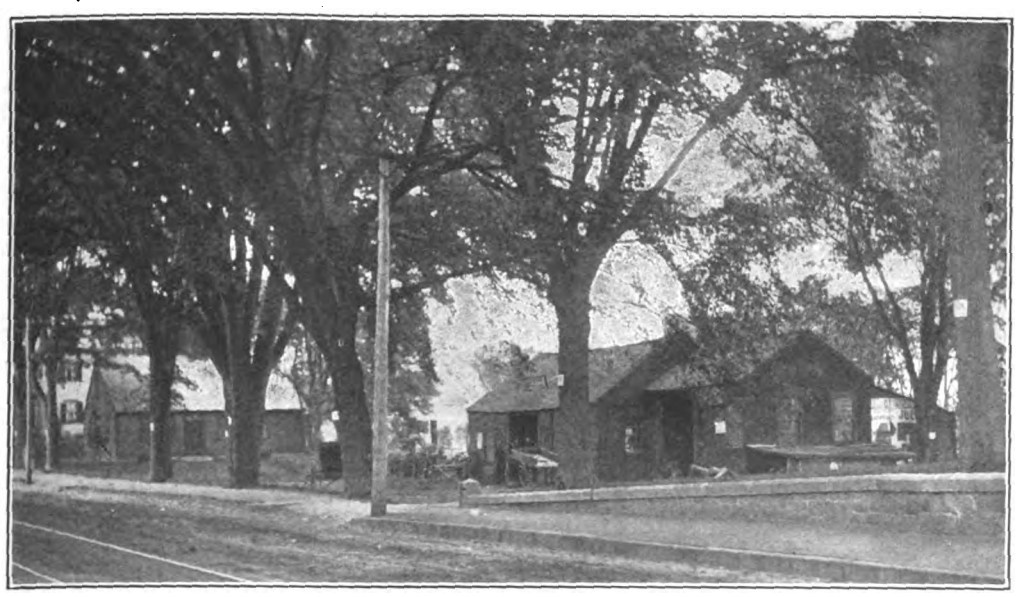
Leave it flat at A and draw the sides out rounding at B. Make it ½ inch square from B to C. From C to D make it ⅜ of an inch round. The screwdriver in all should be 14 inches long. Take an oil cup and cut off the stem at E, Fig. 2. File the hole at E in the cup till it will just fit the screw driver at F, Fig. 1. Use the cup as a ferrule for the handle. Make the handle out of hardwood. It makes a fine screwdriver for heavy work. If you run across a screw that is too hard, put a wrench at G, Fig. 2, and twist it

right out. But as a rule you can lift the most of them with your hand. The flange at G takes the strain off the handle, and makes it everlasting.

An Historic Blacksmith Shop.

From Charles Booker, Massachusetts.—Uxbridge, Worcester County, Massachusetts, has lost an ancient landmark in the shape of a blacksmith and wheelwright shop which was erected 145 years ago. In its stead will be constructed a beautiful building devoted to banking interests.

Situated on the main street, in almost the centre of the town, surrounded by grand old elms, traditionally as old as the shop itself, the old building has stood ever since 1768, when Simeon Wheelock built it, with hewn timbers and hand-wrought nails. Even the original forge and



A Shop 145 Years Old.

chimney has stood time's test, silently speaking volumes for the builder.

Besides being a blacksmith, Simeon Wheelock was a patriot. In 1775, when sturdy men were needed at Lexington and Concord, Wheelock, who was then in his 34th year, readily responded and was made 1st lieutenant of the company mustered in Mendon, as Uxbridge was then called. At the close of the Revolution he returned to his forge, where he toiled until 1786, when his fighting spirit was again aroused and his services enlisted to quell Shay's Rebellion at Springfield, Mass., where he was numbered among the slain. In 1789 the widow and eight children were obliged to part with the property to Reuben Thayer, who one year later sold it to Elihu Brown. In 1809 Joseph Spring is recorded as the owner. About 1840 its possession fell into the hands of Royal Jefferson. Since then it has been let to various tenants, the last tenant being Delphis Desjourdy.

The original family home of Simeon Wheelock, which is situated a few yards from the blacksmith shop, shown at the left of picture, was purchased recently by Mr. and Mrs. W. E. Hayward, two of the town's public spirited citizens, and by them presented to the Daughters of the American Revolution for a Chapter House and Tea Room. Many visitors gather at the old historic house, and view a fine collection of the town's colonial relics.

Tire Setting Operations.

From H. C. B., Kansas.—I have wheels in my head and have had for nearly forty years (I am now over sixty) and I also know something about hot tire setting, having done lots of it, and now, at the outset I want to give my opinion of the relative merits of the two systems of setting tires. It is this: Tires can be set better by the hot process when done in the best possible way, than it is possible to do by the cold process, with any machine yet made; in fact, I feel confident there never will be a machine made that will set a tire cold as good as it can be set hot when done at its best. I think it is rather strong to say a wheel is injured every time the tire is put on hot. If that be true, what a large number of wheels must have been injured before cold tire machines were made—about all of them I guess.

Now it is not the tire alone that causes a wheel to keep in condition, much less is it the process by which the tire is set; more depends on quality and the condition of the material of which the wheel is made, than on the tire or the process by which it is set. Next comes the care of the wheel after it is put in use; because just as sure as the rim or felloe is run in water and mud without paint or oil on it; just that sure will the tires loosen; and why—because the bare wood takes in moisture which causes it to swell and if the spokes are properly set in the hub, the place of lease resistance to the swelling felloe is the shoulder of the spoke. The felloe swells out around the shoulder of the spoke; then we say the spoke has pressed into the felloe, the result is the first time the wheel becomes dry the tire is loose, regardless of the method by which it was set. While the wheel has been running in water and mud and the felloe or rim swelling up, it has had its effect upon the holes in the rim of the felloe which have been gradually changing from round to an oval form, thus compressing the tenon on the spoke to an oval shape also, and I do not think cold tire setting will prevent it either. What is said about the charring and burning of the felloes by hot setting, being too often the case is absolutely true, but it need not be done at all; that is the fault of the workman, not of the process. The assertion that tires can be reset by the cold process much better than it is possible to do the old way, I think, should not be taken seriously; wheels needing tires reset are in various conditions. Take a wheel say that has had the tires set on it when the wheel was damp and upon it becoming dry the tire is loose; that wheel is in good condition, and but few of that kind come for resetting; the condition I find in most wheels that come for resetting is this; the rim or felloe, bare of paint, has taken moisture and swelled until the holes are oval in shape and now when the wheel is dry the spokes are loose in the rim and rattle. Now I will take such a wheel and put a tire on it by hot process, and I do it this way: I first mark the tire and wheel, then I remove the bolts and tire. I now bring the wheel to the vise and place the rim in the vise jaws when it will grip it each side of the tenon on the spoke and tighten up the vise, thus giving the holes in the rim their former round shape to some extent. This causes the rim to lengthen a trifle, and also causes the sides of the holes opposite to the sides gripped by the vise to loosen or move away from the tenon on the spoke. I now take wedges made of the solidest wood I can get and a little narrower than the diameter of the tenon on the spoke and wedge every spoke. In that way the vise prevents the rim from splitting, and I am careful to have the rim down solid on the shoulder of every spoke. Possibly I will need to put a piece of good solid leather in one or both joints of the rim to make rim long enough. The wheel is now ready for the tire. I run the rim carefully to get the size and now I bring the tire to the proper size. I put the tire in the fire on the forge if it is a light tire and turn it around in the fire until I think it is hot enough and to make sure it is not so hot that it will char the rim. I take a dry stick (soft pine is best) and press it quite hard on the tire moving it all the way around the tire. I have a bucket of water at hand and if I find a place on the tire that makes the stick smoke, I draw a wet cloth over the place, which cools off. Right here I want to say that if after upsetting the tire it is trued up by running in the tire bender and given a true circle it does not need near the heat in it to put on the wheel. After the tire is on and cooled off the wheel has no more dish in it than before and if the wheel is kept properly painted the tire will stay tight provided the wheel was perfectly dry when tire was reset; but, if the rim takes moisture and swells, the holes in rim will become oval again and when dried out the tire will be loose and the spokes loose again. But if the spokes are wedged up as before when the tire is reset again it will give it but very little more dish.

Now we will reset a tire on a wheel in the same condition by the cold process and do it without removing bolts or tire. The holes in the rim are oval and the rim is actually shorter than it was when the wheel was first tired. The spokes are loose in the rim and the joints in the rim are open. We put the wheel in the setter and proceed to shrink the tire, and when the tire and spokes are tight the wheel is in as good condition as the others are. But the holes in the rim that was oval or elongated have been made more oval or elongated; the rim that was already too short has been made shorter by the elongating of the holes in the rim, the natural result of which is that the wheel will have an excess of dish.

I am both wheelmaker and tire-setter and have no hesitation in saying I know there is just one part of the wheel that is a guide to setting the tire and that is the rim. It is the only part of the wheel that the setting of the tire has anything to do with, and if the tire is put on the rim properly you can take every spoke and hub out and still the tire will be tight on the rim. I filled a wheel years ago that I yet well remember; the wagon had been overloaded and the wheel went down; yet the rim was in the tire as firm as could be, and in driving it out I spoiled one piece of felloe.

Dish is of little concern to the tire-setter; that is the wheelmaker's business, and if he fails to have the dish right, the tire-setter cannot make it right without doing something the wheelmaker should have done. It is very easy to fasten a wheel so it will not change in dish while the tire is being put on, but how long will it remain the same dish? Dish in wheels is something hardly two persons agree on, but there is one thing certain and that is, if fifty wheels be tired by the hot process, if the wheels are of the same material and made exactly alike and the tires are put on as they should be, there will not be enough difference in the dish to make material difference to the vehicle.

Faults of the wheelmaker should be charged up to him, and not to the process used in setting the tire.

A Few Useful Kinks.

From C. Jenkins, Canada.—As I have been a reader of The Blacksmith and Wheelwright for quite a number of years, and have not contrib-

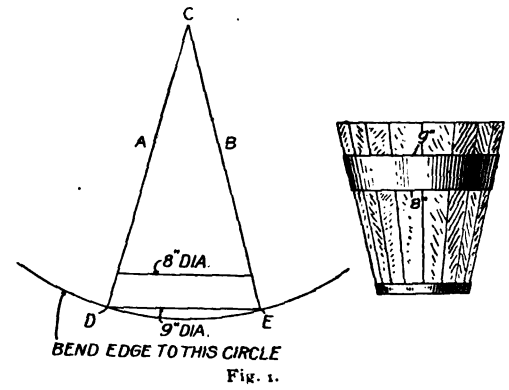


Fig. 1.

uted very much for its pages, I will now endeavor to give the craft a few useful kinks that will come in handy in any jobbing shop. But first let me tell you that words cannot express my appreciation for what The Blacksmith and Wheelwright has done for me in the past, as I have learned a great deal through its valuable pages and contributions of brother craftsmen. I also appreciate the advertisements, for they keep a man well posted in nearly all the latest labor-saving machines that are manufactured, so I cannot speak too highly of one of the most valuable trade journals that is published.

I am sending some drawings that I hope will be easily understood. First, we sometimes get a band to put on a tapered tank or tub, and it is quite a job to get the proper bevel in the band to fit the taper. Let me explain the way I do it. Say your band is 9 inches on the top edge and 8 inches on the bottom edge, as at Fig. 1. Draw two lines from the widest side of the band or hoop, as at D and E to the point C. Now take your dividers and set them one point at C

and the other at D or E and scribe a circle, as shown. Now bend your band edgewise to this circle. After bending it edgewise, bend it on the flat weld, and you have a band that will fit the tub or tank.

It is sometimes necessary to twist a piece of flat iron, A, Fig. 2, a quarter twist so as to have two straight sides or edges. First heat the iron where it is to be twisted and bend it edgewise to about 20 degrees of an angle, as shown in drawing at B. Have the bend as sharp or short as

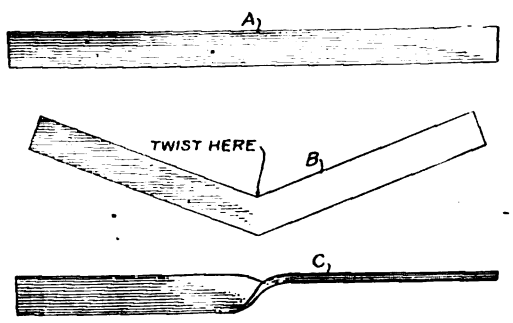


Fig. 2.

possible in one heat. Then heat it again in the bend and twist it, as shown at C, and you will have two straight edges.

Another useful tool for holding short bolts in the vise is made as follows: Get a piece of spring steel about ⅜ or ¼ inch square, Fig. 3, and draw it down very thin in the middle, so it will spring and leave the ends about ¾ by ⅜ inch, and bend to shape shown in drawing. Put

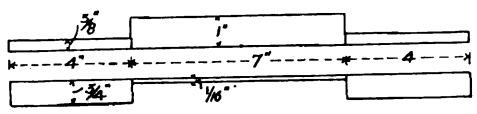


Fig 3.

the bolt in the jaws of the tool and put the tool in the jaws of the vise, as at Fig. 4. I think the drawing will explain itself.

Mr. W. T. Dunn wishes to know, in the July issue, how to spring in a spoke in a wheel. I will try and explain my way of doing it, but first let me say that it is only a makeshift job and should not be done. However, I have sprung quite a number of spokes in and find they stay

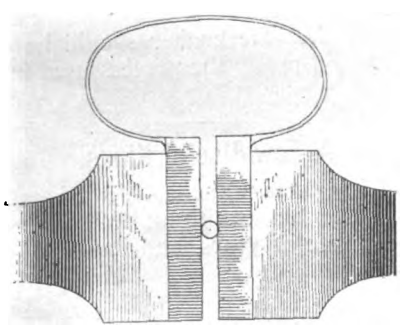


Fig 4.

as long as the tire does not get loose. Get a lever, A, Fig. 5, about 8 or 10 feet long, and cut a notch in one end so as to straddle the spoke you want to put in, as shown. Fit your spoke and get it the right length from the hub to the rim. Tenon both ends. Get a block and bore a hole a little larger than the round tenon to drive on. Drive your spoke into the hub, driving it home, and cut the round tenon anywhere around

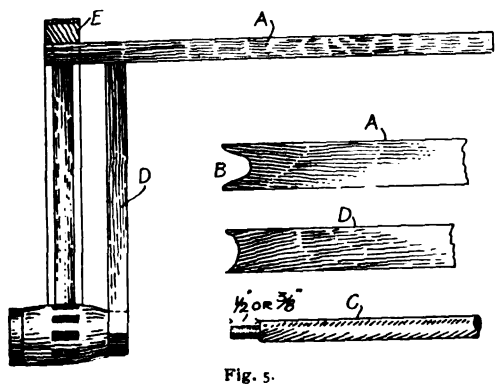


Fig. 5.

half an inch from the shoulder C, for you will find it rather difficult to spring the rim any more than ½ or ⅜ of an inch.. Leave the wheel on the axle, or on the wagon, and on the ground, so it will not turn easily. Now get a block, D, 6 by 2 inches, and long enough to reach from the hub to the under side of the lever, and cut to fit the hub so it will not slide off. Now get a helper to bear down on the lever, A, so as to raise the rim, E, enough to let the spoke, C, in under the rim and your job is done. Drive your spoke in on the back side of the wheel so as to give room for the lever on the front side.

Mr. E. E. Otis, New Mexico, wishes to know how to temper taps and dies. Here is my way. Heat the dies just hot enough to lift a scale, cool off in fish oil, or linseed will do, polish off with emery cloth, heat a piece of plate, put the dies on the hot plate and draw to a straw color. Treat taps likewise, but use a heavy piece of pipe to draw the color, and cool off in hot water, as cold water may crack the dies. I find this method works fine on threading machine dies. We have them to suit threads from ½ to 2½ inches.

Painting and Prices.

From W. A. Riggleman, Ohio.—Small carriage shops and horseshoeing shops that have paint shops connected with them should keep this copy of The Blacksmith and Wheelwright with this article on repainting, and have their painters do their work this way. For piano box buggies you only get $8, for two-seated carriages $10, and for heavy jobs, such as cabs and automobiles $20. You know these are the prices in the "small fry" shops in small towns, but customers have got these prices in their heads, and the small shops have done it by cutting prices. It does not look like you were all going to get together for better prices, does it? If it does, you had better start soon. No danger for awhile of better prices, for the automobile has caused the farmer and others to shout for lower prices, as it costs so much to keep an automobile in repair. For a time the small shops could make up on repair work what they lost on repainting, but now the prices have been cut all around.

If only you had all stuck together on the prices for repairing, you would have been in better shape. If a man can afford an automobile he can afford to pay well to have it fixed right. Look out and all get together or it will be too late, and it will be like horseshoeing, carriage and other repairing, prices down to the lowest notch. Get together on the prices for automobile work, for you can't on the other vehicles. The old saying is there is no such word as "can't." Well, you lost out on trying to raise the prices on blacksmithing. There is only one way to do, form a union, stick to that lodge, and bring your wages into that lodge. Why don't the blacksmith, trimmer, wood-worker and painter form an association, the head lines of the charter to read, "For better prices for repairs and all other things a man labors for," and let any one join that wants to. This lodge should have dues the same as other lodges and its object should be betterment in all things. If we had plenty of lodges of this character how long would it be before the poor man could stand some chance with the big man with all the "kale?" Do not work unless you get the price.

Concerning the repainting job, when starting first number all articles, and wash them good and clean. Sandpaper the body good and give the same a rough coat with a little more white lead in it than the regular; when this coat is dry glaze good all over. Let it get well dried, then rub the same down with lump pumicestone, wash clean, and when dry sand well, and give the body a coat of lampblack with a little oil in it. When this coat is dry give the body a coat of strong color varnish. If the body is to be red, give it a coat of India red with a little oil in same. Lampblack will do for green foundation. India red will do for a brown body. Common light dead lead will do for gray bodies of automobiles, then give a coat of color for red, brown and gray, and then a coat of strong color varnish. Get the same on smooth to save rubbing, but for the varnish just moss good, dust or wash, stripe and finish. Aim to get the color varnish on smooth and clean and it will finish nicely without rubbing. Look at all the time you have gained and the labor saved. For the gear or chassis, sandpaper good and give the same a coat of dark lead, so it will dry quickly and hard. When dry sandpaper lightly, and give it a coat of heavy color with a little oil in it. Let it dry and give it a smooth coat of color varnish, moss stripe and finish. Use any good body and gear varnish. The same gear and body rubbing varnishes we have been using for years will do, as carriages and buggies go through about the same thing as the automobile does.

In nine years the workers of the United States have increased their savings bank deposits 60 per cent.

A Good Triphammer.

From E. N. See, Nebraska.—I have been running a shop for myself only about one and one-half years. I learned the trade from my father who is among the best of common blacksmiths. He is now 78 years old and still works at the trade. I would like to see an article from him as I know he could give some good ideas. My shop is equipped with a four-horse power Associated gas engine, emery and buffer, disk sharpener, triphammer, and I will soon install a saw. My triphammer is of my own make and I am sending drawings and descriptions. Fig. 1 is the front view and Fig. 2 is the rear view. This hammer works as well as any hammer I ever used. A is a 12-foot 8 by 8 oak upright. B is the anvil made of an old eccentric shaft of a steam engine. It is 3 inches through and about 4 feet long. C is simply a 2-inch block between the upright A and the anvil B. I clip the anvil to the upright at this block, also at D, which is a clip bolt, fastening the anvil to the upright, A. E is my foot lever which starts and stops the hammer. F is the hammer made of a 2-inch shaft and about 18 inches long. It weighs about

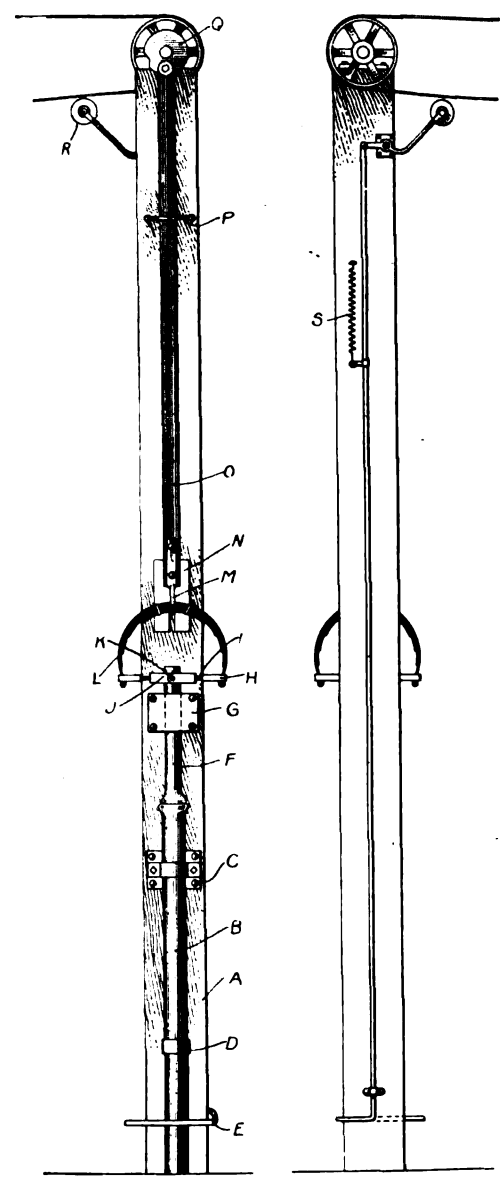


Fig. 1.

Fig. 2.

14 pounds, but I would suggest about a 25-lb. hammer. G is my guide for the hammer. It is made of wood, although I shall change this and make an iron guide some time, but I was in a hurry when I made my hammer. H is a loop made of ⅝ round steel (mild steel is all right). This loop is 3 by 1¾ inside, with a 1-inch piece welded in one end to give weight. I is a ⅝-inch bolt with a swivel head and threads, with a hole drilled through the threads to place a 16-penny nail in. This nail is to keep the bolt from turning around when the hammer is in use. J is in two pieces, each 6 inches long and made in the shape of a V, connected in the center with a pin, K. J and H are connected by the swivel bolt I. K is a ½-inch pin with head on one end and key in the other. This pin couples the hammer, F, to the spring, L, by the loop J and H, also the bolt I. L is my spring made of buggy springs. I tighten this spring and gauge my hammer by turning the swivel bolt I. M is a ½-inch bolt, 4½ inches long, with a bar welded 2¾ inches from one end and with a bar on the long end. This long end then couples my spring and pitman driver O. The short end of the bolt M extends back and is a guide which works in block N. N is two pieces of 2 by 2, secured to the upright for guides. O is pitman driver made

of 2 by 2 iron. P is just a loop around the driver for protection should the driver O come off the pitman Q. Q is my pitman, made of an old Buckeye mower, the shaft extending back for my pulley. R is a tightening pulley.

Fig. 2 shows how my foot lever E is connected to tightening pulley R. S is a spring to hold the pulley R off the belt. This hammer cost me in actual cash $2.50. It is all made of stuff I had about the shop, except the upright belt and anvil, which I paid $2.50 for. I made my own pulleys. It seems to me it is useless for a man to go without a hammer when it costs so little yet works just as well as a boughten one. I have made several tools that I did not feel able to buy, among them being a cultivator shovel trimmer which has brought me a good trade this year.

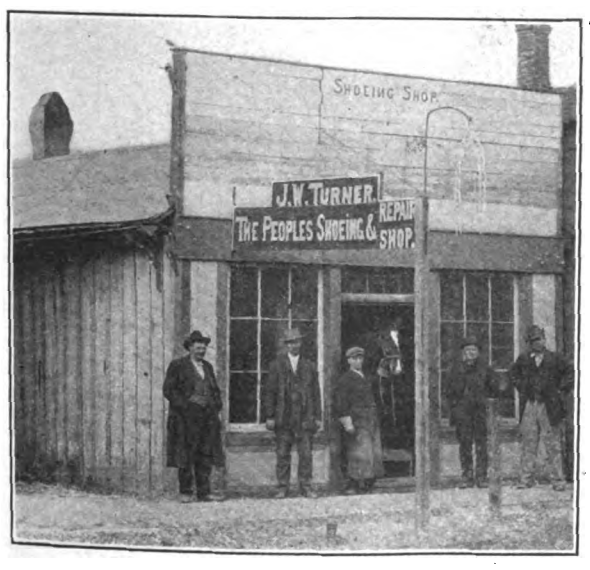
I do considerable auto work and some very difficult pieces. I have designed two different auto number plates which take very well. One party, 14 miles away, sent me his license for a plate; he is within ten miles of three garages and five or six blacksmith shops.

I did a piece of work the other day which I want to tell about; it may help some brother to do a difficult piece of work easily. A party brought me a set of iron wheels which he had himself ordered. They were just a little too small for the spindle. He wanted me to drill them out so they would fit. Well, I sat down to look over them and study out how I was to rim them out. I had nothing to work it out with but I had a head and I used it. First, I took two trestle benches and placed the axle on them. Then I put oil and emery dust on the same, and placed the wheel and spindle in line with my belt wheel to the engine. I then belted the wagon wheel to the engine and started the engine. In about three minutes I took the wheel off and put more oil and emery dust on and then ran it about two minutes longer when I had it fitted and fitted good. I fitted the others in the same way, but it took longer to work some of them down. It took me about one hour to do the work and I had a perfect fit on every wheel. I charged the party one dollar for the job and he helped me. He was perfectly satisfied and has brought me more work, so I gained a customer, as this was the first work he had had done at my shop.

I think that we blacksmiths should have more confidence in ourselves. I have done several pieces of work here that older blacksmiths have turned down, either because they didn't want to do the work or couldn't. I have one customer who comes five miles and passes two blacksmiths (who have been working for ten or more years) just because I did a piece of work for him that the others said couldn't be done by a blacksmith. I'll try anything once.

Why He Gets Good Prices.

From Jesse W. Turner, Indiana.—I am sending you a picture of my shop on a card so you

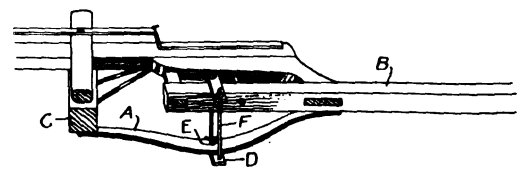


Mr. Turner's Shop.

can see what I look like. I have a fine trade. Only two shops in town. We get good prices and work in harmony.

A Wagon Tongue Spring.

From Ellery M. Cruthers, Colorado.—I send you herewith a sketch of a tongue spring that I have been using on my freight wagons and found cheap and durable. Anybody can make one. They are made of common wagon seat springs, A, that have been thrown in the scrap pile. You need only one part of the spring for ordinary tongues. When it is a heavy tongue take another leaf until your spring is strong enough to hold without bending or breaking. They are put underneath the tongue, B, with one end under the axle, C, with the bend down. Then take a piece of flat iron, D, ¼ inch thick and

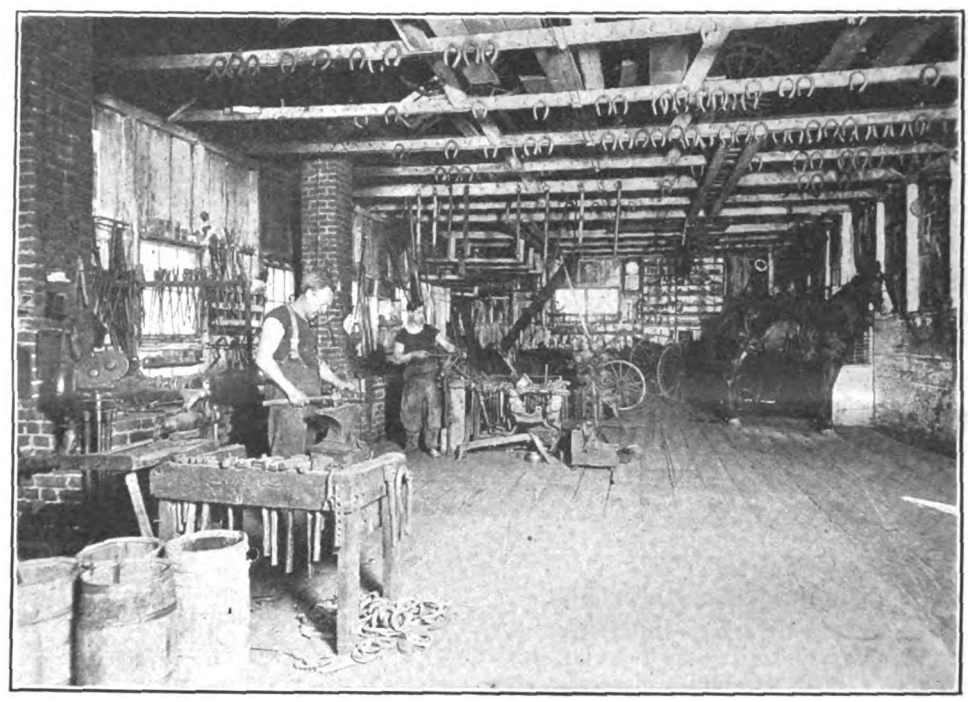


about 2 inches by 5 inches long, and put a hole, E, in the center about ⅜ inch, then bolt this plate to your springs, with the longer end of the springs under the axle and the other under the tongue. Then put a ½ inch hole in each end of this plate for ½ to ⅜ inch bolts, F, one extending each side of the tongue upwards and through another plate which is similar for your bolts to extend through. This plate rests on the tongue just back of the queen bolt, or bolt that holds the tongue. The tongue should be raised to put these springs on and there should be threads enough on the bolts to loosen or tighten the springs.

An Interesting Shop Interior.

The illustration is reproduced from a photograph of the shop of Matt E. Burdett of California, and it is published with more than usual satisfaction because the photograph is an unusually clear one for the interior of a blacksmith shop where the light is often bad and consequently difficult for photography. Illustrations of shops, both exterior and interior, are interesting and instructive if they are sufficiently distinct to give the reader some idea of the arrangement and fittings. Otherwise, and especially if the photograph is blurred, it means very little to the reader and is unsightly on the page of the magazine. It may be added that the value of such illustrations is increased when accompanied by a description of the shop and its outfit, prices for work, etc.

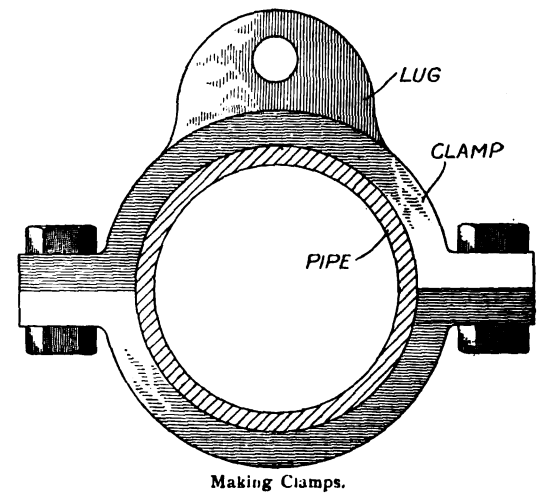
Mr. Burdett does all kinds of wagon work and horseshoeing, and judging from the appearance of his shop he has all he can do.



Mr. E. Burdett's Shop.

From South Africa.

From F. Swift, South Africa.—I agree with Brother E. S. Nicholson in what he says in the June number. We have been drifting away from practical blacksmithing a bit, I fancy. I should like to see more about engine smithing and perhaps a little less about horseshoeing; anything that helps a brother smith who has to make his own tools and do without a power hammer, and all the ideas how to do the different kinds of work. This seems to be the thing required in my locality. I have been at the trade for at least twenty years and am still serving my apprenticeship. I don't know whether you have any "finished" blacksmiths out your way. I heard of one here, but have never been able to find him. We smiths are very much handicapped out here as we have only Kaffirs to help us, and we often get the blow on the head instead of on the iron. Of course we have all kinds of work to do in connection with the mines, from welding stems to making a link. In welding stems, I always make a male and a female scarf (if you can call it a scarf), and put a pin through the lot.



Making Clamps.

Get a nice heat and have a lump of iron on the hearth to put it on instead of carrying it out to the anvil. Stick it and put back in the fire and get a sledge on the far end and "bump" it like the devil while in the fire, and then bring it out to the anvil and finish. I always use a flux. I had some clamps to make once. They were to fit 3 inch pipes and were made with a solid lug on one-half like the sketch. I used 1½ inch square mild steel and split it down the required distance, drew the other end to the required thickness and put in a suitable hole in a swage block, and then drew the split ends to the required size, 1½ by ⅜ inch. I made a good job of them.

I would like some brother to tell me his way to bend and weld angle iron rings. When I was working on a mine last, we used a lot of Waugh drills, but was always humbugged with the starters. They were practically spoiled before they left the shop with too much upsetting to get them big enough. I used to weld the 1¼ inch Star steel used for the big machines on to a piece of Waugh drill steel.

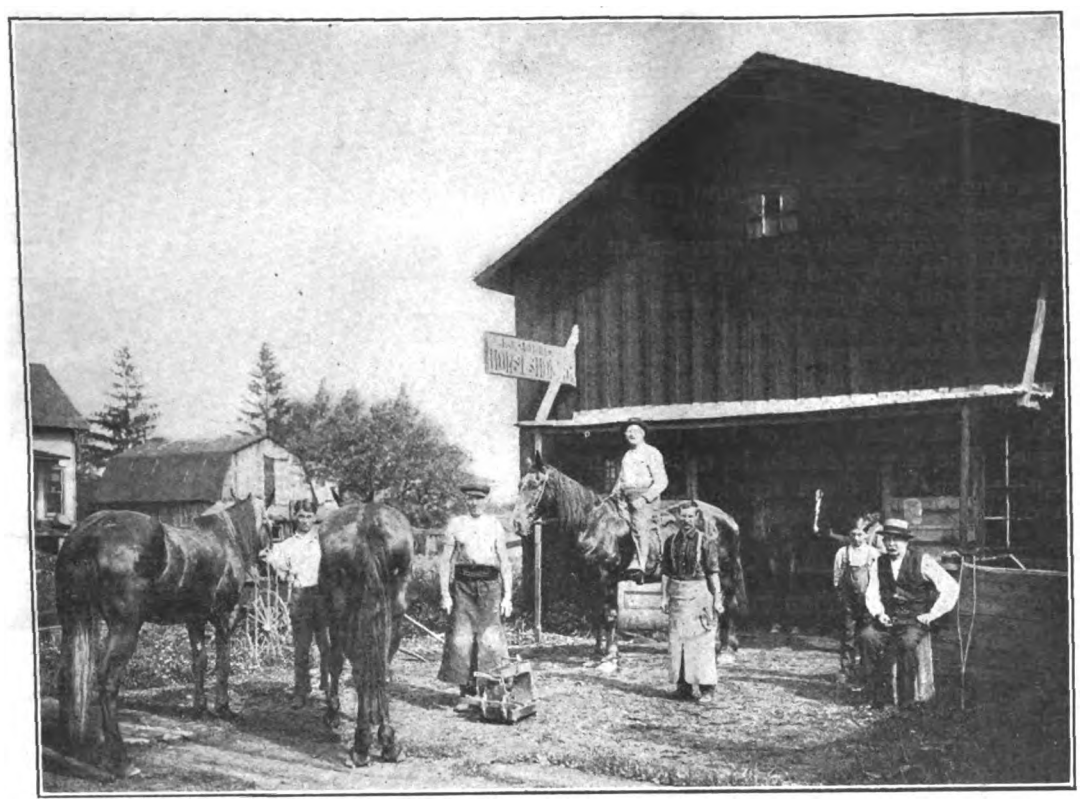
If any brother would like to ask any questions about Rodesia I shall be pleased to answer him to the best of my ability. I enjoy the articles on steel welding and tempering, etc., very much, and have often got a wrinkle out of the good old Blacksmith and Wheelwright. I wish all the readers and contributors good luck.

Carriage Draftsmen's School.

The Technical School for Carriage Draftsmen and Mechanics opened on September 22d with a full attendance in the evening classes. At this writing (September 23d) the day students have not all reported, and there is still room in that class for more men. This room will probably be taken before the end of the term. For particulars of the school, address Andrew F. Johnson, 20 W. 44th St., New York City.

An Active Shop.

The illustration is a photograph of the shop of J. J. Morrison of Pennsylvania. As will be seen, it is an unusually lively place, and we should judge that the proprietor is having about all he can do with the aid of three or four men



Shop of J. J. Morrison.

to help him. Mr. Morrison himself stands in about the center of the picture with a shoe in his hand.

ANSWERS TO CORRESPONDENTS

Under this head will be found each month replies to questions asked in previous issues. Our readers will appreciate the importance to inquirers of furnishing the desired information as promptly as possible.

Pulleys, Speed and Case Hardening.

From B. Lester, Nebraska.—In answer to Brother Emile Alexis, Louisiana, I would say that to get the size of the pulley necessary to use on his blower when running it by power, he should multiply the diameter of the pulley on his line shaft by its revolutions per minute and divide this number by the speed he desires to drive his blower at. I suppose he has tight and loose pulleys on his blower, so as to shift the belt instead of taking it off when not desiring to run the blower by power.

Some one asks how to harden plow lays so they will be soft in the center. A case harden is of this nature, and ordinary case hardening answers the purpose.

Welding Heavy Tires.

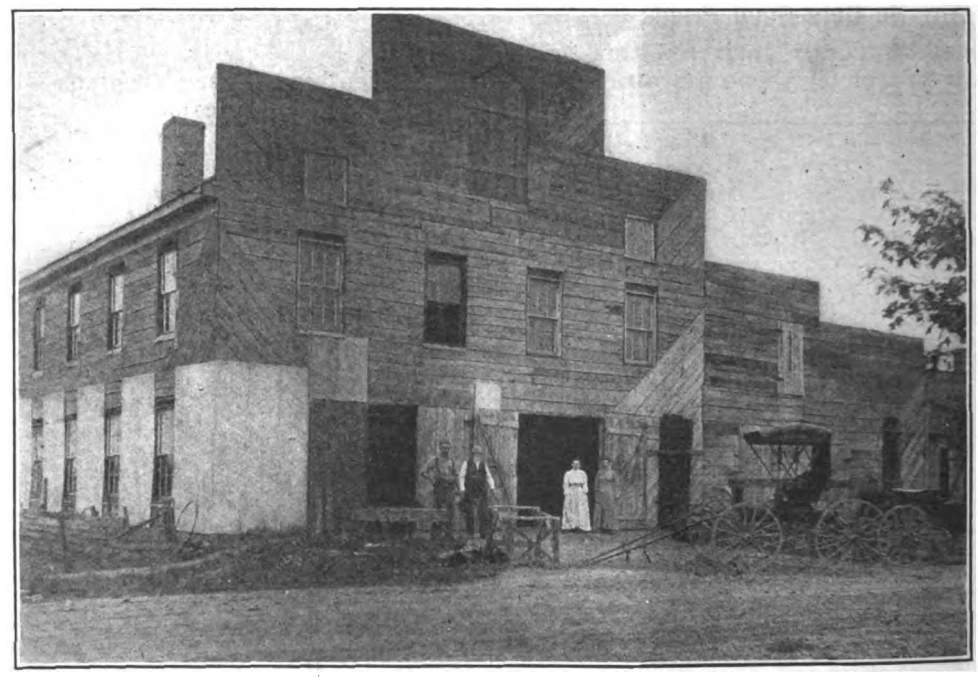
From L. L. James, Indiana.—In the July issue of The Blacksmith and Wheelwright I notice A. W., New Jersey, is having trouble welding wide wagon tires. Now the trouble with him is he don't get his fire big enough. Put on more coal. Get a good bed of coal and get the tire away from the tuyere iron when the tire is beginning to get at a white heat on the bottom and stop blowing until the heat gets even all through, and then go ahead. I have welded heavy tires, 6 inches by 5/8x3/4, in a fire with the cold duck nest, tuyere iron and a bellows. A smith sometimes gets worked up to such a pitch that he don't take time to think of the fire. To make a good fire is half the battle in any good welding. You need good clean coal well charred. Don't work the coal green. Forty years ago in making plows I learned that the secret was in making the fire. Now I see young smiths trying to work with green coal and it makes me tired. They say the old fellows are out of date—away behind. They now learn the trade in ninety days.

The Cause of Corns.

From A. E. Bachman, Pennsylvania.—The so-called corns found in horses' hoofs are at first nothing but coagulated blood in the quarters, the result of the bursting of the blood vessels running round the coffin bone. The shoer is often accused of being the cause of horses having corns, from his supposed bad shoeing. My experience teaches me that in ninety-five out of every hundred cases the shoer is not at fault. Horses that are not driven fast seldom have corns; those that are driven fast over a rough and piked road are only ones that have corns, and they would very likely have corns if they were driven at the same rate without shoes. During my fifty-three years of experience in shoeing all kinds of horses and colts, I found ten colts that never wore shoes having large and fully developed corns, thus proving the fact that the shoer is not at fault, as some men think.

A Model Forge.

From L. L. James, Indiana.—I send you by this mail a photograph of my shop taken a year ago and before it was completed. The main part of the shop is 60 x 40 feet, with an ell at one side 30 x 24 feet. The main part is two stories high and has lots of room above the second floor to store away wood, stock, etc.



L. L. James' Shop.

Now I want to tell you about the forge which is the best one I have ever seen. It is built in the rear of the shop with two fires, one at each end on opposite sides. The forge is 10 x 5 feet, starts square and runs to the second floor; there it begins to taper in gradually on all sides. The chimney is 30 feet high, with an opening 2 feet 9 inches, and is in the center of the forge. On top of the forge I have a plate of iron, 3/8 x 12 inches, the full length of the forge, 10 feet. Then the flues start the full width of the forge, which is 5 feet, and is 2 feet the other way, making the forge 6 feet between the two flues. Now, the opening is 2 feet by 9 inches. This is built up this size 5 feet from the top of the forge. Then I have a heavy channel piece of steel put on and lay bricks on this steel, which is 10 inches wide, one inch thick and 10 feet long, the full length of the forge. This is built up full size until it pokes through the second floor, then it gradually tapers in, but the opening for the flues remains the same size to the top. Where the two come together there is an opening left to catch the smoke that accumulates, so there is none gets out into the building, even when charing coal. There is an iron door, 2 feet wide, hung to this channel steel that I can let down, and raises to allow a wagon tire to go under, but for all other work is shut down. Now you can see what the other smith is doing, and if you have a "cub" you can see how he is getting along. I have had a good many forges built and have had lots of bother, and as I am getting too old to work, this one will probably be of some benefit to others. I have been waiting for the brick mason who built this forge to furnish me with a drawing that I could send to you, but he keeps putting me off, so I thought perhaps I could make you understand the way it is without a drawing, but if it is not plain, let me know, and I will try and get some one to make a drawing. In the picture the man with the shears in his hand is myself, and next to me is my wife. The other lady is my daughter.

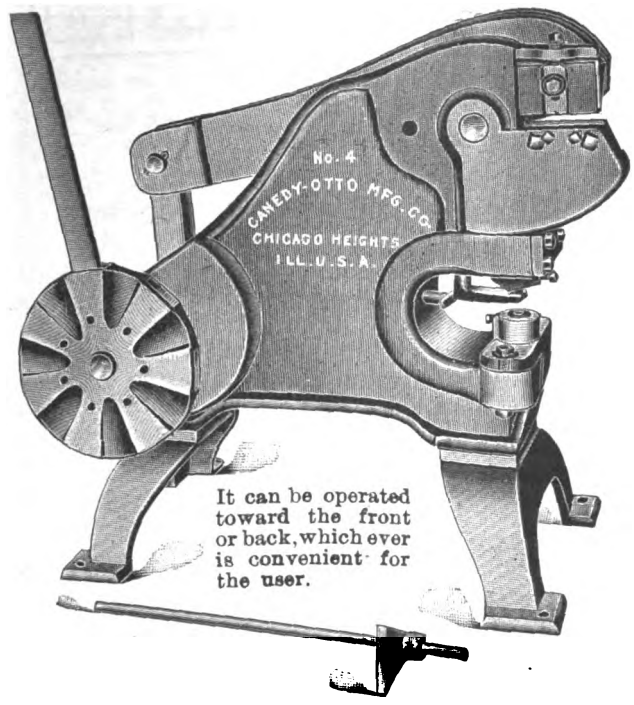
Welding Springs.

From C. H. Wyatt, Colorado.—A few months ago some one wanted to know something about welding springs, also how to weld flat iron. I scarf them by backing them up and making them a little narrower at the point. Then I put them together just the reverse. This way the thin edges are away from the anvil and we do not have any cold shuts. In welding springs I use Courtland's Climax Compound, and put them together as I would iron. I never rivet together, and I do not believe a man can do as good a job by riveting. If you use Climax I will guarantee the job after you have tried this way a few times. I put tires together the same way. If I have steel tires I use Boraxett, made by the same company.

Rights of Horses.

The Humane Society of Kansas City, Mo., has issued a stenographic report of a mass meeting for the horse, held a month or two ago, which includes drawings of fountains now in use in that city, and a summary of the agents' reports. The address of President Edwin R. Weeks, in which he refers to the lack of water now available for horses in the streets of Kansas City, is one of the most earnest pleas for that faithful animal that we have seen in a long time. The Humane Society, through the Bands of Mercy, the women of the society, the committees on legislation and education, and other

No. 4 Combination Punch and Shear



Will shear ¼x4-in. flat bars.
Will shear 1-in. round bars.
Will punch ¼-in. hole in ¼-in. plate.
Depth of throat 6 inches.
This machine is furnished with ¼-in., ⅜-in. and ½-in. punches and dies, also a lever bar.

When choosing your blacksmith shop equipment why not get the best—

CANEDY-OTTO

It costs no more.

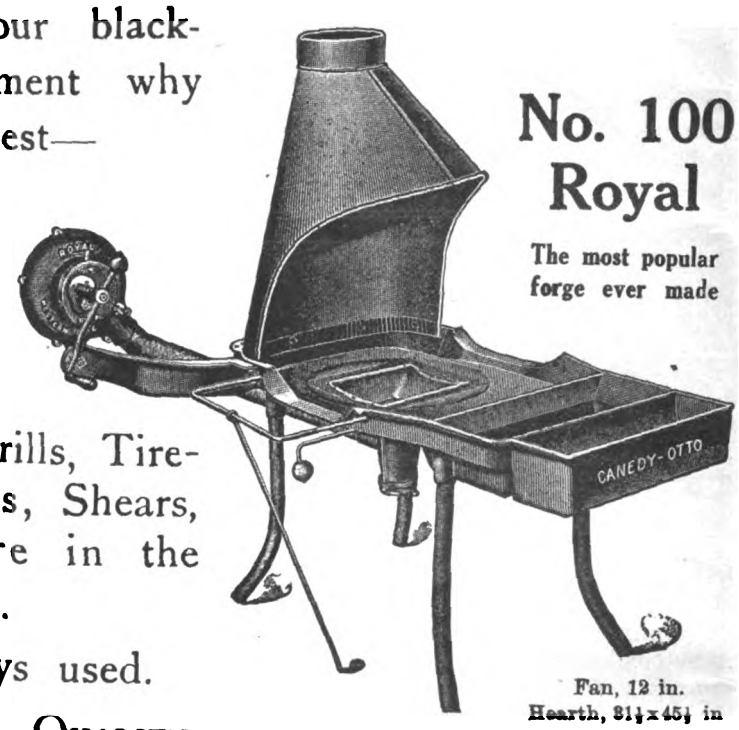
Manufacturers of the finest line of Forges, Blowers, Drills, Tire-Shrinkers, Punches, Shears, produced anywhere in the WORLD.

Once tried, always used.

There's a reason — QUALITY.

No. 100 Royal

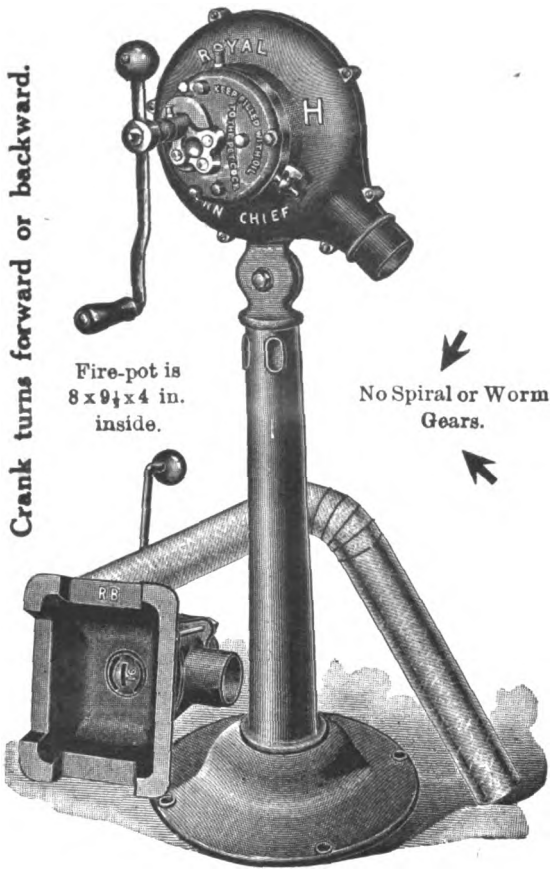
The most popular forge ever made



Fan, 12 in.
Hearth, 31½x45½ in

Royal Blower

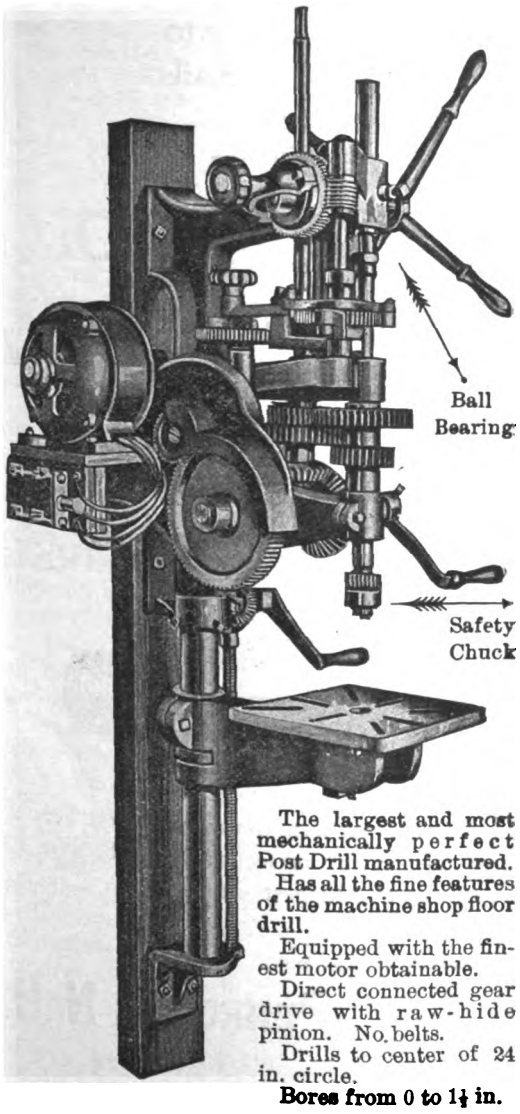
(Ask the man who owns one)



FORGES BLOWERS

PUNCHES SHEARS

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 raw-hide pinion. No belts.
Drills to center of 24 in. circle.
Bores from 0 to 1½ in.

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Over 200 different styles of TOOLS. We can suit every need.

Send for Catalogue

Give name of supply dealer or jobber.

CANEDY-OTTO MFG. CO.

CHICAGO HEIGHTS, ILL.

No. 1½ Western Chief

(TIRE and AXLE SHRINKER)

The easiest operated and most powerful Shrinker of its capacity in the WORLD.
Capacity from smallest up to 4x1 in. round edge tires and 1½ square axles.

means, has had laws enacted, fountains erected, and made more than 100,000 intercessions in behalf of the horse; and with the effective aid of the Board of Education and the teachers, and the assistance of a sympathetic city press, has accomplished much to create a more nearly just public opinion in recognition of the rights of the horse.

QUESTIONS FOR OUR READERS

You are invited to ask questions freely on all points pertaining to your work. Our subscribers who have solved successfully the problems which confront you will take pleasure in imparting the results of their experience for the benefit of their fellow-craftsmen.

Tempering Automobile Springs.

From L. W. Fox, Texas.—I have been a blacksmith for twelve years and have had lots of automobile springs to make and temper. I will ask some of my good brothers how to temper an automobile spring so as to give the best results.

An Annealing Question.

From E. Bravender, Mississippi.—I have a broken iron bedstead. One of the locks is broken—the side rail lock to the head board. This could be easily fixed, only the cast part is so hard no drill will make any impression on it. Will some reader please advise how to anneal this casting so I can drill it? It is not case hardened, as it is hard inside as well as on the outside.

Interferes at the Knee.

From Andrew Gendron, Michigan.—Will some one of your expert readers please advise me what to do for a horse that interferes in the knee?

Welding and Disc Sharpeners.

From John Jeffery, Canada.—I have trouble in welding wide flat iron and steel. Sometimes I get just one side welded and it may look O. K. but often it is no good. I have often broken irons off wagons and other things brought in for repairs. The flat ones are nearly always broken at the weld. In fact, they are often only just stuck across one end, or at a corner. I have seen good workmen often make a failure at welding wide flat pieces. I have tried to be very careful by keeping a good clean fire and in all the other ways I can think of. I should like to know how the fine welding of steel to steel, or iron, is done on planing machine knives and other wide knives.

I would like to know the experience of the users of disc sharpeners. It seems to me the kind that rolled the edge would be the best. The kind that cuts or grinds must leave nicks in the edge if the disc is bent or kinked on the edge.

Death of Alfred A. Pope.

Alfred Atmore Pope died at his Farmington home on August 5, 1913, and was buried at Salem, Ohio. Mr. Pope was born in Vassalboro, Me., in 1842. At the time of his death, and in fact from their beginnings, Mr. Pope was president of The National Malleable Castings Co. and The Eberhard Mfg. Co. He was also director in many other manufacturing enterprises and banks, also president of Westover School, Middlebury, Conn.; trustee of Western Reserve University; member of the Royal Society of Fine Arts, London, and member of the Visitors' Committee of the Fogg Museum of Fine Arts of Harvard University. The integrity of his character was impressed on the least detail of every business which he controlled, in every relation both within its organization and with the outer business world. A long and active business life left his ideals untarnished, and in the minds of his associates his commercial genius, great as it was, was overshadowed by the other many and greater traits of character.

POWER

In this department an expert will reply to any questions our readers may propound as the result of their experience, or inspired by a desire to become acquainted with the value of power in the shop. All inquiries should be addressed to the Editor of THE BLACKSMITH AND WHEELWRIGHT, P. O. Box 654, New York City.

When the Engine Acts Sluggishly.

Weakening of the valve springs because of set or loss of temper, sometimes is responsible for a sluggish engine and loss of power. A weak spring makes the valve lag in closing, and throws it out of time. With a weak exhaust spring, part of the incoming charge will be blown out through the exhaust, while a sluggish inlet valve spring is a promoter of back firing in the carburetor. If one or more of the cylinders lack power, and the cause is difficult to ascertain, a few washers inserted between the springs and cups to increase the tension of the former may reveal the cause of the trouble. If this treatment shows a livening up of the engine, new springs should be fitted, where needed. However, while a certain tension is necessary to give the best results, if the springs are too strong more power will be required to open the valves, and the strain and wear on the valve gear will be greater.

Get the Hole Big Enough.

The efficiency of an engine is often reduced when an exhaust pipe washer is renewed owing to the diameter of the central hole being smaller than the interior diameter of the exhaust pipe. Of course when a washer is cut from sheet asbestos and the central hole is left smaller than it should be the passage of the exhaust gases will very quickly blow away the surplus asbestos protruding within the pipe, but when the joint is formed with a copper-covered asbestos washer the restricted bore is likely to prevail for some time—in fact, it may remain permanently.

A Surpassing Buggy Catalog.—The Parry Buggy Catalog for 1914, which has just been published, is wonderfully effective, complete and attractive from the standpoint of illustrations. It is quite appropriate that the "largest carriage factory in the world" should have the best and largest catalog in the world, and this is true of the Parry Catalog. Buggy or carriage dealers will find it advisable to send for one, hang it up in their shops and call the attention of their patrons to it. If it doesn't sell buggies, then we miss our guess. One can select a carriage from it with as much assurance as by a visit to the factory, and he will find it hard not to select one if he has any appreciation of the best in the way of driving vehicles, and at a price that is marvellously low. If you wish the catalog, address the Parry Manufacturing Company, Indianapolis, Ind.

Free Trial of the Roto Electric Blower.—This blower is made by the Rosewater Electric Company, Dept. B & W, 3110 Croton Avenue, Cleveland, Ohio. It is said in their advertisement on another page that it can be adjusted to any forge without cost and without trouble, and it is so well made that the manufacturers guarantee it to stay in order for a year, although, of course, it will last very much longer. They want you to cut out the coupon in their advertisement, fill in your name and address and send it to them to-day and they will send you one of their blowers on a ten days' free trial. You don't have to pay a cent, as we understand it, for ten days. Manifestly this company could not afford to put out a blower in this way unless they had absolute confidence in it. But consult their advertisement, read it carefully, and then send to them if you want to test one of these blowers.

Broken Castings Mended.—You can do this in your own forge by using "Braziron," manufactured by the A. & J. Manufacturing Company, 561 West Lake Street, Chicago, Ill. See their advertisement on another page, and send for an outfit with full directions how to use. Every blacksmith has opportunities for mending broken castings, or can have such opportunities if he will only notify his customers that he can do work of this sort. It is not generally believed that cast iron can be mended at all.

Horse Clipping Machines.—We have received from the Gillette Clipping Machine Company, 110 West 32nd Street, New York, their latest booklet describing their different clipping machines. They would like to send a copy of it to every reader of the Blacksmith and Wheelwright who may be interested in clipping horses. Horse clipping is a side line for blacksmiths from which they can make considerable money by very little effort.

The Erie Heel Calking Machine.—This is a solid substantial machine, occupies but a foot of space, and may be set at one side of the forge and be handy without being in the way. With it any boy or helper can make calks of any size steel, flat, blunt or sharp, any length you wish from a short heel or side calk to a lone toe calk. Three strokes of the hammer make a calk from the bar. Write for further particulars and price to Butts & Ordway Company, 33 Purchase Street, Boston, Mass.

THE BLACKSMITH SHOP.

Any Place and Any Kind Often Considered Good Enough.

From The Hub.—The smith's shop, even in the present days of system, shop management and efficiency, gets the least consideration. Any place seems good enough for a blacksmith shop—down the cellar, some place where there is no fresh air and very little light, and a low roof where the smoke and gases hang.

To an employer who has a good smith and whose work goes on day after day and year after year without serious mistake, the smith seems to fill a small place. But let the smith leave and let some fellow less capable take his place, how they begin to take notice and to realize how valuable the other man was.

The trouble, it seems, is as much with the men themselves as with the employer. The smith gets careless when cutting off stock. He throws the scrap or cut-offs on the floor and lets them lie. That one thing helps to keep the smith and his shop in a poor condition.

The idea of a great many men is to have as much iron and work on hand as possible, so that the foreman or the employer may think that they are very busy. My experience is that a man who has been smart enough to fill the position of a foreman or employer is not so easily fooled. There is not a foreman but who likes to see his shop nice and clean—everything in order and tools in place, so that the men may at a moment's notice proceed to turn out the work.

First—A shop well ventilated and with plenty of light and room. Some manufacturers are advertising improved ventilating systems and are ready to prove that the firms who have had their systems installed have found the men turning out more work.

Second—The forges laid out on the plan best suited for the work to be done at each forge; near to the steam and trip hammers, as the work demands, and not placed close to the wall as is the usual custom. Put the forge in the center of the shop, if possible, so that the smith may have plenty of room to do his work.

If conditions necessitate that the forges be placed along the wall, have them five or six feet away from the wall. This prevents rubbish and scrap from being thrown behind the forge, and this space can be used for tool racks or perhaps a bench.

Third—Cranes form another important part of the shop, and placed between the heavy fires and the steam hammer they do away with the lifting and carrying of heavy stock. These, I think, are three of the most important items in the smith's shop.

As the days of apprenticeships are about past, as far as the manufacturers are concerned, the foreman or head of the department ought to specialize his men. Take a man and break him in on a certain class of work, let him have special tools suitable for his work. And have the tools marked with a number or figure, so the man may know his own and be held responsible for the tools.

If tools are marked in this way it gives the man more interest and pride in keeping his tools properly in order for his work.

In a place without system of some kind a man is inclined to borrow a tool and drop it at his feet, and even to let the fellow next dress it if he chooses.

Another time saver is to have the stock cut off at the saw or by some handy helpers at the spare

fire and laid down at the forge. Then when a smith is finished with one job he can start right on the next.

Templates made of sheet iron are very helpful time savers. Or, better still, when the work is standard, have a sample forging, as some men can work from samples better than from drawings.

Some men are more skillful than others at handling the stock at the steam hammer and are able to turn out the work quickly. This fact can be profitably worked even in a small shop by having one man rough out the work and let the others less capable at the hammer finish the work.

Making blacksmith tools is also important. Have one man who is careful in heating and forging steel tools do this work and you get all the tools uniform in shape, weight and quality. You save time, thereby knowing exactly where the trouble is in breakages, and you save yourself endless trouble and expense.

Marking the hammer tools is also a good idea. A pair of 1⅜-inch swages will look like 1½-inch when worn, and you cannot very well rely on measurement with the rule on the outside. As a result, a man depending on the swage instead of his calipers gets the job below size.

A Big Chain.

A giant chain, formed of some of the largest links ever made, was recently constructed in England for use in towing the huge floating drydock "The Duke of Connaught" across the Atlantic to Canada. This floating dock is the second largest in the world, and is capable of taking the largest battleship being built or projected. It is 600 ft. in length, 105 ft. wide, and 60 ft. in depth.

Care of the Draft Horse.

Following are the drivers' rules of the Boston Work Horse Parade Association:

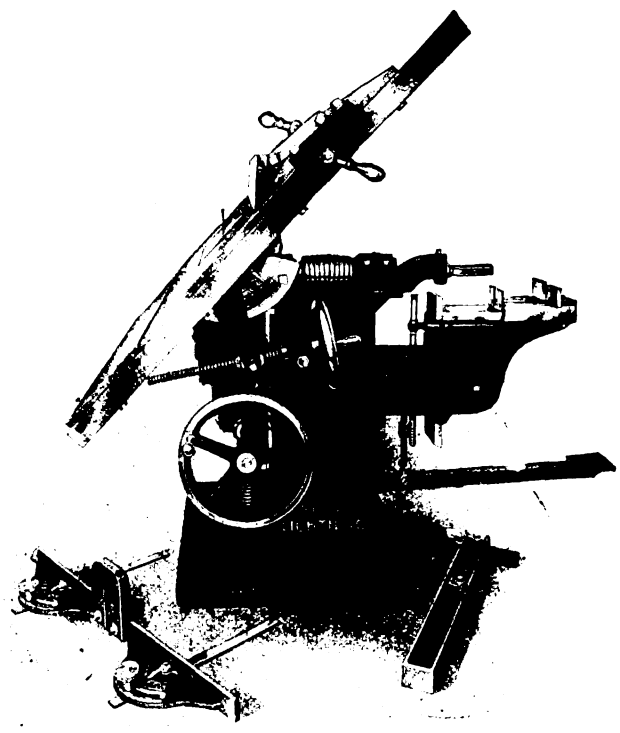
1. Start at a walk and let your horse work very easily for the first half hour.
2. A heavy draft horse should never be driven faster than a walk, with or without a load.
3. Look to your harness. Avoid these faults especially:
   Bridle too long or too short.
   Blinders pressing on the eyes or flapping.
   Throat latch too tight.
   Collar too tight or too loose.
   Traces too long.
   Breeching too low down or too loose.
4. Drive your horse all the time. Feel his mouth gently. Never jerk the reins.
5. Take the horse out of the shafts as much as possible; and if you drive a pair of four, unfasten the outside traces while the horses are standing; they will rest better that way.
6. Teach your horses to go into the collar gradually. When a load is to be started, speak to the horses and take a firm hold on the reins so that they will arch their necks, keep their legs under them and step on their toes.
7. Water your horse as often as possible. Water in moderate quantities will not hurt him, so long as he keeps moving.
8. Blanket your horse carefully when he stands, especially if he is at all hot. Repeated slight chills stiffen and age a horse before his time.
9. Bring your horse in cool and breathing easily. If he comes in hot he will sweat in the stable, and the sudden stopping of hard work is bad for his feet.
10. In hot weather or in drawing heavy loads, watch your horse's breathing. If he breathes hard, or short and quick, it is time to stop.
11. Remember that the horse is the most nervous of all animals, and that little things annoy and irritate him. Remember that he will be contented or miserable accordingly as you treat him.

Grease Stains on Steel.

Grease and stains can be removed from steel with a mixture of unslaked lime and chalk powder, by rubbing it on the steel with a dry cloth. The best proportion for the mixture, which is easily prepared, is 1 part of lime to 1 part of chalk powder. The powder should be used dry. It can be kept in cans for future use and can be used over and over again.

An Improved Variety Saw.

The variety saw has long been recognized as a very important tool in small woodworking shops. It is the machine of many uses and without which manufacturers in these lines could hardly operate their shops. One of the latest improvements in the variety saw is now being placed on the market by the J. A. Fay & Egan Company. From the illustration and description given here it will be seen that the 330 and its combinations is an excellent tool. The special care taken in the design and construction of this machine is such that all adjustments are easily and quickly made, which feature will appeal to one from the economical viewpoint.



330 Variety Saw, showing Table tilted, and Mortising and Boring Attachment.

The 330 Variety Saw is made in two sizes to meet the requirements of the purchaser. The larger size shown in the illustration has a 36 by 42 inches heavily ribbed castiron table mounted on rockers and angles 45 degrees by hand wheel and screw, a micrometer index showing the exact angle of tilt. A wooden throat plate is provided so that molding, jointing, dadoing, grooving, rabbetting or gaining heads up to 2 inches wide may be used. As will be seen, the fence equipment is elaborate, consisting of a bevel ripping fence for angle sawing and one for plain ripping on either side of the saw. Two miter fences with brass indicators and yoke for using both at one time are furnished. A hood and chute guard the lower part of the saw, but by loosening a single thumb screw the hood may be removed for easy access to the blade.

The small size of the 330 is similar to the 330 regular, excepting that the table, which is 26 by 30 inches, and the fence equipment, is not so complete. However, the fences are sufficient to take care of all ordinary work. The column and adjustments are duplicates of the regular machine in size and weight.

An interesting bulletin on this machine will be sent to anyone on request to J. A. Fay & Egan Company, 175-195 West Front Street, Cincinnati, Ohio.

Genuine Armstrong Bolt Dies.—These are made by the Armstrong Manufacturing Company, 316 Knowlton Street, Bridgeport, Conn., and are adjustable to variations in the size of nuts. Consult their advertisement on our fourth cover page and write for catalog, which will give full particulars.

Easy to Own an Engine Now.

One of the most notable things in the gasoline engine business is a very handsome, large size circular in three-color printing, just brought out by Ed H. Witte of the Witte Iron Works Company, Oakland Avenue, Kansas City, Mo. The title of this is "Own Your Hired Hand—It's Cheaper Than Hiring." The text matter with the rich illustrations show, in a convincing manner, that a Witte engine, using either kerosene, gasoline, gas, naptha or distillate, is a competent "hand," suitable for any work that can be harnessed to a belt. For

E. H. Witte.

twenty-seven years Mr. Witte has done nothing but build Witte engines. His catalogs and circulars, together with the prices he makes, show that he is a master at his business. Another thing that is brought out in this circular, which is of big interest to power-users everywhere, is Witte's new plan of selling only direct from factory to user, on easy payments, at no advance over the regular prices. This plan is devised so a Witte engine can earn its own cost while the user is paying for it. The striking part of the plan is the really low prices that are made on all sizes of these engines, from 1½ to 40 horsepower, stationary, portable, skidded or sawrig styles. These factory prices mean a saving to purchasers. Your name and address sent to Mr. Witte at his address as given above will bring you one of these new circulars free, together with his big new catalog and easy payment sales plan.

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

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Diamond Horse Shoes.—No reader should fail to turn to the full page advertisement in this issue of the Diamond Calk Horse Shoe Company of Duluth, Minn., and read it carefully. Illustrations of these shoes are given in the advertisement. They are made of special horse shoe steel and are positively guaranteed to be frost proof and will not break. Otto Swanstrom, the President of this company and the inventor of this shoe is a practical horseshoer and the shoes are practical all the way through. They are easy to fit, well punched nail holes and calk holes and have a strong clip without weakening the toe. Write at once for a catalogue giving a list of sizes, patterns and prices. Ask for one of the advertising art posters. You will feel like hanging it up in your shop when you get it.

WANT ADVERTISEMENTS

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

will be inserted under this head at 2 cents a word, including the address for each insertion, payable in advance; but no advertisement will be accepted for less than 50 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 FOR INVENTIONS.

H. W. T. Jenner, patent attorney and mechanical expert, 608 F St., 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.

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.

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.

PATENTS.

C. L. PARKER, attorney-at-law, and solicitor of patents. American and foreign patents secured promptly. Handbook for inventors sent free upon request. 926 G street, Washington, D. C.

CASH FOR YOUR BUSINESS OR REAL ESTATE.

I bring buyer and seller together. No matter where located, if you want to buy or sell, address FRANK P. CLEVELAND, 975 Adams Express Building, Chicago, Ill.

MECHANICS.

Send for a circular describing "Mechanics' Companions," a tri-square, a centering square, a caliper, rule and protractor. Address J. O. HESS, Oran, Mo.

BLACKSMITH.

Here is your opportunity to be an expert blacksmith without help. As life is short, get Toy's Modern Methods of doing hard jobs easy, forging and welding all kinds of steel solid. Also tempering all tools to a standard by colored charts. This is real plain information, not theory, all for $1.00. Send for free samples first. W. M. TOY, Sidney, Ohio.

WANTED.

WANTED—Traveling men who visit the carriage implement and livery trade make big commissions selling our steel and rubber tired wheels, poles and shafts as a side line. Why don't you try it? THE BOOB WHEEL CO., Cincinnati, Ohio.

FOR SALE.

McGovern and West power tire shrinker, Moyer and Defiance hub boring machine. All as good as new at one-third the price of new ones. Address, 554 Freeman Avenue, Cincinnati, Ohio.

DON'T PURCHASE A TRIP HAMMER

Until you have asked for a price from the COLEMAN IRON WORKS, Elmira, N. Y., U. S. A.

FOR SALE.

General blacksmith and wagon repair shop; new dwelling house and about an acre of land, located in a thriving German Catholic settlement in a good farming community of Central Wisconsin. Fine chance for the right man. For particulars address A. J. MARTIN LBR. CO., Bloomer, Wisconsin.

FOR SALE.

Guaranteed Brooks Cold Tire Setter; a bargain; cash or part cash and short time on balance. Write for particulars. P. O. Box 325, Wichita, Kansas.

AUTOMOBILE REPAIRS.

Blacksmiths who own automobiles or repair automobiles in their shops should subscribe for the Automobile Dealer and Repairer, the big 100-page illustrated monthly devoted exclusively to automobile repairs. The only magazine of the kind in the world. The "Trouble Department," with five pages of numbered questions each month from car owners and repair men, which are answered by experts on gasoline engine repairs, is worth many times the subscription price, which is $1.00 per year or 15 cents per copy. The subscription price of this magazine in foreign countries, including Canada, is $1.50 per year. Postal cards will not be answered. CHARLES D. SHERMAN, 52 Windsor Avenue, Hartford, Conn.

LEARN TO PAINT

automobiles and carriages by new, best and latest process. Good money in it. I can teach you how to do first-class work. J. FRAHLICH, Mayfield, Ky.

SITUATION WANTED.

An experienced carriage painter, striper and finisher wishes a job in some quiet country town with some blacksmith building enough work to keep a painter going. Address W. A. RIGGLEMAN, Jamestown, Ohio.

BROTHER,

Accidentally have discovered a root that will cure both tobacco habit and indigestion. Gladly send particulars. No drugs. G. S. STOKES, Mohawk, Fla.

Get our big free bargain list of stationary, portable, traction, marine, automobile engines and supplies. BADGER MOTOR CO., Milwaukee, Wis.

FOR SALE.

Lathes, 13", $140; 18", $150; 25x16, $300; 18", plain, $90. Drills, $12, $20, $38, $48 and up. Shapers, $45 up. Planers, 16", $100; 20" and 24", $150. Millers, $150, $290. 30" band saw, $50. 1 side sticker, $40; 8" 4 side sticker, $175. 20" Fay planer, $95; 26" planer, $100; 3 drum sander, $100. Automatic knife grinder and many other machines. BICKNELL, Janesville, Wis.

FOR SALE.

Blacksmith shop with stock and a fine lot of tools for blacksmithing and wood working and doing a fine business, keep one man nealy all the year around. There is plenty of work for two men. Size of shop 33x53, two stories. Half of floor is concrete. Price $700 cash. Reason for selling given on application. Address, STANLEY GRIFFITHS, Berkshire, N. Y.

WANTED AT ONCE.

All around blacksmith, must be good on horseshoeing and plow work. Steady job. Good wages. Married man preferred. Address Box 95, Roanoke, Ill.

FOR SALE.

Horse shoes. Several thousand pounds, assorted sizes "Good Enough" shoes, at 2c. per lb., while they last. A great opportunity. Act quickly. GEO. H. HOLZBOG & BRO., Jeffersonville, Ind.

FOR SALE.

Blacksmith shop (new) also new dwelling house. Good opening for right man. For full particulars and price address L. L. JAMES, Medora, Indiana.

FOR SALE.

General blacksmith and wagon shop in good farming community in Central Illinois. Plenty of work for two men at good prices. Address for particulars MOSHENROSE & BROWER, Bellflower, Ill.

PATENTS SECURED.

Prompt attention. Legal protection our specialty. Our clients receive personal service. Booklet free. HARRY PATTON CO., Suite 352, McGill Building, Washington, D. C.

FOR SALE.

Good general shop electrically equipped. Best location in Illinois and best prices. Doing good business. Address for full particulars W. R. POLK, Milan, Illinois.

FOR SALE.

Only shop, good place. Cleared price of place in the last fourteen months. Bargain for some one. Address for particulars JOHN PRINTZ, New Richmond, Ohio.

FOR SALE.

Power blacksmith and wood shop combined, stock and tools. Good trade for three men. For particulars write E. D. SATTERLEE, East Otto, New York.

WANTED.

A blacksmith and horseshoer. Steady job for a sober man. Address GEORGE C. SCHRECK, Pawpaw, Illinois.

FOR SALE.

Only shop in town. A first-class power blacksmith and wagon shop in combination with six room house; all in first-class condition. Address for full particulars and price E. A. STEIN, Royalton, Minnesota.

FOR SALE.

Blacksmith shop, tools and stock with dwelling. Plenty of work; fine location for German blacksmith. W. F. TORNE, Rich Valley, Minn.

FOR SALE OR RENT.

Good two-story blacksmith shop. All kinds of materials of both wood and iron, in German locality. Good location for right man. For particulars address H. E. WIECHERT, R. F. D., No. 1, Dietrich, Ill.

The Gas Engine Handbook. By E. W. Roberts. 323 pages, 4¼x7; 85 illustrations; indexed. The Gas Engine Publishing Co., Cincinnati, Ohio. Price $2.

This book is practical rather than theoretical. Where formulas of more than ordinary difficulty are employed, their use is explained in detail by means of a practical example. This is especially shown in the chapter on frame design, in which the author has worked out a practical example in detail, showing each step in the process, and in such a manner that the reader would have little difficulty in designing a frame of almost any form by following the method explained.

The book is divided into three separate parts. The first part is descriptive, the second deals solely with design, and the third gives general information on the installation, care and selection of gas and gasoline engines.

In the descriptive portion the author does not appear to have followed the conventional method of copying from catalogs and the use of catalog cuts, but illustrates the parts by means of origignal drawings and original descriptive matter. We find separate chapters on automobile motors, marine motors and aeronautical motors. These chapters contain a discussion of the conditions to be met by the motors of each class and the special features of each type. No attempt is made to describe any particular motor, but the description is general.

It is especially noteworthy that in these chapters the author has made a strong plea for the two-cycle, pointing out the false ideas about this type and the causes of its unpopularity in certain lines.

The book ends with a chapter on the selection of a gas engine, which is well worth reading by the intending purchaser of a power plant. It is well printed, illustrated and bound.

Light for the Blacksmith Shop.—It often happens that a blacksmith is required to work in the winter after dark, and he needs a good light, better than can be obtained generally from kerosene lamps or lanterns—that is, if he is to do his work well and comfortably. Such a light is manufactured by the Brilliant Gas Lamp Company, Dept. 24, 1009 South Wabash Avenue, Chicago, Ill. It is a new 100 to 700 candle-power light, and turns up and down like gas at one-third the cost of electricity, gas or kerosene. Anyone can operate it, and they guarantee satisfaction. Write for catalog giving full particulars, and mention the Blacksmith and Wheelwright.

Locomotive Boiler Construction. By Frank A. Kleinhans. New revised edition. Price $3. The Norman W. Henley Publishing Co., 132 Nassau Street, New York.

This book takes the locomotive boiler up in the order in which its various parts go through the shop. Each step, from the first mark on the sheet to the finished boiler, receives careful attention in a thoroughly practical way, shows all types of boilers used; gives details of construction; practical facts, such as life of riveting, punches and dies; work done per day, allowance for bending and flanging sheets, and other data, including the recent locomotive boiler inspection laws and examination questions with their answers for government inspectors.

It contains 478 large pages, 350 illustrations and 5 folding plates. It is complete, accurate, simple, and all who have anything to do with boilers need it.

Sherwood's Improved No. 88 Jointer Head.—In this issue W. L. Sherwood of Kirksville, Mo., has an announcement of his improved No. 88 combined outfit nine inch Jointer Head. This is a tool which can be used to advantage in every wheelwright or wagon shop in the country. It is easily mounted on a simple wood table which any workman can make from the blue prints and instructions which Mr. Sherwood furnishes. This outfit will plane joint surface, round tongues and other straight work, and chamfer circular work such as felloes, hounds, etc. Write for illustrated circular and price list giving full particulars. You can order one through your regular dealer if you want to. Consult advertisement for further particulars.

Sampson Power Grind Stone Shaft.—This shaft is built to meet the requirements of the average blacksmith and woodworker. It has 1⅛ inch steel shaft 18 inches long, 6 inch flanges, 8½ inch pulley with 2 inch face. You can probably buy this grind stone shaft of your supply house, but if not, write direct to the manufacturer, John Whisler, Gibson, Iowa.

"Easy Money" for Blacksmiths.—This is the heading of an attractive advertisement in this issue of the Chicago Flexible Shaft Company, 630 LaSalle Avenue, Chicago, Ill. This "Easy Money" refers to the clipping of horses in the Fall and Spring. It has been well established from long experience that a horse clipped in the Fall will stand the cold weather better and is less liable to get sick than a horse not clipped, which is working constantly, provided of course that the clipped horse is well blanketed at night. The unclipped horse in cold weather, if he travels with any considerable speed, or has any hard work to do, is sure to develop perspiration which saturates his coat of hair. It does not dry out properly before he is put in the stable at night with the result that standing still he gets chilled and a variety of ills are liable to follow. The clipping of horses is naturally the business of the blacksmith, because he comes in contact all the time with the horses of his neighborhood. Those of our readers who have not yet invested in a clipping machine should consider the matter of doing so very carefully. The outfit is not expensive and as the usual price for clipping a horse is $2.00 (in some places it is a little more and in some places a little less perhaps), it does not take long to pay for a clipping outfit. You can order direct from the above company or if you prefer you can write for a descriptive circular and get further particulars. It is just the time of year now to invest in a clipping machine and the blacksmith who gets one should notify his customers that he has a clipping machine, either by word of mouth, or better still by a circular or letter.

Subscribe for the Blacksmith and Wheelwright, $1.00 a Year.

UNCLE SAM Will Deliver This Tool by Parcel Post for $1.00

Remit by Postal Money Order

THE IMPROVED EASY HOOF TRIMMER

THIS TOOL has a detachable knife that can be removed or replaced in a moment. The knife jaw is adjustable by means of screws. When the knife becomes shorter by sharpening, give the screw a turn or so and the reins will go back to the proper distance apart. When knife wears out it can be replaced for a few pence.

DIMENSIONS—Weight, 2 lbs., Length, 12 ins; Opens 2 ins. Cuts 1 in.

OUR GUARANTEE—If you don't like it you can return it and get your money.

DIRECTIONS FOR USING—

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SECOND—Avoid all wrenching or prying. Hold the tool as near upright as you can. Cut straight through to the blank jaw regardless of NAILS OR OTHER OBSTRUCTIONS and with very little leveling with the knife or rasp your job is complete.

CAUTION—Don't make the mistake that a great many do by grinding bevel on one side of blade, but keep the bevel equal on both sides, so that it will pass through the hoof straight and not in a strain.

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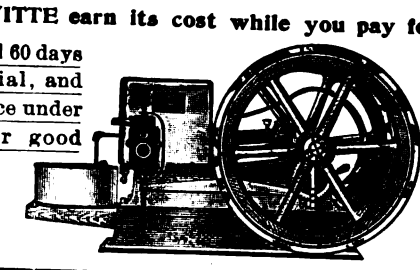

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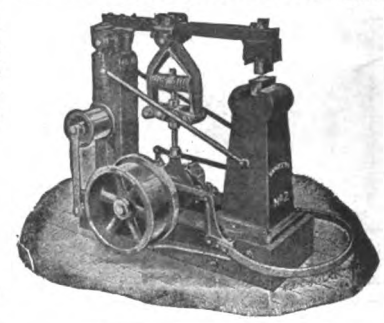

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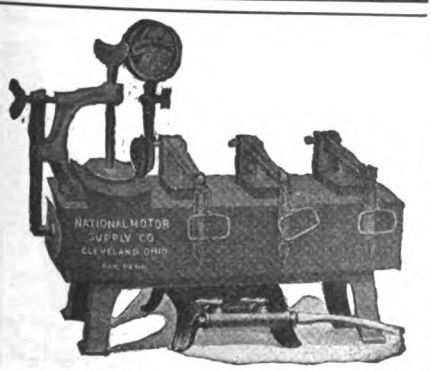

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The machine is used every day in the year, on either sharp or blunt work. Used on every shoe you calk. And you are wasting money every day until you have one, whether you are alone or have five men working for you.

The machine that is in use by the U. S. Government.

The machine that is in use in the best shops.

The machine that pleases Bosses, Journeyman and Customers.

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The machine you will eventually use.

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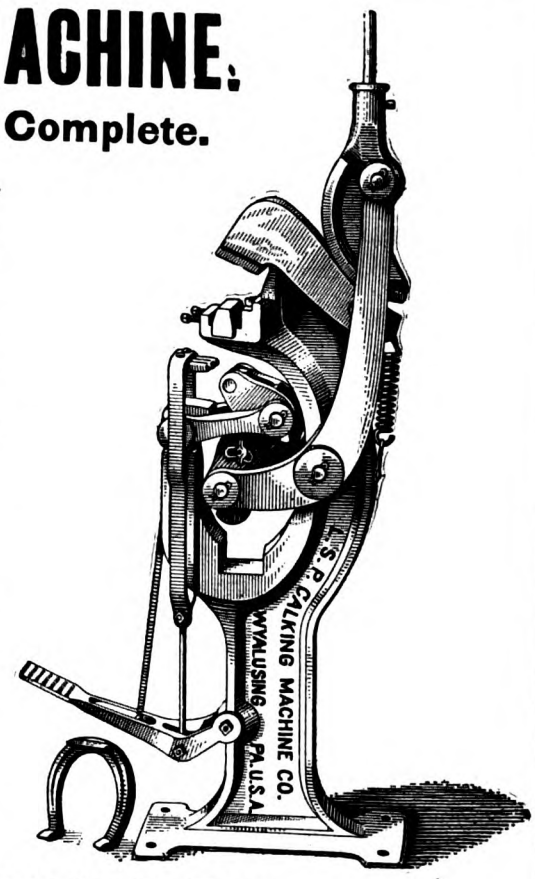

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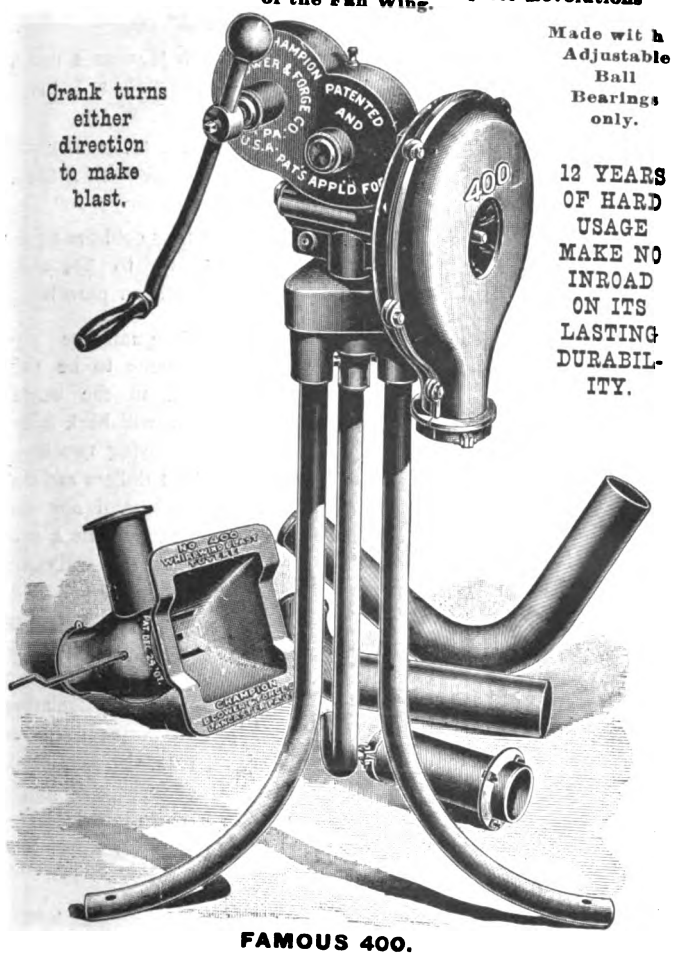

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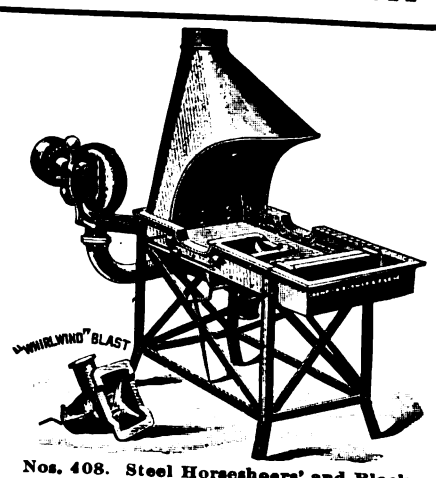
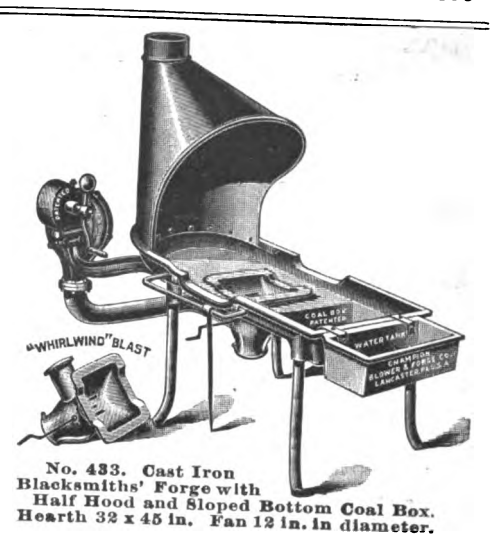


Nos. 408. Steel Horseshoers' and Blacksmiths' Forge with Half Hood. Hearth 30 x 36 in. Fan 12 in. in diameter.



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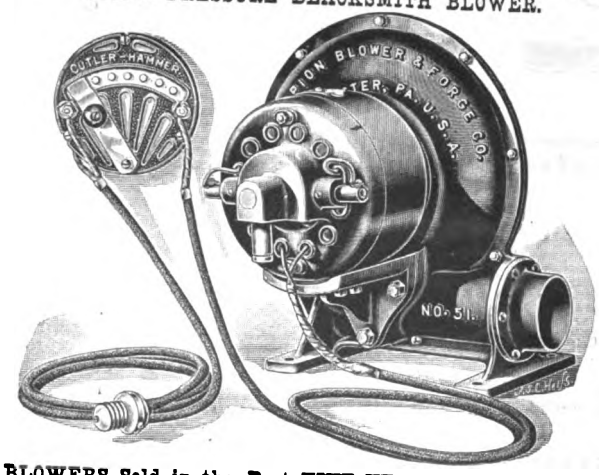

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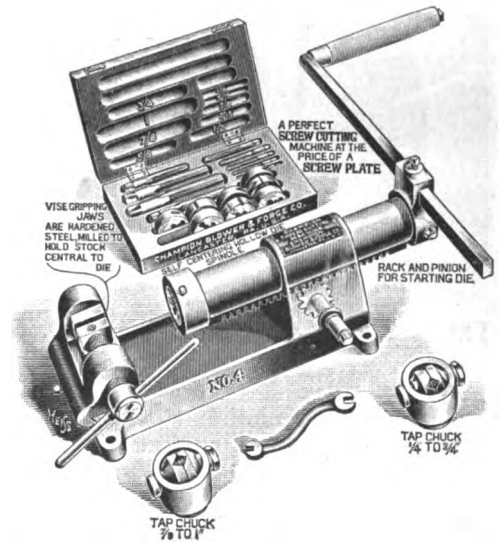
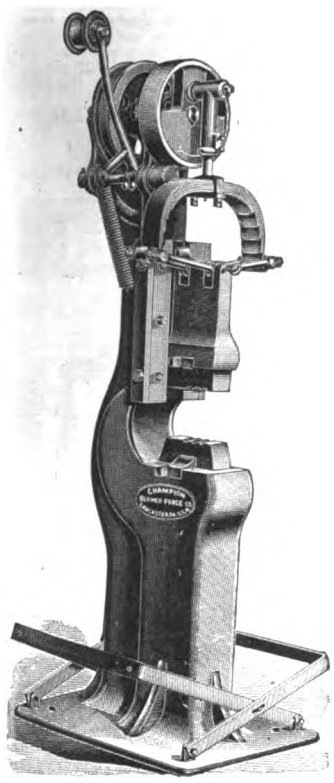
Made in two sizes. ¼ to ¾ inches, or ¼ to 1 inch





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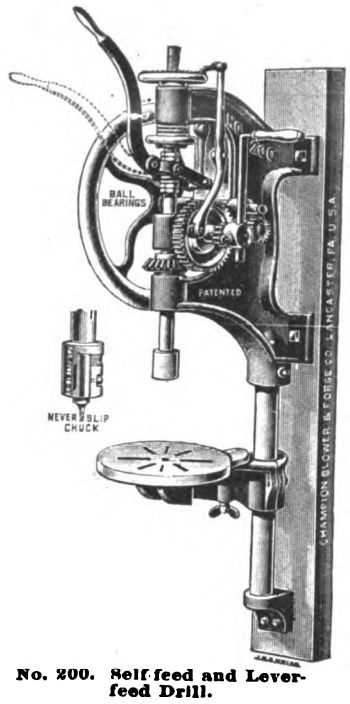
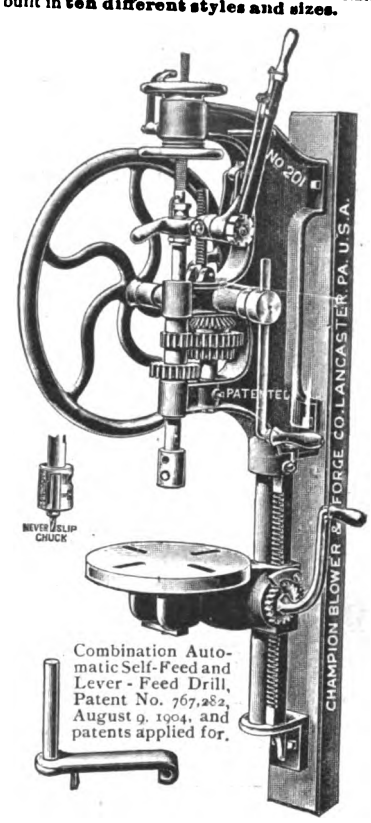
30,000 CHAMPION ELECTRIC BLOWERS Sold in the Past FIVE YEARS.

Champion Electric Blacksmith Blowers are all tested before leaving our works with a continuous **ten hour, highest speed, non-stop run. Our 40% over-size motor does this with ease,** prevents all over-heating, guarantees endurance and meets all blacksmith shop conditions. Champion Electric Blowers built in **ten different styles and sizes.**



No. 200. Self-feed and Lever-feed Drill.



Combination Automatic Self-Feed and Lever-Feed Drill, Patent No. 767,282, August 9, 1904, and patents applied for.

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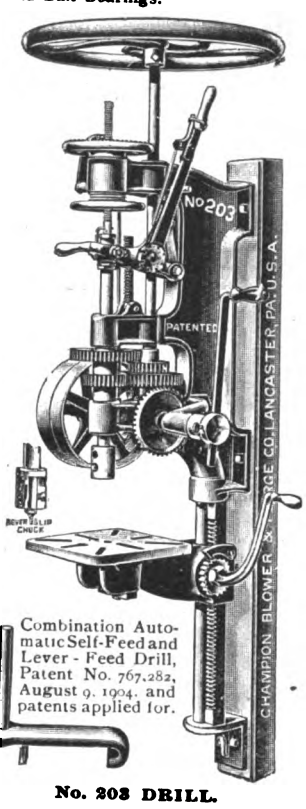
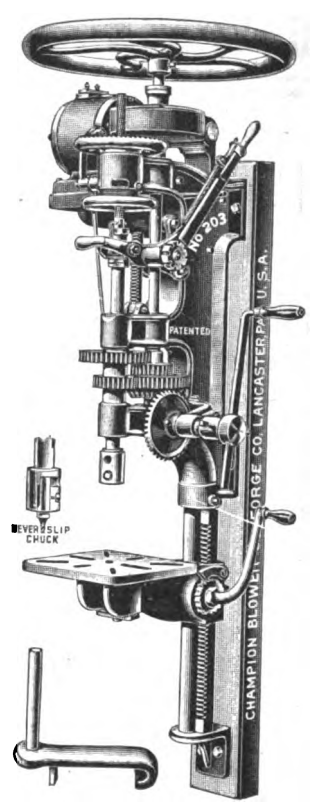
On the **Champion "Patented" Automatic Self-Feed and Double Compound Lever-Feed Upright Post Drills.** Made with Cut Gears and Ball Bearings.



Combination Automatic Self-Feed and Lever-Feed Drill, Patent No. 767,282, August 9, 1904, and patents applied for.

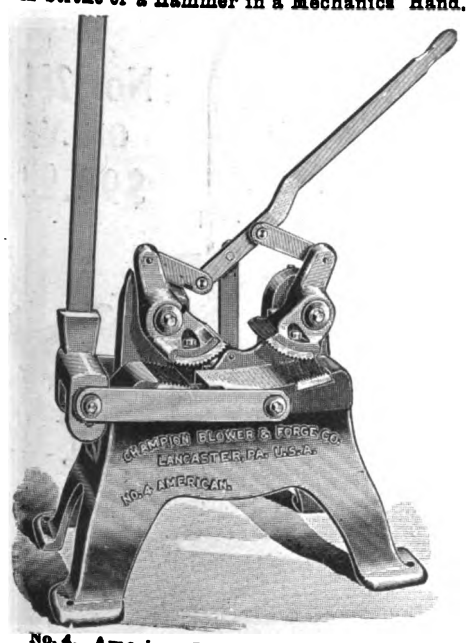
No. 203 DRILL.



No. 203 Champion Combination Automatic Self-Feed and Double Compound Lever-Feed ELECTRICALLY DRIVEN Upright Post Drills.

This Drill has the motor direct connected to the upright back gear shaft, which represents what we consider a perfect up-to-date Electric Drill and one that is worthy of most careful consideration from the up-to-date mechanic. It represents simplicity, durability, and no loss of power.

THE POWER HAMMER With the Flexibility in Stroke of a Hammer in a Mechanics' Hand.



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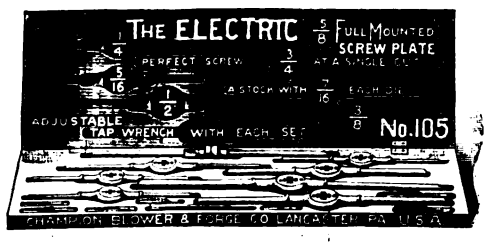
Will shrink up to 4 x 1 inches round edge tire, and axles up to 1¼ inches.



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The Double Compound Lever-Feed produces 80 per cent more pressure or drills holes 80 per cent larger, with the same labor, than any other Lever-Feed Drill.

Remember

There is no TURNING BACK of the FEED SCREW NUT WITH EITHER FEED.

THE DOUBLE COMPOUND LEVER-FEED SAVES 200 PER CENT.

IN TIME AND LABOR in drilling holes, reaming, countersinking, etc., and makes the drill a first class Wood Boring Machine.

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BLACKSMITH AND WHEELWRIGHT

Vol. LXVIII. No. 5. NEW YORK, NOVEMBER, 1913. TERMS: ONE DOLLAR A YEAR

VEHICLE WORK.

Various Styles of Bodies for the Same High Wheel Machine.

BY WAGON MAKER.

The length of the wheel base on this car is 7 feet 6 inches, the diameter of the wheels front is 38 inches and in rear 42 inches, fitted with 2 inch solid rubber tires. The length of the entire frame is 10 feet 11 inches, and the length from the dash to the rear end of frame is 9 feet 7 inches. The length from the rear end of the seat on the vertical line is 6 feet 3 inches. This length, when a body is built on it with two seats, gives plenty of room, as the space between the seats is 16½ inches, and 18½ inches for the seat frame.

If the three seat bodies are built without being interchangeable, the three seats are combined in one body, but when made interchangeable the front part of the body is separated from the rear end, as shown by heavy and light lines on Fig. 1. If built as designed all kinds of bodies can be fitted to the rear end. If the three seats are built in one body the width of all three seats is the same, but if made interchangeable, the front part of the body is made stationary, with a width across the top from 42 to 44 inches, while the rear cross width varies to any desirable or necessary width.

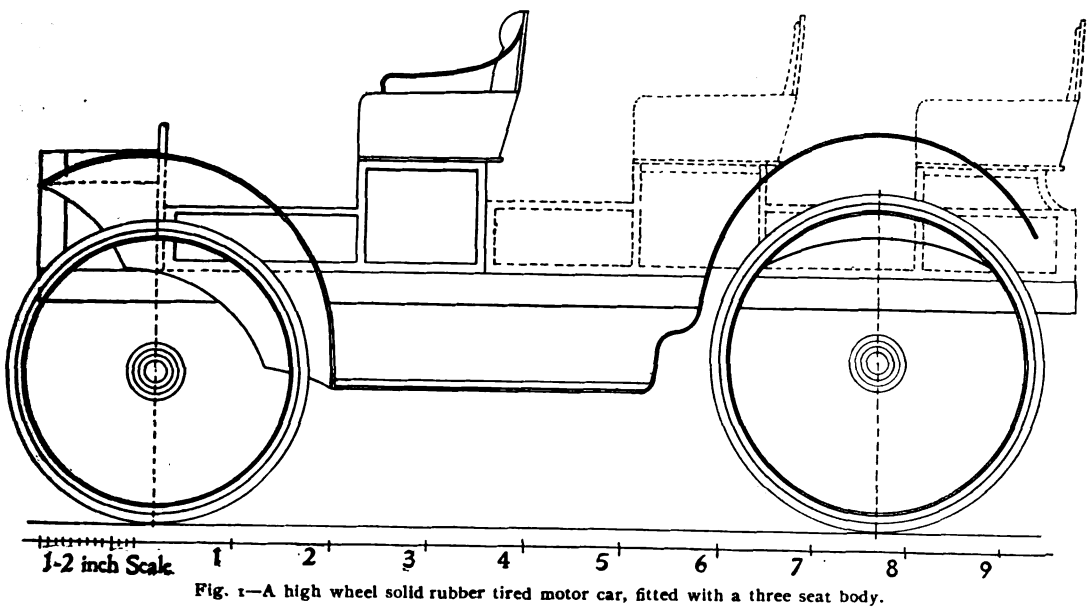

Fig. 1—A high wheel solid rubber tired motor car, fitted with a three seat body.

The entrance on this car to the rear seat is obtained by either dividing the seat in half, the one half stationary the other half hinged to the body, as the fenders and the wheels are in the way to afford an entrance to the rear seat. The distance from the floor to the top of the frame on which the body rests is 31½ inches, which is about the same as a straight bottom surrey.

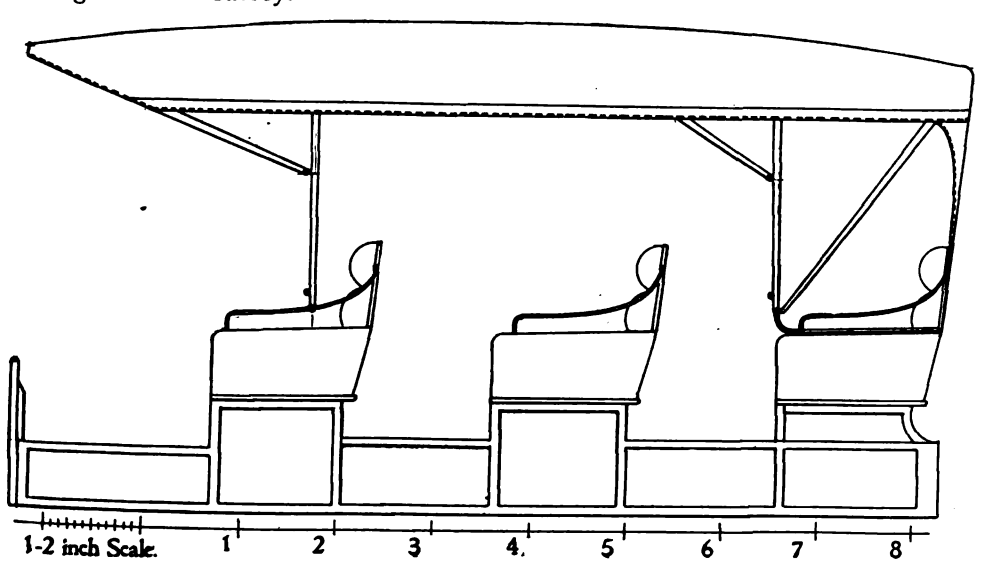

Fig. 2—Three seat body carrying six passengers, fitted with a five bow extension top, without top joints.

With Fig. 2, we illustrate a three seat extension top wagon carrying six passengers. This body is 9 feet 7½ inches long and 32 inches wide, same width top and bottom; and the seats across the top are 44 inches wide. The length of the top is 10 feet. The top has five bows which are bent to a width across of 46 or 48 inches; on the lower end they are bent inward to suit the position of the seat rail in front and the goose neck on the rear seat.

These bodies are generally framed the same as surrey bodies, paneled and molded; or ¾ inch as boards and molded. The seats for the sides and rear pieces are generally ¾ or ⅞ inch poplar fitted to the top of the seat and with corner blocks for each corner, while the seat frame pieces are ⅞ x 3½ to 4 inches mortised together. The top covering is generally imitation leather or drill of a gray or brown color. They are also made with front seat and second seat stationary with top and rear seat to shift, thus making room for packages or trunks on the rear end and carrying four passengers only, without the top.

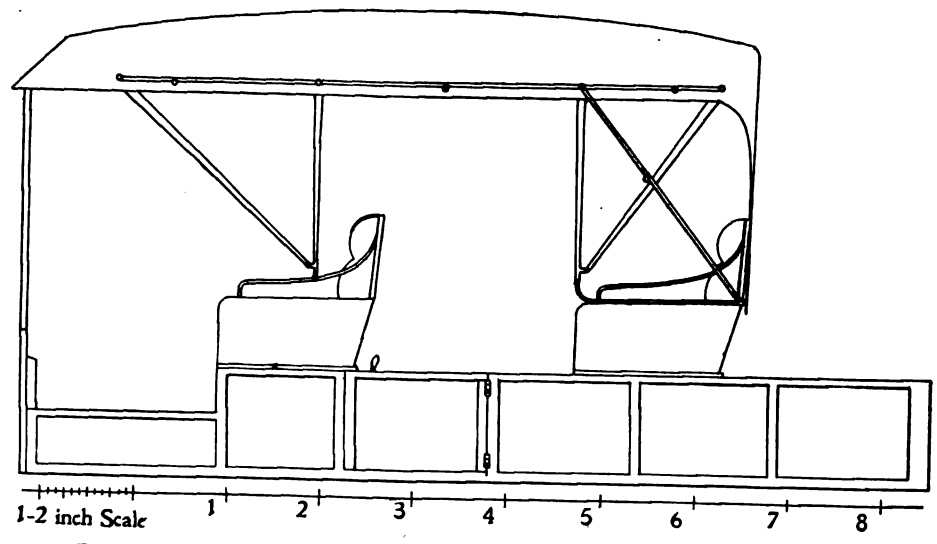

Fig. 3—Four passenger extension top, eight feet long, with top and rear seat to shift.

Fig. 3—The front seat on this car is stationary, while the rear body and rear seat is made to shift. There is a door on each side. This body is intended for a four passenger extension top family carriage with side door entrance on each side, the top made to shift, including the rear seat and space between the two seats, 28 inches, so that two extra seats can be placed on each side for children. In this case the doors have safety locks and cannot be opened with the door lever handles. The length of the top is 8 feet, including the hood. It has top joints to hold the top in position and has four bent bows, 45, 46 or 48 inches wide outside, and short bends on the lower ends. The rear end of the body can be used for packages, and if the top and rear seat are removed, the car can be used for commercial purposes. In this case there should be a drop gate, but made in such a way that its appearance is similar to those used on carriage work.

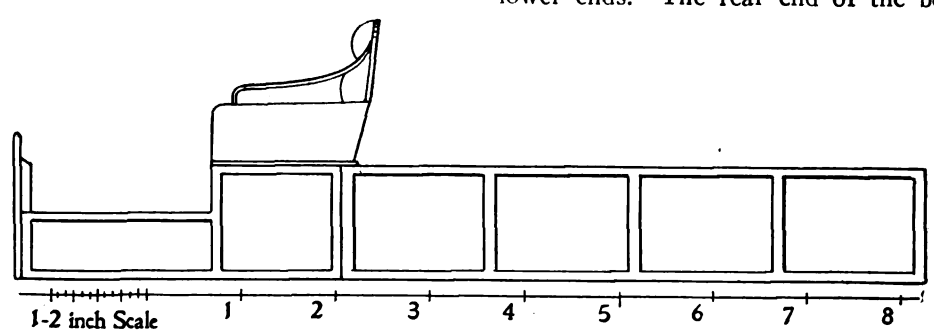

Fig. 4—With stationary front seat, rear of body to shift, with or without tail gate.

Fig. 4 represents a regular commercial body which can be used for various purposes, because the body is 6 feet 3 inches long and can be as wide as 48 inches. If the fenders are removed two more inches can be added to the width of the body without the wheels touching the body. For all such bodies which are wider in the rear the front part of the seat is stationary, because it is cheaper and better to have them separated, besides the rear body can be changed when needed. If the body is built 52 inches wide and the chassis is narrow it will be necessary to use heavier sills and cross bars. If built too light on account of the overhang the weight of the load when thrown to one side or the other may bend the cross bars.

These wagons are also fitted with three light bows and two curved ones in front, making virtually a four bow buggy top, with side and rear curtain to shift. They are also made with wing boards to shift, making a most serviceable wagon.

Fig. 5 has a stationary front seat, rear body to shift, stationary wing boards, drop gate and

six side posts to shift. While this body is made for commercial purposes only, the body can be shifted and replaced with a four passenger body of any shape and style. The rear body, when wing boards are used, must be wider than the front one, otherwise the wings will touch the seat. The wing boards are secured with iron stays from the inside surface of the body and also with ten stays on each side from the outside. Of course, the outside stays are light and support the wing boards at an angle, but the inside stays are heavier and are riveted to the posts of the body.

The six shifting posts rest in loops which are fastened to the inside, and the posts can be easily removed when not needed.

Fig. 6 is a paneled store delivery wagon body with stationary front seat with curved hood stationary to the body and wind shield. This style of body is made any width from 42 to 50 inches, depending entirely for what purpose it is used. For durable work four heavy end posts should be used and fourteen light posts, seven on each side, should be used and especially so when built-up panels are used. With built-up panels the rails can be dispensed with, but with joints the rails are positively necessary as the joints should have a solid support, otherwise they will open. These bodies are built in front with glass frames to drop, or open, with shelves inside if needed; with drop gate, hinged screens, or with one or two doors paneled or glass frames to drop.

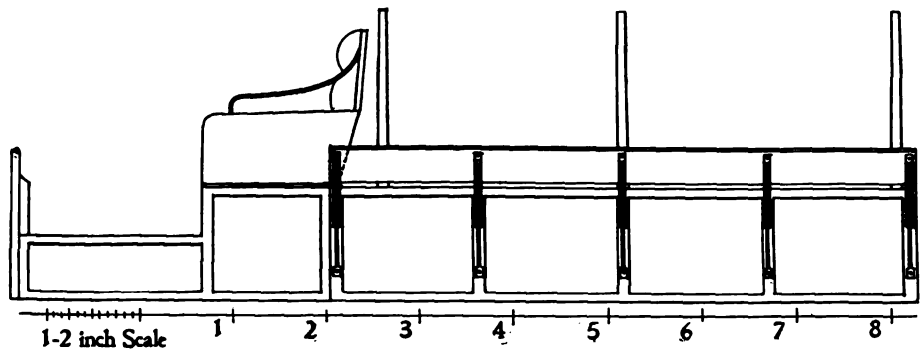

Fig. 5—Front body stationary, rear body to shift, wing boards stationary and drop gate.

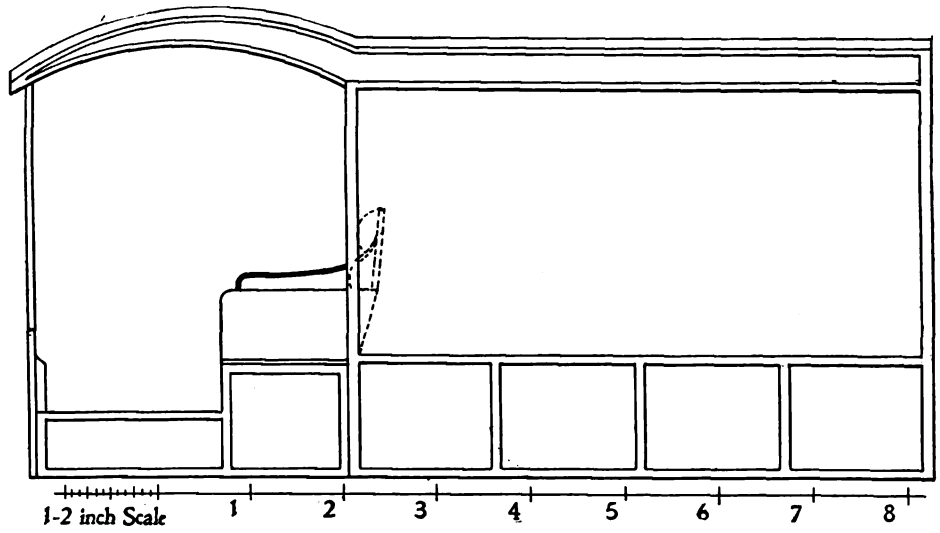

Fig. 6—Paneled store delivery wagon body finished to suit to various uses.

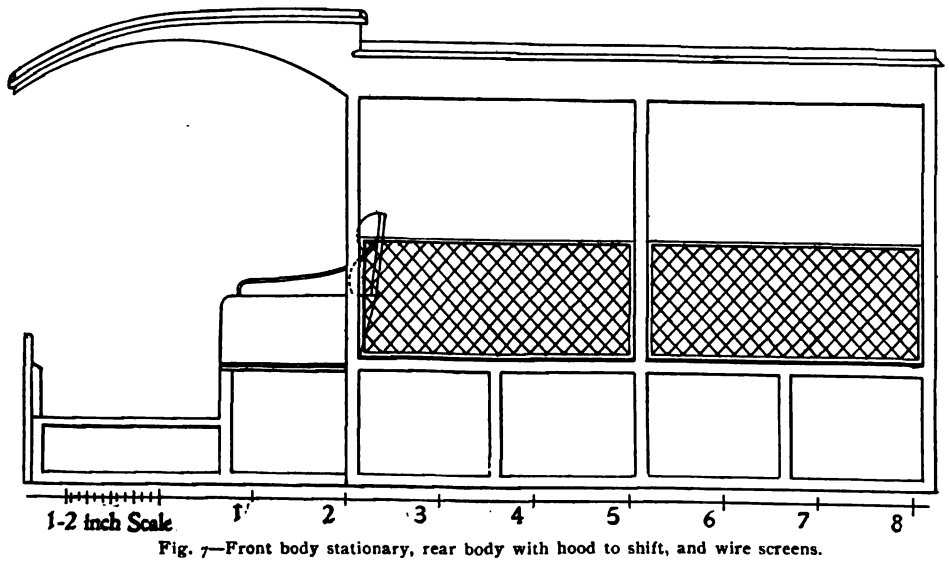

Fig. 7—Front body stationary, rear body with hood to shift, and wire screens.

Fig. 7—Front body stationary, rear body with hood to shift; six posts, three on each side; fifteen inch high sides; fourteen inch high wire screens; seventeen inch wide space open above; six inch wide top rail and curved hood. The width of the body is controlled by the kind of business it is used for, and this also holds good with the wire screens, as in many cases the screens are not needed while on other wagons the entire sides, rear and front end, are screened. When screened from the front they are made in two parts; for rear end on a narrow wagon one screen is used, while for wide wagons they are made in two parts, either swing to each side or upward, but the drop gate is generally used. This body has drip molding on all sides, while Fig. 7 is finished without it.

CUTTERS AND SLEIGHS.

Putting Them in Shape for the Season of Winter Use.

From The Carriage Dealers' Journal.—The owners of cutters and sleighs are usually slow in moving this class of equipment out of storage quarters. Except in the extreme northern belt of country where snow, as a rule, comes early and stays late, good sleighing conditions are very uncertain, and this customary uncertainty has taught sleigh owners to move cautiously in putting available money into a project that promises no satisfactory returns. If left to their own inclinations they are quite as likely to wait until the arrival of the first run of sleighing before seeking the services of the painter, in which case the latter party is more often than not working "tooth and nail" to stand from under the volume of work invading the shop.

For this reason, not to mention others equally important, we urge our paint shop friends to actively engage in making a canvass of the sleigh owners within reach and solicit their trade. It may occur that in order to get the cutters and sleighs to the shop you will find it necessary to bring them in and return them, all of which can be done by charging this work up to "overhead expenses" and entering it into the cost account.

If the sleigh painting business can be handled, or a fair percentage of it at any rate, early in the season, the painter may be able to discount the usual price to a sufficient extent to induce sleigh owners to play the part of the early bird.

Cutters and sleighs have a mysterious way of disappearing into hay lofts, barn basements, second-story quarters and other out-of-the-way places, and it is into these devious courses of movable things, that the paint shop canvasser should turn his searchlight. The most satisfactory feature of this sleigh painting business is that it comes at a season of the year when a dollar is more than ordinarily good to look at.

It is understood, of course, that the profits on this class of work are less than upon wheeled vehicles, but efficiently managed the work can be made to pay and all hands kept busy, which latter consideration is in itself important enough not to be overlooked.

In the matter of handling the work, all jobs as fast as they come to the paint shop should be examined and classified according to the painting repairs to be applied. In this classification three things may properly be taken into account. First—The surface is below the line of vision and is therefore less exposed to direct examination. Second—Fine surfacing in most cases is not, as in carriage painting, so essential. Third—Quicker and harder drying varnishes are better adapted for this work.

A good share of cutter and sleigh work consists in touching up with color and varnishing, one coat of varnish usually sufficing. The price paid for touching up and applying one coat of varnish runs all the way from $1.50 to $2.50 in the smaller towns and cities, and from $2.50 to $5.50 in the larger places. Same work applied to two-seated sleighs brings anywhere from one-third to one-half more, according to locality, etc.

For a $1.50 job dust the surface off and rub it over briskly with a handful of trimmer's moss or curled hair. Then match up the color as closely as possible, putting enough varnish in the color to cause it to dry with a gloss. Touch only such surface defects as absolutely require it, for at best this touching up is difficult work, and the exact shade in many cases is only a bare possibility. Quite as often as not the running parts are in such condition that touching up with color is impossible, in all of which cases the quickest and most satisfactory way is to put on a coat of flat color, run a single stripe across the face of the parts, and varnish.

As a matter of fact, some very successful painters resort to this same practice on cutter and sleigh bodies that are badly bleached and worn, but which the owners insist upon having touched up. The quicker way is to lay on a single coat of fresh color, run a couple of nice striping lines around the outside of the panels, and then flow on a coat of quick-drying finishing varnish. This is giving the owner really more than the bare face of the contract calls for, but it is actually in the long run cheaper for the painter. Only a natural-born colorist is equal to correctly matching a new color to some of these old and sadly bleached out surfaces.

It happens often, of course, that the surface must have something more than a touch-up treatment. In all such events, cut the surface down smoothly with No. ½ sandpaper and apply a solid coat of color, making this coat for any of the lakes or transparent pigments a preparatory or ground color, and applying the transparent pigment coat directly over this.

In due time rub this coat with water and pulverized pumice stone until the gloss is laid down. Then apply the necessary striping lines, and for a first-class job flow on a coat of clear rubbing varnish. Rub this coat when dry with water and pulverized pumice stone, rubbing moderately but uniformly all over, and then finish with a hard-drying finishing varnish. Use a quick-drying rubbing varnish for this work.

The quicker drying varnishes facilitate operations and are quite good enough for the sleigh equipment, which is never exposed to the hard service imposed upon wheeled vehicles. For cutters and sleighs always paint the running parts a lighter color than that applied to the body. Bright, cheerful colors, such as light greens, blues, reds, yellows, browns and many of the glowing lake pigments, may be effectively used upon both cutters and sleighs.

Plain striping effects have the preference. The ginger-bread style of striping went out of style several years ago.

THE CARRIAGE BUILDERS.

The 41st Annual Convention of the National Association at St. Louis.

One of the Most Enthusiastic and Encouraging in the History of the C. B. N. A.

That the recent C. B. N. A. Convention in St. Louis was one of the finest and most enthusiastic, and thus the most encouraging, in the history of the association, is worthy of special mention. It indicates better than anything else that the automobile has been as much an ally and a creator of the general vehicle industry as it has been a competitor and rather more so. Moreover, the various features of the Convention were of more than usual interest. The speeches were eloquent, witty, and to the point. Quite likely President Hull may deserve a good deal of credit for this measure of success, but beyond this, the carriage builders themselves were optimistic as to future business. It was the general feeling that there is a marked reaction in favor of horse-drawn vehicles. More of these vehicles have been made and sold, thus far, in 1913 than in any year since 1905.

It is not the purpose in making the following report of this Convention to present things in their order and sequence. The main point is to give a record of some of the more important ideas that were brought out, and especially those of a permanent value.

There was, of course, a good deal of interesting and witty "airy persiflage," quite appropriate, to that or any other occasion, but this must be omitted in order to find space for the important addresses of general interest. Some of the leading features follow:

MEDIUM PRICED VEHICLES.

Those Who Make Them Are Doing a Thriving Business.

President C. C. Hull, of Connorsville, Indiana.—This meeting marks the forty-first milestone of our honored Association. Many and varied have been the experiences of the Association and its membership during these years. The last twenty-five years of the nineteenth century were years of great development in the carriage industry; hundreds of carriage factories were established, many of which developed into large proportions, producing handsome returns upon the investment. Perhaps but few industries during these years grew more rapidly or more substantially. The depression of 1893 was withstood with unusual fortitude by the carriage builders.

Disturbing Factors.

Peculiar to our industry is the fact that for many years it had no common competitor. Transportation was alone by railroad, steamship or the product of the carriage builder. The brougham, coupe, or victoria, graced the boulevards and the park drives of our cities, and the buggy and carriage were the pride of the townsman and farmer. The first real disturber of this rare condition was the advent of the bicycle. Some real sturdy carriage manufacturers took fright and conceded they had met their Waterloo. Time proved this to be untrue, and demonstrated that this means of transportation had not arrived too soon. In reality, the use of the bicycle made the use of the horse and buggy more necessary, for th public learned to ride and forgot the art of walking. The "novelty and faddy" days of the bicycle were soon past and it assumed its burden amid the affairs of mankind as a commercial proposition.

The inventive genius of some men could see still a greater field in the realm of transportation as yet unexplored, so there came, in the early dawn of our present century, the advent of the automobile. The novelty and newness of this means of transportation were inspiring and most attractive, and as a result, the carriage builder was absorbed in thorough admiration and fear of this new competition. The builders of high-grade vehicles were justified in their alarm; their once thriving business is now a sweet memory of the past. But not so with the vehicle of medium price, whose province is to give real service. The manufacturer of a standard utility buggy or carriage, who, during the past four or five years, has conserved ideas, conserved efficiency, conserved up-to-date methods, and has applied enthusiasm and push to his business, is to-day possessed of a thriving, profitable business.

Co-operative Unity.

Transportation, like all other elements of development, exists in an atmosphere of evolution. It had its beginning in the art of walking, then the beast of burden, the ocean craft, the steamship, the railroad, the carriage and buggy, the electric car, the bicycle, the motor car, and the airship—it takes all of these to meet the world's transportation requirements. Our industry is responsible for a goodly portion of this service, and that less service is not expected of us is evidenced by the fact that 1913 has been one of the best years in the history of the industry. That conditions and environments have changed is but natural. This is true in all lines of activity. We, as an industry, must meet those conditions.

I honor this, our National Association, for the service it has rendered the members of the craft during these forty-one years, but I believe there is need of a closer co-operative affiliation now between the membership and the executive department of our Association than ever before. This is a period of concerted action. Industrial evils can be eliminated only by co-operative movement. Unity of action is possible when confidence abounds—confidence results from a better knowledge of our fellow-craftsman. Our competitor is not half as dangerous a fellow as we think he is, and there is a chance that we may find him more conscientious in his business affairs than we ourselves. The future of the carriage industry, in a great measure, depends upon the conduct of those engaged in the business. A fair and sane policy toward our fellow-craftsmen and a "square deal" for our customers, will conserve a prosperous future for our industry.

We are here to-day under favorable and auspicious conditions. This year has been a prosperous one to the carriage builder, and has done much to re-establish confidence in the permanency and stability of our industry. We should stand close together in our National Association work and adopt such policies as will make our Association helpful to the membership in the greatest measure possible. The work in the hands of our several committees has been prosecuted with diligence and success, as will be seen by the reports which they will make during our convention. It affords personal pleasure to recount that during the year there was not a single note of discord in any department of the Association work, and I take this opportunity to thank our worthy Secretary, the Executive Committee, and all who have had to do with the Association's affairs, for their very kindly co-operation and support.

A BRIGHT OUTLOOK.

Increase of 11,000,000 Horses and Mules in Three Years.

Perrin P. Hunter, President of the American Carriage Co., of Cincinnati, Ohio.—Last night as our Carriage Makers' Special from Cincinnati rolled this way I could continually hear "41, 41, 41, 41, 41," until I finally realized that "41" was certainly a very prominent figure to-day. In talking with those people who make the majority of the parts for the horse-drawn vehicles an estimate has been made recently that in the last twenty years there has been put together, manufactured and sold 41,000,000 horse-drawn vehicles, and it fits this day, as our president has said, that this is the forty-first annual meeting of the Carriage Builders' National Association. I see a strange sign on the door, "4-11-41." I can divide that and make it into 41 twice and still have four left. The 11 in there calls to my mind that in the last year or two statistics tell us that there were 11,000,000 more horses and mules in this country than there were two or three years ago. I am also reminded that the harness men of the United States for the last fifteen months have been very busy—more busy than usual, looking for an extension of their business. If we have that increased number of horses and mules, and the harness men have had that increase in the last fifteen months, does it not stand to reason that the vehicle business for the coming twelve or fifteen months will show a wonderful improvement?

The Prosperous Southland.

Our Southern land this year has made marked improvement by diversifying its crops. It has drifted away from cotton. It has a country which is getting as good as the North. They have raised more oats, they have raised more wheat. I am told that the production of cotton will exceed 15,000,000,000 bales, which means that those eight or nine Southern States will have for themselves practically in gold a sum between $800,000,000 and $900,000,000. Taking it for granted that 60 per cent. of the cotton goes abroad, there is $500,000,000 to $600,000,000 of new gold that comes back to this Southland. The Southern manufacturers are busy at this time. They are expecting to do better even after the clearing up of this crop for a start of a new year. The metal spring manufacturers tell us that more than 1,300,000 horse-drawn vehicles were made and sold this year. That is certainly encouraging.

The general farm products of the country all over are good notwithstanding the fact that the Government claims that we possibly will be one billion short in the total crop. Going back to 1906 and 1907 this country claimed farm products to the extent of four and a half billion. Every year since that time it has increased one million,

W. H. Roninger, the new President of the C. B. N. A.

until last year it is claimed to have nine billion, five hundred million, and if we have only lopped off one-sixth or one-seventh this year, we are still in a position to expect a wonderful business in the vehicle and harness line.

The people who have for the past hundred years put their love and their pride on a good-looking buggy and harness and horses, may have for a time been interested in the novelty that uses gasoline; we have use now from a government standpoint for the airship, but, gentlemen, as long as we live, as our president has said, if we give them a square deal you may look for a steady improvement in the horse-drawn vehicle industry. I thank you.

THE CENTRAL WEST.

More Value for Its Agricultural Products Than Ever Before.

C. S. Walker, Des Moines, Iowa.—The automobile is here to stay, certainly, but also is the carriage industry. We are going to stay with the game awhile, and we who have stayed by the game have all the more reason to be thankful for it. Some of our good brothers have followed after strange gods and dropped their wads and want to get back in the ranks; some of those who wandered off have succeeded.

I have been asked to say a word as to the carriage business in the Central West, and I cannot answer that without quoting some figures. Figures are great things, gentlemen. It is only by figures we can tell how we are going to do within the next twelve months, and being more familiar with Iowa I am going to use some figures that are based on Iowa conditions. After you hear the figures you will all want to move your plants out our way and get some of this prosperity. In

Iowa there is an automobile for every sixty inhabitants. When I first heard that it nearly knocked me off my feet, because I thought if that was true there certainly was not much chance for us boys; but I decided to do a little figuring myself, as I have gotten a few, and I find that in Iowa there are 217,000 farms, leaving out the odd numbers; I have calculated the population as 2,250,000, and I discovered by a little method of short figuring that there is a carriage or a spring wagon or a top buggy for every three and a half persons living within the State.

A Little Bunch of Figures.

Now if we can go on as we are going the carriage industry throughout the Central West is going to grow, and it is going to grow because of this little bunch of figures: For example, in 1912 we raised in our little State 432,000,000 bushels of corn and we got for it a little over $151,000,000. This year we have raised a little less in bushels, 330,000,000 in round figures, but we have gotten $198,000,000 for it; so you see that we are still in position to buy buggies. We have got more oats, more cattle, more hogs, more horses, and taking the entire totals we have got an increase over last year, which was said to be one of the best we ever had in our section; we have an increase of almost $100,000,000 over and above the best figures that we have ever been able to show before; that is this year's—this year when we are having crop failures; this year when everybody said the country was going to the bow-wows. The Central West is the market for your products.

There are indications that the horse-drawn vehicle is coming back. The increase in the number of surreys, the increase in numbers of four and five-passenger vehicles, leads us to believe that such is the case.

There is only one more thing, and our good president has touched upon it, that I would like to see, and that is to see this organization grow bigger and grow stronger and really come to amount to a good deal in this land of ours. A man told me in the hall out yonder this morning that the carriage trade was the poorest organized of any trade in the United States. I am very sorry if that is true—I am not prepared to say that it is true, but I do know that this organization can do a great deal more, we can accomplish more, if we will get together in the spirit which we ought to get together in, and I hope that is one of the things that we may accomplish at this meeting.

"A LITTLE MORE NOISE."

The Public Should Know That the Vehicle Builder Is Alive.

W. H. McCurdy, Evansville, Indiana.—It has been my opinion during the last three years, and I have so stated, that the carriage manufacturer should make a little more noise; should make enough noise to attract the attention of the dealer and that this might best be done through some methods of advertising that have not been generally employed during the past three years. I am not, at this time, going to make any special recommendations along the methods that I think should be employed. I believe there is a movement on foot pointing to plans that might be worked out. I will say, however, that whatever plan, if any, is adopted, it should be for the express purpose of convincing the present dealer and men who have discontinued handling buggies, that the buggy manufacturer is alive; that we know the people of the country are yet using horse-drawn vehicles and that if they will carry a sufficient line on their floors and adopt the same measures that have been adopted in former years, the business that has slipped away from them will gradually come back.

I believe that with the proper effort we can again raise our industry up to the highest point in volume that we have ever reached.

It is a self-evident fact that the farmer who can't afford more expensive means of travel will be compelled to continue riding in the buggy and surrey. There is another fact that can't be refuted and that is the farmer who can afford other means of transportation than that of horse-drawn vehicles, will also keep on hand buggies, surreys and runabouts for certain seasons of the year. This, it seems to me, is a fact undisputed, as the farmers have the horses and the price of a buggy is to-day so low and the product of the farmer is priced so high, that they can well afford their buggy and will continue to use them if the dealer will keep them on hand and display them for the purpose of sale.

I have, as is my custom, made a careful canvass of conditions in the different States and while there are good reasons for complaint in some localities, there are abundant reasons for rejoicing in others, and in striking a general balance, I see nothing to discourage us in business in the near future, and, candidly, I anticipate a normal business for 1914 and feel quite confident that the buggy industry will be equal to that of 1913, and I think all who made a reasonable effort to secure trade will agree that the general volume has been very encouraging.

I am firm in the belief that the building of horse-drawn vehicles, is a more staple industry to-day than it has been at any former period. It has in the past five years withstood the test of a fierce and bitter fight.

"Back to the Farm."

Buggies, surreys and spring wagons are still on the road and out for an increase in volume by reason of the tremendous "Back-to-the-farm" movement. The government is from time to time throwing open to the public homestead land; large land owners are cutting tracks for the small farmers, and the increase in our farm population is making itself felt among the implement and vehicle manufacturers.

One man, well informed, coming in from Texas recently, made the statement that a 20 per cent. short crop was not felt much in that State as it was largely overcome by the increase in new farmers coming into the State, which increases the acreage under cultivation.

THE FUTURE OF STEEL.

How the Actual Consumption Keeps Pace With Population.

M. P. Bote, Carnegie Steel Company, address read by W. G. Clyde.—We may start with the general prediction that the steel industry is but little past its infancy, however lusty the youngster may be. The world, and especially our own country, is growing in population and each additional increase means steel consumption. It is a trite saying now, that every man, woman and child in the republic consumes at the rate of 700 pounds of pig iron annually. That amount has been steadily increasing and it is fair to assume that even if the amount per capita does not increase, the continual demand for steel in both standard and new uses will keep the requirement no less and the actual production will increase with the growth of population. I will only diverge here to answer a question as to how women and children consume their proportion of pig iron. Children use steel cradles, travel in baby buggies made mostly of steel, use table utensils, the basis of which is steel; play with mechanical and other toys, many of which are either steel or castings from pig. In the cities, many of them live in apartment houses of steel skeleton construction; they travel, and share with their parents the use of steel in cars pulled by powerful locomotives, on steel tracks over steel bridges, into terminals largely constructed of steel. In the larger cities, they use elevated railroads and subways, all of steel construction. Our fair friends use much steel in corset stays, in hat pins and in the many varied forms of wire for hat stiffeners. They share in the evenness and elegance of travel in steam cars and steamships, in automobiles, and where the horse is still employed, carriage and buggy are largely of steel. Even out on the farm steel is found in the wire fence and the wire nail, while the mower, the reaper, the plow and all other forms of agricultural implements are of steel construction. These are but a few examples, and if the individual fails, here and there, to use his quota, the average is still maintained. Is it too much to say, that having found a material so readily adaptable to use in myriad forms, its application will be greater and its production increased?

Now, another side. Ever since railroads have found the value of steel in their operations, they hold the key to much of the future situation and that future is clouded by their inability to obtain needed finances to continue development, but even more for maintenance of present organization and equipment. In the ten years between June 30, 1902, and June 30, 1912, the total trackage in miles increased 31 per cent.; the number of locomotives 48 per cent.; the number of freight cars 42 per cent., and the number of passenger cars 37 per cent. The total revenue increased 63 per cent., but total operating expenses increased 76 per cent. The net operating revenue, excluding taxes, increased 42 per cent., but taxes increased 107 per cent. Wages paid to employes increased 87 per cent. These figures tell the story and account for much of the reason why a considerable amount of stocks and bonds pay no interest or dividends.

Importance of Railroads.

Yet the railroads are vital in the economies of life and comfort. Let us suppose for a moment that all traffic in and out of New York should be suspended for only forty-eight hours during a hot summer period. Who can imagine the suffering and death which would ensue? Therefore, the railroads should be fostered and cared for, under reasonable regulation, with the view of maintaining their efficiency even at some increase of cost in freight rates to insure this result.

Assuming this to be reasonable, the tremendously increasing traffic due to larger population, the needs in track equipment and rolling stock, with increase in terminal facilities, badly needed in many large centers, will continue to call for steel in increasing quantities. Gradually, but surely, must come the steel tie, for better road bed and greater safety, for modern traffic has shortened the life of the wooden tie, even now hard to obtain of proper character for the service required. This will mean an increase in demand, the tonnage of which is hard to estimate.

Continually, new uses for steel are being discovered, while its substitution for other materials adds to the production. Little items appear insignificant, yet add to the total. Thirty thousand tons of tin plate are required in the manufacture of tops for beer and white rock bottles. Something over 4,000 tons of sheets are required in the manufacture of eyelets and hoops for shoes in New England. Reinforced concrete construction has grown to a point where fully 500,000 tons of bars are employed annually, and so we might go on listing items in which steel is used to the point of wearying you.

COST OF PRODUCING.

Competition and the Difficulty of Regulating Prices.

George R. James, Memphis, Tennessee.—I have installed in my own business a very simple but effective cost finding system, which is primarily based upon the "pay and take," or the results of the last year's business, made up in the form of a statement, subdivided so as to readily fall in line with the requirements of the Federal Government, in making the "Annual Return of Net Income" to the Internal Revenue Bureau.

Under my system it is necessary to have the net costs of the material, going into the makeup of the product, and also the productive labor, and by productive labor is meant the wages paid to those persons engaged in the actual process of manufacturing.

All other items of expenditure, which of course go to make up the sum total of the cost, are figured by percentages.

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The idea that by increasing the "volume" of business a manufacturer can reduce his cost of production, is correct only in a very limited way, and a comparison of costs, made between the costs in very large plants, will vary but little with the smaller factories, provided both figured on the same identical class or kind of work.

The popular idea, as to increased volume reducing cost, is actually exploded, since it has been proven it does not always follow that the very large plant can produce a given article at less than the smaller manufacturer.

As evidence of this fact I submit that, in the recent compilation to which reference has already been made, the cost of the average of five wagons, made in the factory of the largest concern in the wagon business, and where something like 60,000 wagons are turned out per annum, was $49.74; whereas, the average cost of turning out five wagons, built upon the same specifications, in the plant of the "James & Graham Wagon Company," where approximately 6,000 wagons are made per annum, was $48.52, or in other words, the "little fellow" built this average wagon at $1.22 less than did the big one.

This sounds like an incredible statement, but it is nevertheless a statement of fact, so the question naturally arises, "How do you account for this condition?" Unhesitatingly, I answer, "Variety!"

With the increased volume in the large factory, the increase in variety of goods produced necessarily follows, and no condition about a factory tends to increase cost as does an increase in variety.

Volume of business, for which so many of us strive (and incidentally go broke in the effort) has a tendency toward decreasing the cost of production only up to a certain point, and if increased volume means increased variety, then there is sure to be an increase rather than a decrease in cost.

It is well to keep these facts in mind, for no one is so badly fooled as is the man who fools himself.

* * * * *

Any man who, knowingly, sells goods at less than cost, is committing a crime, for certainly when he loses money he is defrauding either his family, the stockholders of his own company, the people from whom he buys his supplies, or the banks that loan him money, and perhaps I may justly say he is defrauding all classes of people.

Stockholders or owners may stand for running the business at a loss, but I do not believe there are many people who care to sell their goods to a concern which they know is selling its product, or a considerable part of it, at less than cost, and it is an absolute certainty that as soon as the banker is advised of the particulars, the line of bank accommodations will be very promptly curtailed.

Right here is wherein a correct knowledge of manufacturing, and of conducting a manufacturing business, through association work and cooperation will make its longest stride toward correcting the abuses of price-cutting, elongated terms and other evils.

Sentiment in Business.

Hugh T. Cartwright, of the Banner Buggy Company, which makes 65,000 buggies a year.—Only a few years ago it was necessary, in securing business among industrial people, for large amounts to be expended in entertainment. We were compelled, first, to show the other fellow that we were a "good fellow" and afterwards tell him in regard to our values and prices.

We found there were institutions that practically existed on this basis and most of their business was transacted through this class of sentiment, created in coming in contact with their trade. But, as competition becomes keener and keener, we find this interpretation of sentiment to be less and less practical.

It is this class of sentiment created that I believe to be impractical, for it is my opinion that we are putting it on the right basis in showing a customer the usual business courtesy—entertaining at dinner, theatre, or in other similar ways—to make this customer feel that we are doing it not to buy his business, but from the heart; because we feel this way personally towards him and not for actual commercial gain, but absolutely feel personally interested in him, or otherwise it is not money well spent. It is not lasting; we have created a customer on the wrong basis; we have misled him; taken advantage of his sentiment; not looked after his interest.

The individual or institution to-day who is remembered and makes headway in the business world is the man that creates sentiment through his action—his square dealing—for this is what we all appreciate and would gain for us more friends and create more good fellowship than doing tenfold more in an insincere way.

Best for Buggies in Eight Years..

O. B. Bannister, Muncie, Indiana.—There have been made in the United States in the first six months of this year one buggy for every 200 people in the United States, assuming that there are 100,000,000 people in the United States. There will be made, according to the best data that we can secure one and a quarter buggies for every 100 people in the United States this year, and according to the statistics of your Statistic Committee it is the best year that you have had in the buggy business for eight years. There is possibly involved in this business $75,000,000, making close to $100,000,000 of products. Is there anything that you could do that is a better line of business than that? Why, sure not.

In addition to the foregoing addresses, the salient points only being published, there were the usual reports of committees and officers, all of which were most gratifying and encouraging. The annual banquet was held at the Planter's Hotel, Thursday evening, October 16, and was as usual a most successful social and intellectual occasion.

Although a larger number of cities than usual made bids for the next convention, Atlantic City finally received the majority vote after three ballots had been taken, Cleveland and New Orleans being the two close competitors.

W. H. Roninger of St. Louis was unanimously elected president for the ensuing year. Mr. Roninger's portrait is given elsewhere. He made a modest but felicitous address on being escorted to the platform.

The list of exhibitors was as follows:

List of Exhibitors.

Anderson Electric Machine Co., St. Louis, Mo.
Bishop, M. F., Barrington, Ill.
Blacksmith & Wheelwright, New York.
Backstay Machine & Leather Co., Union City, Ind.
Buser-Poston Tufting Machine Co., Chillicothe, Ohio.
C. C. Bradley & Son, Syracuse, N. Y.
Campbell & Dann Mfg. Co., Tullahoma, Tenn.
Carr Co., F. S., Boston, Mass.
Collins Vehicle Woodwork Co., St. Louis, Mo.
Carriage & Wagon Builder, Philadelphia.
Carriage Dealers' Journal, Troy, N. Y.
Chase, L. C., & Co., Boston, Mass.
Cately & Ettling, Cortland, N. Y.
Cleveland Hardware Co., Cleveland, Ohio.
Central Manufacturing Co., Connersville, Ind.
Cowles & Co., C., New Haven, Conn.
Crandal, Stone & Co., Binghamton, N. Y.
Cortland Forging Co., Cortland, N. Y.
Carter Co., George R., Connersville, Ind.
Cortland Carriage Goods Co., Cortland, N. Y.
Carriage Woodstock Co., Owensboro, Ky.
D'Arcy Spring Co., Seat Springs, Kalamazoo, Mich.
Ditzler Color Co., Detroit, Mich.
Eberhard Mfg. Co., Malleables, Cleveland, Ohio.
Eccles Co., Richard, Auburn, N. Y.
Fabrikoid Co., Wilmington, Del.
Fernald Manufacturing Co., Northeast, Pa.
Firestone Tire & Rubber Co., Akron, Ohio.
Fairfield Rubber Co., Fairfield, Conn.
Fitch Gear Co., Rome, N. Y.
Federal Rubber Manufacturing Co., Milwaukee, Wis.
Goodyear Tire & Rubber Co., Akron, Ohio.
Gramm-Bernstein Co., Lima, Ohio.
Heath & Son, Edmund F., Newark, N. J.
Herbrand Co., Fremont, Ohio.
Hub, The, New York.
Indiana Lamp Co., Connersville, Ind.
Ideal Lamp Co., Cincinnati, Ohio.
Illinois Iron & Bolt Co., Carpentersville, Ill.
Kelly-Springfield Tire Co., New York City.
Keystone Forging Co., Northumberland, Pa.
King Fifth Wheel Co., Philadelphia, Pa.
Laidlaw, Jr., Wm. R., New York City.
Liggett Spring & Axle Co., Pittsburgh, Pa.
Lowe Bros. Co., Dayton, Ohio.
Lounsbery & Sons, G. H., Fabrics, Cincinnati, O.
Meyer Engraving Co., Cincinnati, Ohio.
Mutual Wheel Co., Moline, Ill.
Metal Stamping Co., Long Island, N. Y.
Metropolis Bending Co., Metropolis, Ill.
Mossman, Yarnell & Co., Ft. Wayne, Ind.
Muncie Wheel Co., Muncie, Ind.
Monarch Carriage Goods Co., Cincinnati, Ohio
National Malleable Castings Co., Cleveland, O
New Wapakoneta Wheel Co., Wapakoneta, O.
Perfecto Light Co., Des Moines, Iowa.
Pioneer Pole & Shaft Co., Piqua, Ohio.
Peters & Herron Dash Co., Columbus, Ohio.
Rand, E. M., New York City.
Rielly & Son, P., Newark, N. Y.
Rhodes & Co., James H., Chicago, Ill.
Reid Coupler Co., Clinton, Ind.
Rose Manufacturing Co., Philadelphia, Pa.
Rodriquez, R. E., New York.
St. Louis Surfacer & Paint Co., St. Louis, Mo.
Schubert Bros. Gear Co., Oneida, N. Y.
Sidney Manufacturing Co., Sidney, Ohio.
Standard Varnish Works, Chicago, Ill.
Spokesman, The, Cincinnati, Ohio.
Standard Wheel Co., Terra Haute, Ind.
Smith & Co., Edward, New York.
Sheldon Axle Co., Wilkes-Barre, Pa.
St. Marys Wheel & Spoke Co., St. Marys, Ohio.
Sherwin-Williams Co., Cleveland, Ohio.
Timken Roller Bearing Co., Canton, Ohio.
Union Bow Co., Cleveland, Ohio.
Valentine & Co., New York.
Wade Manufacturing Co., Brockton, Mass.
Ware Bros. Co., Philadelphia, Pa.
Wilcox Mfg. Co., The D., Mechanicsburg, Pa.
Willey, C. A., Co., Hunters' Point, N. Y.
White, I. D., Clinton, Ind.
Western Spring & Axle Co. Cincinnati, Ohio.
West Tire Setter Co., Rochester, N. Y.
Zelnecker Supply Co., Walter A., St. Louis, Mo.

PATHOLOGICAL SHOEING.

Laminitis Feet, Wire Cut Feet, Stove Up, and Spavined Feet.

From E. W. Perrin, Arkansas.—By pathological shoeing, I mean shoeing feet which have been injured and deformed by accidents or disease, and, in consequence, need some special treatment by the shoeing smith.

Laminitic, foundered, pumiced or dropped sole feet, are one of the very common ailments of the foot with which the shoer has to deal.

Laminitis means inflammation of the sensitive laminae of the foot, which may be acute or chronic. I am not going to detail the symptoms of acute laminitis for all such cases need the

Fig. 1—Section of laminitis foot. Dotted line indicates abnormal growth.

services of the veterinary surgeon, and the horseshoer's art is not necessary until the animal is convalescent, but since every attack results in structural changes of the foot and hoof, according to the severity of the attack, the horseshoer's art is indispensable to put the animal in condition for work.

Every horseshoer of experience knows a laminitic foot on sight, because the profile presents an elongated toe (see Fig. 1), provided, of course, this surplus growth of toe has not been rasped off. Even then, the foot presents a squat appearance according to the descent of the foot bones from their normal position; again the sole is flat, or convex-dropped, perhaps so badly that the animal can bear no weight on the foot without the shoe.

In cases where the sole is badly convex, the probabilities are that the animal will only be fit

Fig 2—Wire cut hoof.

for walking work, but without the skill of an excellent horseshoer he will be fit for nothing but fertilizer.

The effect of an attack of laminitis is to impair the function of the coronary cushion and sensitive sole and to stimulate the sensitive frog and laminae, the latter especially at the toe. The result is a very weak wall and sole, an abnormally developed frog, and a superabundance of soft horn at the toe. The weak wall, together with

defective shoeing, gives rise to hollow wall, sand crack, fractured hoof, etc. Horseshoers have learned from practical experience that the drop sole can bear no weight. In fact, many such cases can only be shod one foot at a time. This fact has led many a shoer to believe that because the sole could bear no weight the frog can bear none either. I have been frequently requested to put good high heels on a laminitic foot to keep the frog from touching the ground. This is an erroneous notion, the frog of a laminitic foot will

Fig. 3—Wire cut hoof.

not only bear weight but the foot will greatly improve if you allow the frog to perform its natural function of weight bearing by the use of properly fitted bar shoes.

To be sure, if you impose weight suddenly on an organ which has been deprived of its function for years you will have lameness as a result. Such changes are to be made gradually. The proper method of shoeing a laminitic foot is with a bar shoe. If the frog is high with low heels don't cut away the frog, but weld a slug on each heel; have the bar wide so that it will not cut into the frog; arch it up so that it barely touches the frog at the first shoeing. When you take this shoe off you will find the frog has grown up to

Fig. 4—Wire cut hoof.

the bar. Now fit a little closer and after a few shoeings you can put equal weight on the frog and heels. From this time on the foot will improve, the heels will grow stronger and the frog will slowly sink back to its normal condition. Seat out the shoe as far as the particular case needs, for you can gradually put some weight on the outer margin of the sole, provided, of course, you do not pare it thin, which ought not to be done. The laminitic foot has nothing to come off of the plantar surface. On the contrary, many of them need a piece stuck on, for they do not grow enough hoof to counterbalance the wear and tear of shoeing. Cut back the abnormal growth of toe from the front, but don't cut away the bottom. Put plenty of holes in your shoe so

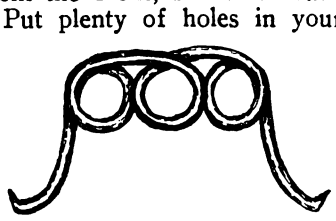

Fig. 5—A spiral spring expander.

that you can drive your nails where the hoof is best, and use leather soles, tar and oakum.

The toe is the seat of pain in the laminitic foot. Take notice that the animal in endeavoring to save it puts the heels of the affected feet to the ground first, therefore, high heels, which throw the weight on the toe greatly aggravate the pain.

Wire Cuts.

Since the advent of the barb wire fence, the number of defective hoofs from wire cuts is large. It is common for a colt to get his foot over a barb wire and in pulling it back it is usually cut about the heels or quarters. I am showing the reader in this article three typical cases of wire cuts. A wire cut might not be so serious a matter if it were attended to when it happened; but since it happens while the animal is at pasture it usually escapes notice for days, often until serious complications set in; generally involving suppuration, and often more or less sloughing of the coronary cushion.

The coronary cushion being the organ which secrets the bulk of the substance of the wall, any injury which causes a loss of its substance, likewise causes a loss of its secreting function at that part; consequently, the secretion of horn is impaired or entirely lost, resulting in a depression, a seam or fissure; perhaps in a bad case, leaving nothing but the inner layer of soft horn to cover the laminae. In this weakened condition the heel, at the affected side of the hoof, invariably contracts; as a result a depression usually becomes a fracture—quarter crack (see Fig. 2). In some cases where there is no loss of the coronary cushion (see Fig. 3) we have a club foot with more or less contraction. In other cases where the cut is deep yet owing to prompt treatment there was little loss of the secreting function, there will be an ugly scar with a deep seam (see Fig. 4).

Fig. 6—The spiral spring applied. Note the greater crack growing out.

A wire cut is a defect always to be considered as a weakness, for although a young horse may show no lameness from such a defective hoof, the probabilities are ninety per cent. against him keeping sound if put to the test of street work. In all cases where the injury is serious enough to cause loss of a part of the wall it should be regarded as positive unsoundness.

Shoeing the Wire Cut Foot.

In all cases of wire cuts the first requisite is to get the weight off the affected part by the use of a bar shoe nailed around the toe with no nails

Fig. 7—"Stove up." Shortening of feet or tendons.

back of the injury. Soften the foot with poultices, soak in water or stuff with wet clay. When soft, use a spiral spring expander (see Fig. 5) to spread the heels.

Where there is much loss of the coronary cushion there is no hope of a cure, because the function of the coronary cushion which grows the wall is lost at the seat of injury. You may keep the fracture from opening and closing by the use of the spiral spring, and with sufficient rest it will develop a thin covering from the laminae, but the strain of work may resplit it at any time; such cases are fit only for walking work on the soft earth of the farm.

You cannot treat these cases as we do the ordinary fractured hoof, because the wall at the edge of the fracture is too weak and thin to hold any fastening.

"Stove Up."

"Stove up" is a term used in the South to designate an animal which stands on the point of its toes, as a result of permanent shortening of the flexor tendons. Some of these cases result from injuries and some develop slowly without showing lameness until the case becomes chronic. In the latter form, the animal begins to wear heavy at the toe, finally it does not wear the heel of the shoe at all, eventually he walks on the toes only

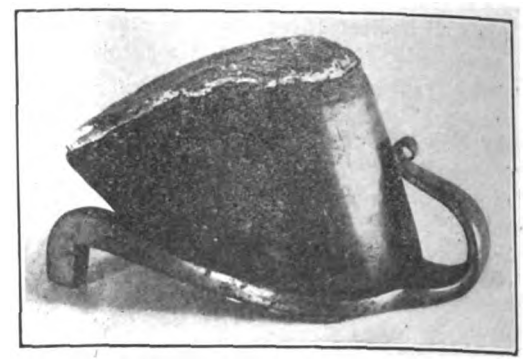

Fig. 8—The "gooseneck" shoe.

(see Fig. 7), and finally, with time, he knuckles over on to the fetlock.

Some such cases are greatly aggravated by some ignorant person putting on a shoe with a toe and no heels, thinking that by these means the heels will come down to the ground; on the contrary, the increased tension thus imposed on the inflamed tendon adds to the injury. The proper kind of shoe for such cases is the "goose neck" (see Fig. 8) with heels high enough to suit the individual case. If such cases were taken in time and given the proper treatment the veterinary surgeon might do something for them, but the shoer has to deal with many such cases (I have seen some with tendons as hard as wood) and it is up to him to shoe them "so they will go" and

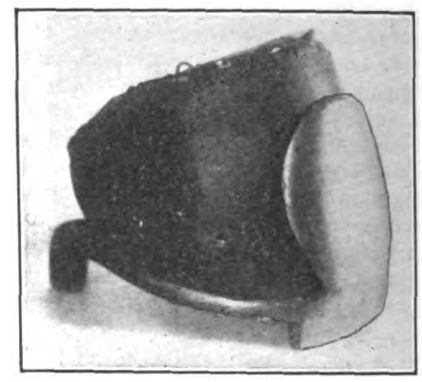

Fig. 9—Scalping plate for protecting the front of the hind hoof.

the "goose neck" will enable them to do hard work at a walk.

Spavined Hock.

Spavin is a disease of the horse's hock. Bone spavin, technically called exostosis tarsus, is a deposit of bone which knits two or more bones of the tarsus or the hock together. In incipient spavin there is no outward sign of disease; no enlargement to be seen. The first sign of the trouble is stiffness on coming out of the stable first thing in the morning, but this stiffness wears off with a little exercise, and is seen no more until the next morning. But after a while the stiffness develops into lameness, which it takes longer and longer for the animal to "warm up out of," and

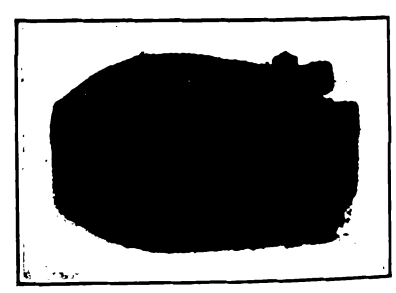

Fig. 10—Detachable sole plate shoe for protecting a wound in the sole of the foot.

if you tie him up for a while he moves off lame again, until finally the lameness is permanent. Another marked symptom is when the animal begins to wear away the toe of the shoe, and when standing he will endeavor to find a hole to set the toe of the foot in, or, he will achieve the same result by standing with the heels of the affected foot on the front of its fellow. The lameness is now chronic and he is a confirmed toe dragger.

The Spavin Shoe.

Any attempt to block up the toe will greatly aggravate the trouble. In fact, he cannot travel worth a cent unless you let him have his foot the way he has worn it. Put high heels on the shoe. Then take a piece of tire steel, the right size, or weld up about three doubles of rasp, and weld it on to the toe of the shoe, but hammer it flat, leaving an extension of about two inches or enough to roll up on the toe of the hoof so as to protect the part which he drags on the ground. Fit it rounded up at the toe just as the animal wears it. This is the way to get the best results

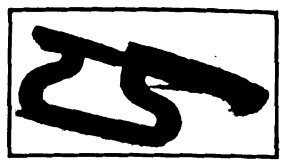

Fig. 11—High heeled shoe for resting flexor tendons.

in shoeing for spavin. The shoeing here recommended does not cure the spavin. Prompt treatment by the veterinary surgeon may affect a cure. Some will become chronically lame, but the majority of them remain toe draggers, and the shoeing here recommended is the best method of protecting the hoof.

Parrot-Toed and Interferes.

In the July 15th issue of "The Horse World," Mr. James Clark, one of the best known shoers in the country and who was formerly conspicuous among the Grand Circuit following, replies to a North Carolina writer who addressed Mr. Clark for information on the shoeing of a stubborn case of interfering. The question and answer are as follows:

M. O. C., North Carolina.—I have a mare that is a little parrot-toed, just enough to cause her to hit, especially with her left foot, on which she is mostly parrot. The average knee boot does but little good, and I am writing to ask that you please advise some way to have her shod so as to relieve this trouble. As you know it is too much trouble to wear boots on her unless it is when I am going to speed her I have tried the side weight and most every way of shoeing that I could think of, all of which seem to have no effect. She does not hit in ordinary driving; it is only when she is going fast that she hits hardest.

Answer.—Lower the foot as much as possible on the outside and take off all of the outside point of the toe you can, shaping the foot so that it will toe in instead of out if you can do so. Put on a shoe weighing ten ounces and leave the inside web a half inch longer than the heel of the foot. Bevel the outside of the shoe from inside of the center of the foot, this being determined by a mark made directly in front of, or on a line with the point of the frog. Make the outside forward quarter of the shoe diagonal from the center of the toe back to the second nail hole, or rather, where the second nail hole would be if it was an ordinary shoe. In this case the first nail hole will be where the second one usually is. On the inside heel weld or braze on a flat block calk. Braze or weld on a sharp grab calk on the inside toe of the shoe, the forward end of this calk to be set at the beginning of the bevel, which is to be inside the center of the toe. Let this sharp grab extend back two inches and see that it is not as high as the block heel. Fit the outside heel as close and short as possible, and do not use any outside heel calks. The outside of the shoe should be at least one-half an inch shorter than the inside, the object being to make him break over squarely in front and fold the foot higher, so that he will go over the opposite knee when at top speed. Do not remove a particle of the wall from the inside of the foot; neither should you set the shoe too close on the inside, in fact, you should run the inside heel back almost straight. I would advise that you shoe both feet alike, although of course the foot he toes out with the most is the one with which he does the most damage. The outside web of the shoe should be perfectly smooth, the nail heads countersunk, and the shoe beveled down to a feather edge. That portion of the shoe I have advised you to make straight on the outside toe will leave the wall of the outside toe projecting over the shoe, and this you will round off a little from the bottom to prevent its breaking or "slivering" up. The horse that toes out is the hardest to cure of the knee-hitting habit for the reason that it is really a deformity, and a close inspection will show that the foot and pastern joints are so aligned that when the horse folds his foot it folds partly under the body instead of on a line with it. I am satisfied that many horses that have been troubled—ruined is a more appropriate expression—with these kind of feet would have been all right had they received a little intelligent attention when they were sucklings. How often have we worked a colt—a big high-headed fellow for his age—sucking his dam, probably a small or medium-sized mare, and in order to get best results the baby stands with head twisted and front feet spread wide apart, standing literally on his inside heels. Right there the "parrot toe" is started; the inside wall at the heel is forced upwards and the delicate pastern bones, in fact the whole column of bones from the shoulder down are twisted from the position nature intended they should occupy. It is unfair to point out a defect without suggesting a remedy, and my contention has always been that a colt should have his feet trimmed regularly from the time he is four months old and even before that time if he shows signs of toeing out. Also that a colt should be stood on a level surface once a day when it is but a few days old, and its feet placed squarely under its body and rubbed or massaged the same as we rub down an aged horse's legs and joints. Then if a little baby is twisting his joints out of shape trying to get his dinner you can easily twist them back. "A lot of trouble," you'd say. Sure; but think of the gray hairs that the "parrot-toed" horse has put in the horseshoer's head! Also the owner's.

Home-made Face Plate Lathe.

A writer in The Woodworker not long ago gave the following outline for making a home-made face plate lathe:

To those who can afford it, the writer's advice is, "By all means buy a ready-made machine," because in doing so you will save considerable labor, as well as secure an equipment thoroughly up-to-date. Any reliable concern engaged in the manufacture of woodworking machinery will be only too glad to furnish a face plate lathe of the latest and most approved style.

However, it is not the good fortune of every man starting out on a new venture to have sufficient ready cash to purchase all the machinery required. In that case, it is necessary to resort to expedients, and sometimes manufacture on the spot what one is unable to buy. It is barely possible some readers may find themselves in this plight. Not having money at command, they would like to make some of their own equipment, if only they had proper instructions to guide them in such an undertaking. It is with the object of helping this class that I invite attention to a home-made face plate lathe. Being a comparatively simple contrivance, this type of machine can be easily built by any person of ordinary mechanical skill.

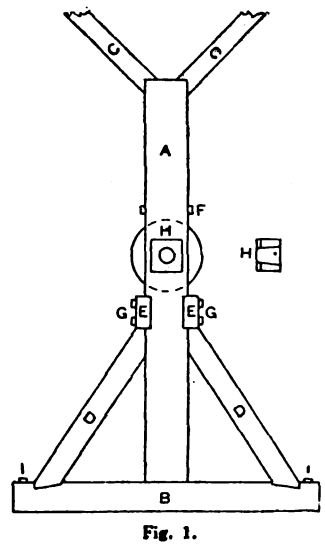

Fig. 1.

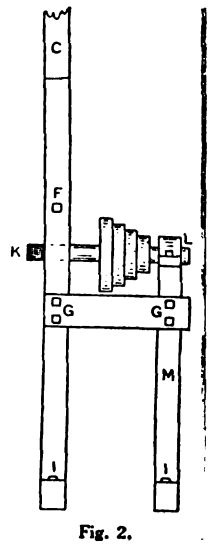

Fig. 2.

The accompanying cuts, Figs. 1 and 2, represent a machine now in almost daily operation. It may surprise some readers to learn that this machine was built by the present owner more than twenty years ago; and although during this long period it has endured hard service, it still continues in fine fettle, and will no doubt last for as many years more. This is a record to be proud of, and the machine is well worth a brief study.

Fig. 1 gives a front view. The upright A is a plain piece of timber 6 ft. high, 8 in. wide and 4 in. thick, dovetailed at the bottom end into the cross-piece B, which rests upon the floor. The upper end of this upright is held in position by two thick braces, C C, securely fastened to overhead beams. It is further reinforced by two braces, D D, notched at the bottom into the base B, as indicated in diagram.

In the same manner the short rear upright, shown at M, Fig. 2, is strengthened. Two side bars, E E, 26 in. long, 6 in. wide and 3 in. thick, are snugly inserted into these uprights and fastened by hot glue and long bolts running all the way through from one side to the other—see G G. Another long bolt passes through the wide upright A, at F, to prevent the possibility of the wood splitting. The square H shows the metal plate and socket, through which one end of the spindle passes. Thus constructed, the whole framework becomes rigid and substantial, and when fastened to the floor by means of strong bolts, I I, is there to stay as long as the building stands, if necessary.

Fig. 2 presents a side view, showing more particularly the position and appearance of spindle and cone pulley. The former consists of a round piece of steel, 2 ft. 3 in. long by 2¼ in. diameter, fitted to pass through the socket H, with a threaded projection, K, on which to screw the iron face plate. The other end enters a babbitted bearing at L, with a setscrew inserted into the latter to push the spindle forward whenever it becomes loose in the socket. The cone pulley, of course, is made of pine and built of segments, two courses to each step, thereby insuring a durable article. Thus put together, the machine is solid, compact and serviceable.

In locating the machine the most solid part of the shop floor was selected, and the ends of the crossbars, C C, were placed right against the wall, the intent being to avoid any trembling effect which might ensue when the machine was in motion. All these precautions contributed materially to the rigidity of the entire framework.

Legal Department

All legal questions answered free of charge. Address Communications to Editor "Legal Department," THE BLACKSMITH AND WHEELWRIGHT, P. O. Box 654, New York City.

When Fixing Prices Is Legal.

Question.—I would like to ask through your legal columns if it would be a violation of the anti-trust laws for the several blacksmiths and shoers of a town, or of the different towns of a community, to get together and place a standard and regular price on the different items of their work? If not, would it be a violation of said laws should each put up a forfeit or a bond which would be forfeited in case a man broke his obligation and cut prices?—A. C. H., Texas.

Answer.—If all the shoers concerned in the fixing of the prices live in Texas, the Sherman anti-trust law would not apply at all. The Sherman anti-trust law regulates commerce between the people of different States and does not regulate, nor does it apply to commerce between the individuals of a single State. The courts uniformly uphold an agreement as in this case, and enforce any penalties which members may agree upon to be suffered by any party to the agreement, in case of a default. It follows, therefore, that such an agreement as is suggested in the question, may be entered into between horseshoers. Further, the agreement may provide that each and every party thereto shall file a bond for the faithful performance by him of the agreement, and in case of default by any party to the agreement, undoubtedly he could be held on his bond.

It might be well to consult a local attorney before such an agreement is finally signed by the parties. It would save time and trouble in the future. Why not incorporate an association under the laws of Texas?

The national forests contain water powers with an aggregate estimated capacity of 12,000,000 horsepower, available for use under permit from the Secretary of Agriculture.

It is said that 90,000,000 broom handles are used annually in the United States—one for each man, woman and child.

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NOVEMBER, 1913.

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MAKING WORK LIGHTER.

Years after machinery was being extensively used in manufactures and commerce, the farmer was still working along old hand labor lines. It is true, he had discarded the sickle for the reaping cradle, and there had been some improvements in farm tools. But in our boyhood days on the farm about the only machines we can remember that were designed to save labor was the winnowing machine which took the place of holding the grain up in a measure to let the wind blow out the chaff.

But to-day, farm machinery has lightened the toil and saved even more of the labor of the farmer than it has that of the mechanic. And the end is not yet. We have had the tractor plow for some time, for illustration, but recently a machine has been introduced that not only plows the soil but at one operation puts the ground in condition for planting, and it does all this at an expense of $1 an acre.

Farm drudgery is now largely a thing of the past. Although the farmer's wife must still do a good deal of hard work, the sewing machine, the fireless cooker, the cream separator, and many improved kitchen tools and implements, make farm life for all about the pleasantest and most healthful and well as it always has been, the most independent of all occupations.

Meantime, the blacksmith has had his toil lightened, but to a less extent than either the farmer or the manufacturer. Although he can have power in his shop, and quite a number of machines reduce not only the time of doing certain classes of work but make that work less burdensome, yet he must still do a good deal of manual labor. Nor is there much prospect of his ever being able to carry on his work by the simple guidance of machines as is the case with some other callings. As long as the anvil and the forge are a necessity, as long as the horse is to be shod, vehicles are to be taken down and put together in the process of repair, so long will there be hard manual work to do. This being the case, there is all the more reason for the smith to take advantage of such tools and machines as he can afford to make his work lighter and quicker of consummation.

Yet as with some farmers, it is simply impossible for some smiths to purchase the labor-saving machines and tools that are in the market. Neither the work that he has nor the work that such improvements will add to it, would warrant him in adopting it. He must use his own best judgment as to what he can afford and what he actually needs.

It is safe to say, however, that he can better afford to take the chance of getting such machines and tools than the chance of not doing so, even though he must run in debt for them. There is no absolute assurance of making a success of business when one has the facilities for doing the work the easiest and quickest way, but it must be admitted that such assurance is far more remote when work must be done the hard and slow way.

ENCOURAGED CARRIAGE MAKERS.

The spirit of the recent C. B. N. A. convention at St. Louis was one of encouragement and hopefulness. Not for years has this important event to the carriage trade been characterized by more enthusiasm.

Although it would be useless to disguise the fact that in certain quarters the automobile is now overshadowing the horse-drawn vehicle, yet the demand for automobiles everywhere has largely come from either those who had not before owned a vehicle of any sort or from those who still maintain their horses. Comparatively few horseless vehicles have been sold to those who have disposed of their horses and horse-drawn vehicles. Automobiles have thus been more of an addition to the general vehicle business than a change from one kind of vehicle to another.

Still another hopeful sign for the carriage trade is the fact that here and there automobile owners are selling their cars while still maintaining their horses. As a result of experience, some have concluded that riding for pleasure should not be measured by distance covered but rather by the enjoyment of fresh air and the opportunity of observing the interesting things by the roadside and adjoining fields. Now the man who drives an automobile and those who ride in an automobile have about as much opportunity of observing the outlying country as is the case when riding on an express train at 50 miles an hour.

Another slight set-back to the automobile is the rise in the price of gasoline and the difficulty thus far of finding any other fuel to take its place.

But be all this as it may, the fact remains that both the horse and the automobile has its place in the world of industry and pleasure. They will continue to exist side by side just as do many other articles for which a choice depends largely upon conditions and individual taste.

REAL SUCCESS.

Many of our readers have not found the time, neither would some of them have the inclination, to read "Faust" and "Wilhelm Meister," those two masterly works of Goethe. They are each long, and to some would be tedious. But for the benefit of those who have not read them, we will say they answer in a most impressive way the question, "What are we here for?" and "How can we get the most out of life?" Wilhelm Meister imagined when he first started out in life that material and sensual pleasures would bring him happiness, but it didn't take him long to find out that they brought only disappointment and disgust. Then he turned to intellectual pursuits only to learn that even these would not bring him the satisfaction which he sought. And he finally became a doctor. In that calling ministering to the sick, he found the happiness and the peace of mind which nothing else would give.

In the case of "Faust," Mephistopheles promised him everything in the way of worldly success and bodily satisfaction that he could wish for, if at the last he could have his soul. But he lived to learn that all these were like the "apples of Sodom," and that they withered to the touch. He could only find real peace and joy in reclaiming a swamp which would permit many families to get their living from it.

Despite the fact that the teachings of these two works are in consonance with the lessons of all human experience and of the highest wisdom, yet almost invariably when the term "success" is used by our great leaders in business, they give it the significance of money-getting. Fortunately, the gaining of happiness by renunciation, which is not only in accordance with the teaching of Christ but of Confucius, of Mohammed and of all the great religious teachers of the past, proves itself if given a fair trial, and once adopted as a rule of life is never abandoned.

TO MAKE CHEAP LIVING.

Several methods have been suggested for reducing "the high cost of living" and some of these are far-fetched and of uncertain effect. Why not reduce the high cost of living in a practical and rational way?

Now there are just three ways to accomplish this, namely: Reduce consumption, reduce consumers, or increase the amount to be consumed. It would hardly be practical to reduce consumption. Possibly a good many of us eat too much, but that tendency is now no greater than it ever has been, and in any event people do not exactly relish being put on short rations. Nor is it practical to reduce consumers. Killing off people just because they have got to eat would not be popular even in these parlous times of militant methods.

The common sense way and the logical way, therefore, is to increase the amount of food to be consumed. If, as is shown elsewhere in this issue, in one case an increase of approximately one-fourth in the volume of potatoes raised decreased the price one-half, the price decreasing nearly twice as fast as volume increased, a reduction in the "high cost of living" need not be difficult to accomplish. All that is required is for the farmers of the country to raise one-fourth more; or if this be impossible, the addition of a fourth to the present area of cultivated land will accomplish the same result. Not a tithe of the cultivatible land of the country is cultivated. There are thousands of acres of uncultivated land in easy marketing distance from New York City, and all over the New England and Middle States the amount of land that is lying, not fallow merely, but totally neglected and deserted, is stupendous.

Now there are two methods of increasing the amount of food stuffs to be consumed, one may possibly not appeal to those who do not favor what is often called paternalism, although every existing law for the benefit of a class is paternalistic, and in many cases the objection to paternal-

ism is not so much against the thing itself as against the kind of paternalism. Paternalism is something like orthodoxy—"heterodoxy when it is your doxy and orthodoxy when it is mine."

But not going into that phase of the matter, and maintaining that but two remedies exist for the high cost of living, we suggest as one method that the government appropriates say fifty million dollars, or twice that sum if necessary, not to put men upon irrigated land, or land far away from markets, but to put them on practically abandoned land here in the east where any industrious man cannot only get a living for himself and his family but also have some farm products left to sell. Such men would thus be turned from social menaces to social benefactors.

The other method for increasing the things consumed is for the government to establish farms or schools of instruction where by example and precept the ordinary everyday farmer may receive full instruction as to how to enlarge his yield of crops without any more manual labor but with more head labor or rather head knowledge. The main thing is to have more thought and more of the right kind of thought put into the production of things to be consumed.

We are not going into details; this is not the place for it. But the ideas suggested are eminently practical and almost infinitely more conducive to the promotion of the general welfare than "minimum wage laws," "free lunches for school children" or any of the numerous eleemosynary schemes that have been formulated or in the process of formulation. The purpose of these is well enough but the effect will be to increase that which they are intended to mitigate or do away with.

PRICE AND SUPPLY.

We have before commented on that interesting question of demand and supply, claiming that if each be not restricted or controlled in any way, that not only is the price far higher when the demand is greater than the supply, but that the aggregate amount received when there is a shortage of any product is greater than when there is an excess. We have just come across a good illustration of this in the following concerning the potato crop. The yield, value and price per bushel for potatoes for 1911 and 1912 were as follows:

	1911.	1912.
Total crop, bushels...	279,000,000	363,000,000
Average price per bushel, cents	80	50
Total price received..	$216,000,000	$187,000,000

To state it more simply, the farmers of the country received $29,000,000 more for their crop of potatoes in 1911, when there was a short crop, than in 1912, when there was a large one. There could hardly be a better concrete illustration of the law of supply and demand than this.

Often a surplus of five per cent. of a given commodity over the normal demand will reduce the price of that commodity far more than five per cent., and the shortage of five per cent. less than the demand of a given commodity, will raise the price far more than five per cent.

The same law applies in the case of the sale or the purchase of labor—a different commodity, but no less a commodity; when two employers are seeking the service of one and the same man, the price of that labor will be high; when two men are trying to sell their labor to one employer, the price of that labor will be low.

Of course in the long run production and consumption must be equal. When for a term of years there is more produced than can be sold at a profit, the producers will naturally turn to the production of something else that they can sell at a profit, and this in turn will reduce the supply of the overproduced article and again force up the price.

We are aware that all this is elementary, and that we are not stating anything new. But we want to restate and enforce the importance of this matter of supply and demand, not only as it affects the farmer but the blacksmith and wheelwright.

Take, for illustration, a town or a community where there are more blacksmiths than can find constant work or business, the capacity of these workers being greater than the amount of work to be done. If demand and supply be allowed to take their natural course, each individual blacksmith will seek more work rather than be idle, and in his seeking for this work, he is naturally tempted to either take it at a reduced price or do better work than others; otherwise, there will be no reason why the one having the work to do should give it to him. Then for protection, the competing smith must either do still better work or lower prices still further for self-protection. Soon prices are too low for even a living.

But the smith is unable to turn to some other business as is the case with the farmer who, finding the price of one crop so low that it does not pay to raise it, raises some other crop. The blacksmith must continue to do the same work that he always has. What then is the remedy for low prices for the blacksmith and wheelwright?

Why, it is simply for the competitors in business to get together and raise prices to a fair rate. Anything else will finally result in business ruin, or a stingy and hand-to-mouth living.

This question of supply and demand is most interesting and fundamental in its relation to political economy and it even enters the domain of sociology. Water and air, for illustration, are quite as essential to all life as food. Yet water and air are absolutely free and are worth nothing, while food not only has a money value, but sometimes it costs so much as to be out of the reach of the ordinary individual. Why? Simply because the supply of water and air is without limit, while that of food is seldom greater and is usually less than the demand. We trust our readers will give this subject of supply and demand thought and study in relation to their business.

A LESSON IN BASEBALL.

There is one lesson in relation to the recent world's champion baseball contests, held in this city and Philadelphia, that will well apply to business success.

Of the two nines represented and contesting, one was managed by a man who, although able and experienced, is inclined to treat his men like automatons. The other is managed by a man who treats them as free and intelligent human beings who have ability and judgment comparable to his own.

In the case of the New York nine, the men were anxious to please Manager McGraw; in the case of the Philadelphia nine the men were anxious to win. McGraw was insistent that his men should follow out his ideas to the letter. Manager Mack was willing that his men should follow out his ideas in spirit and their own ideas in letter. McGraw exacted obedience; Mack exacted results. One placed explicit trust in himself; the other placed implicit trust in his men. And men won against self.

The man in business who places no confidence in the men under him, who is as willing to use blighting censure as inspiring criticism, will never achieve the highest success.

And the converse is likewise true: Those who are as dissatisfied with their efforts as they are with the results of them, as dissatisfied with their own shortcomings as they are with the shortcomings of others, and as willing to concede the rights of others as they are of exacting rights from others, are usually the most successful in business.

WHY THE HORSE IS ABUSED.

The horse should receive the most humane and considerate treatment because of its docility, its patience, its gentleness and submissiveness. Yet its possession of these qualities is the prime cause of its abuse. One would think this would incite compassion, sympathy and mercy, but this is not the case.

The horse is abused in most cases simply because there is no danger in abusing him; because he is weak in the sense of recalcitration. Human beings are often abused for the same reason. A humane man, a just man and a wise man, will take advantage of no living thing simply because he has the power to do so. On the contrary, he will be all the more considerate. To make use of unjust force simply because one is able to do so, is the most contemptible of qualities. It is invariably accompanied by the antithesis—an obsequious yielding to power.

We are glad to note that all over the civilized world there seems to be a moral awakening to the cry of justice, and justice for those "who cannot speak for themselves" as there is an awakened public conscience concerning justice among men in their relations one with another. The old, old question, so long unanswered, and for a time seemingly ignored, "Am I my brother's keeper?" seems at last to have been answered in the affirmative and according to the precepts of the book from which the idea was taken.

This tendency is most gratifying and in the line of progress. It must not be forgotten, however, that there is danger in moving forward too fast just as there is in trying to keep the wheels of progress at a standstill. It undoubtedly would have been better had all the great reforms of history been achieved in a naturally and orderly way and according to growth and development, and this would have been the case were there not too many impatient and impractical radicals on the one hand and too many Joshuas who wanted the sun to stand still on the other.

GETTING AND GIVING.

The other day a great merchant of this city passed away. He left a fortune of some $40,000,000. Quite likely, much of it was acquired by fortunate investments, but in any case the returns of legitimate business were not excessive for a long career and a tremendous volume of trade.

But it is of the method by which this success was reached that we wish to refer. First, no one who entered the great dry goods establishment of B. Altman & Company was ever urged to buy. His clerks were simply instructed to exercise infinite pains in showing goods, to never misrepresent, and to allow nothing imperfect to go out of the store, except the customer were made aware of the defect. Instead of following the plan of trying to get as much out of the customer as possible, the policy was to get nothing but what was absolutely just. Yet following rigorously these enlightened although somewhat rare principles, the business proved a gigantic success.

And in his plans for the disposal of his estate at his death this man was as wise and great as he was in life. He appreciated the fact that his employes had contributed a large share to his success, and in his will he made generous provision for them. He recognized that his fortune came from the public and to the public in generous bequests a large share of his fortune is returned in the shape of gifts to charity and in the largest single art bequest ever made to the city in which he lived. There were no strings attached to the various provisions for the bestowal of his fortune; if there were any apprehensions that it would not be wisely used, the terms of his will gave no indication of it. He died as he had lived, having confidence in his fellowmen.

It is not difficult to gain a fortune by a selfish battle with the world—by getting all one can and by giving as little as one can. But to gain a fortune while taking from the world only that which is right and just requires the highest talent as well as the noblest character.

DO YOU WANT TO BUY OR SELL A SHOP?

Our readers who may wish to sell a shop will be quite likely to find a customer by inserting a little advertisement in our classified department, and any reader who wants to buy a shop will stand a chance of finding just what he wants by one of these little advertisements. They only cost two cents a word. Write out what you want, count the number of words including the name and address, multiply by two and you will have the exact amount which can be remitted in postage stamps if more convenient. Parties wanting help in their shops or journeymen wanting positions can use our classified department to great advantage.

A Blacksmith's Epitaph.

The following quaint and interesting epitaph on James Blackburn, a blacksmith, is to be found in Newington churchyard, London:

My sledge and hammer lie declin'd,
My bellows, too, have lost their wind;
My fire's extinct, my forge decay'd,
And in the dust my vice is laid;
My coal is spent, my iron gone,
My nails are driven, my work is done:
My fire-dried corpse here lies at rest,
My soul, smoke-like, soars to be blest.

Occasionally we hear of a slipping belt causing fire. We know that it is possible, but it is a thing that very seldom happens, even though every time a belt slips it does generate heat.

The railroads of the United States use about 150,000,000 wooden ties each year.

MR. HOBART'S ARTICLE.

The Flash-Point—Hardening a Conic Compass—Heavy Shafting—Vise and Potato-Roaster.

BY JAMES F. HOBART, M. E.

"Say, Hobart, what is the 'flash-point,' anyway? I've heard a good deal about the flash point in relation to hardening steel, but I haven't yet found out just where to get off at. Won't you tell me just what it is and what is meant by it?"

What is sometimes known as "flash temper" or "spring temper" is obtained by drawing thoroughly at a temperature of about 550 degrees Fahr. It is the highest heat at which it is possible to draw a bit of hardened steel and have any temper or hardness left in it. When drawn at "flash" point the steel dries off instantly, the oil upon it from the hardening or tempering bath being flashed at once into vapor by the heat of the steel, hence the term "flash temper" or "flash point."

Some idea of the temperature of the flash point may be obtained by considering that water boils at 212 degrees, and heating steel to 375 degrees will relieve all the strains caused by working, annealing or hardening, etc. If we heat tool steel to about 425 degrees, we get the "straw" color so useful for taps and dies. Drawing a little lower, that is, at a little higher temperature, say about 450 degrees, we get the "copper" color so useful for ordinary cutting tools. But if we carry the heat to 550 degrees we arrive at the "flash" temperature and get a spring temper which is about the lowest possible and have any hardness at all left in the steel.

Burned Steel.

A good many receipts and methods for "restoring burned steel" are to be found in the technical journals, and bob up periodically, but no matter

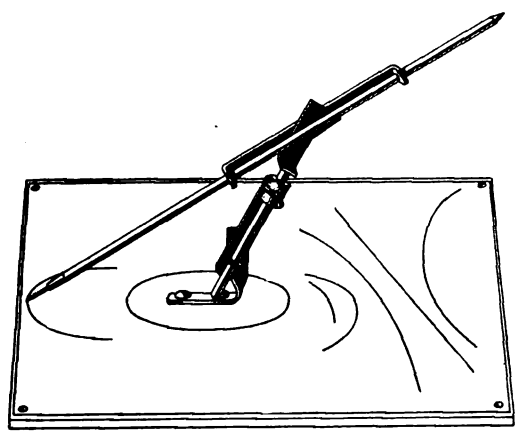


Fig. 1—A conic compass.

where or when you hear of a "good method of restoring burnt steel" don't be led into spending your money for the formula. There is no known way in a bar of steel which has been overheated in the forge, either during shaping or hardening can ever be made as good again as before it was heated too hot. The only way to "restore" that steel is to get a new piece in place of the burned one, and send the old piece to the scrap-heap, or at least so much of it as was "burned."

Not every smith has ever found out what happens to a piece of steel when it "burns." He doesn't understand the changes which takes place at or just before the so-called burning begins. If he did understand this matter better he would never suffer from burned steel save through carelessness.

Heating steel is a good deal in some respects, at least, like heating water. As the heating progresses both substances absorb heat regularly and become hotter and hotter, with every added heat unit. But finally there comes a point in the heating of both substances where things change. The water keeps right on absorbing heat but it does not get any hotter. The steel does the same thing, and takes in three times as much heat in a given time—a very short time, though—as it did before the change occurred.

Now, in both water and steam, the absorbed heat, which does not heat the substances any hotter, is taken up by internal changes in the water and in the steel. In the water it is consumed in turning the water into steam. In the steel the extra heat is employed in making those changes which enable steel to harden when quenched.

The point where the steel begins to take in heat without getting any hotter is known as the point of decalescence, and it may be known by the surface of the steel giving every indication of cooling a bit instead of getting hotter. But the smith should watch very carefully just now, for in a bit the steel will have taken all the extra heat it can hold, and becomes full colored again on the surface. When this point is reached the smith must be on deck and act instantly, for that is the proper instant at which the steel should be quenched in order to harden the best.

The point noted above is called the critical point, and any heating of steel above that point can only result in burning of the steel, and then —good night! Back to the scrap-heap for that

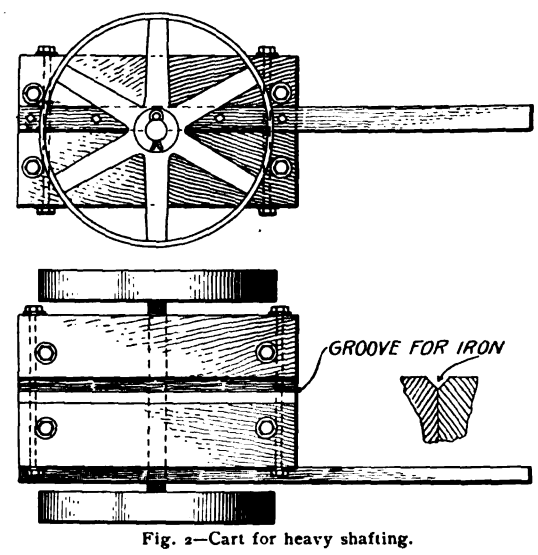


Fig. 2—Cart for heavy shafting.

piece of steel and try again. Just another thing about the critical point: If the steel is removed from the fire before that point has been passed it will reverse the order of things in cooling. That is, after a certain point in temperature has been reached, called the point of decalescence, then the steel gives out for a time, about three times as much heat as it will after the extra absorbed heat has been liberated.

The smith should never harden while this "coming down the ladder" is taking place, for the steel won't be as good as when hardened on the "going up" heat. Therefore, should the smith fail to catch the steel at the point where it ceases to take in heat, and the metal has commenced to cool again, then do not try to harden on the falling heat, but let the piece of steel lie on the forge until it has well cooled. Then heat again, and catch it at the critical point with the temperature still "going up," and required results of good hardening will be obtained.

If the smith will accustom himself to this method of working carbon steel, he need not know or care what brand of steel or how much carbon it contains. All he needs to do to obtain the very best results possible with the steel he has in hand, or with any other brand or make, is to heat evenly and slowly to just below the critical point and then quench while the heat is still "going up" or being absorbed by the steel. So

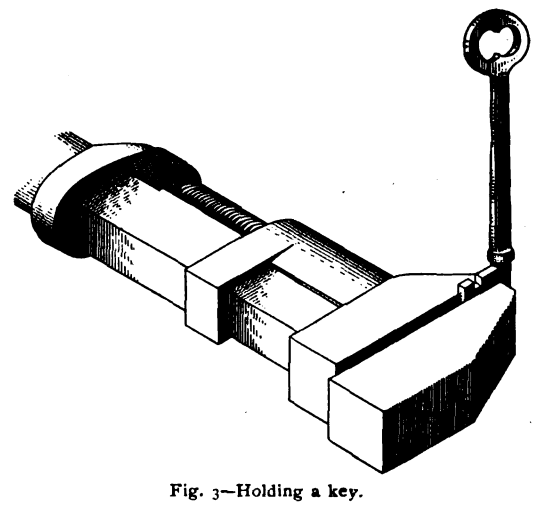


Fig. 3—Holding a key.

much for "burned steel" and how to avoid burning it.

Hardening vs. Tempering.

I am sorry to say that a good many smiths seem mixed in regard to the terms "hardening" and "tempering." Just fix the point once for all that there can be no tempering without first hardening the steel. But there can be hardening without tempering. Hardening has been discussed above, and to temper the hard steel, simply heat it to the exact degree necessary to reduce the glass-like hardness and render the steel tough and strong—elastic, so to speak. The point to which the hardened steel should be reheated in order to obtain the desired temper is given in the third paragraph and it means just what it says, viz.: That to temper hardened steel it is only necessary to place the steel—after it has been hardened and quenched, of course—in a bath which has been heated to and maintained at exactly the required temperature, 450, 425 degrees, or whatever temperature is required. The steel should be left in the bath until the steel acquires the temperature indicated. Then remove the steel from the bath, and it is ready for work as soon as cool. And it makes little difference whether the steel cools naturally or is quenched and cooled thus after removing it from the heating bath.

But the smith must bear in mind that the method described above is not that of "drawing" temper. The method above described is for tempering entire pieces of steel, not one end or side thereof. In "drawing" it is necessary to quench after the requisite color has appeared, but in the oil method described it is only necessary that the hardened steel is reheated to the stated temperature. After that it will take care of itself.

A Conic Compass.

Fig. 1 herewith represents a home-made conic compass which the smith may easily make up for his instruction and amusement. With this instrument any person can draw circles, ellipses, hyperbola and even straight lines. To draw a straight line with the pencil of a compass may seem an impossibility but it is a fact, nevertheless, and each and every one of the curved and straight lines visible around the device were drawn with the instrument here illustrated.

The make-up of this crude and simple instrument is simplicity indeed. The tool consists of two pieces of cold-rolled steel, three strips of flat black steel and two little set collars to fit the cold-rolled pieces. The illustration shows the construction of the compass so clearly that little further description is necessary.

The holes must be reamed to fit the cold-rolled closely. Lost motion must be eliminated and all

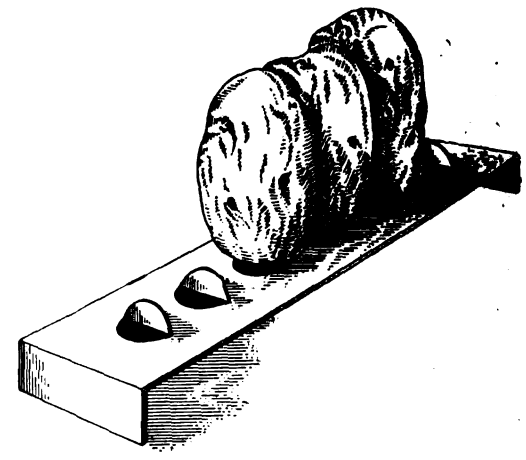


Fig. 4—Potato Roaster.

fitting very closely done. There are two adjustments for angles in the device and the manner in which the two variables are set gives the shape, diameter and size of the figure described by the long rod of the compass. For marking the end of this rod is fitted with pen or pencil and the figure is then marked directly upon the paper which has been placed beneath the instrument.

For general use the instrument may be mounted upon a small metal base of oval or circular shape, and fitted with two or three needle points which will enter the table slightly when the instrument is pressed against the paper for drawing figures.

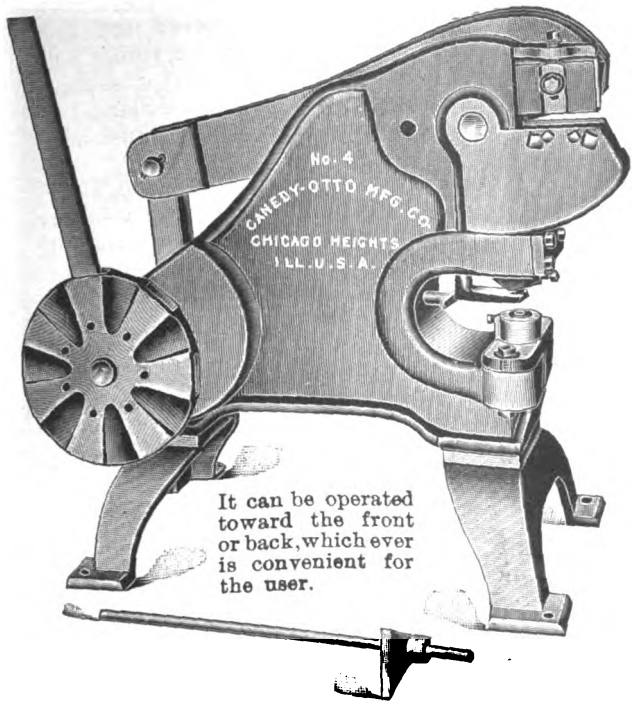
The instrument is called a "conic compass" for the reason that it may be used for drawing outlines of some of the conic sections, as shown by the lines on Fig. 1. If we take a cylinder, a ball or a cone, and slice or saw through it, we get a section which is known as a "conic section" and there is a branch of mathematics, away up the list, above surveying and navigation, and mixed in with the calculus, which branch they call "conic sections." It is hardly probable that the smith will have to work these sections, but he can make up a conic compass and add a bit to his knowledge while getting a bit of amusement out of it.

Cart for Heavy Iron.

Handling heavy iron around the shop by hand is mighty poor business, particularly if 3" or 4" square or round shapes must be used. The work may be made much easier by the use of the little cart shown by Fig. 2, which is useful for heavy bar iron, pipe, shafting, castings, or in fact, for anything which can be placed upon the handy little vehicle.

The cart is best made with a square axle, turned down at the ends to 2 15/16 inches, to re-

No. 4 Combination Punch and Shear



Will shear ¼x4-in. flat bars.
Will shear 1-in. round bars.
Will punch ½-in. hole in ½-in. plate.
Depth of throat 6 inches.

This machine is furnished with ½-in., ¾-in. and 1-in. punches and dies, also a lever bar.

When choosing your blacksmith shop equipment why not get the best—

CANEDY-OTTO

It costs no more.

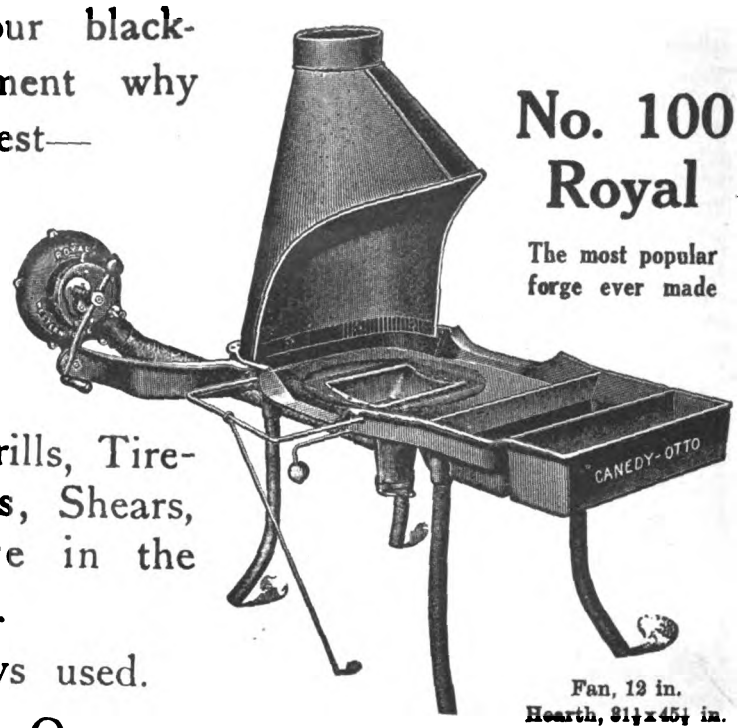
Manufacturers of the finest line of Forges, Blowers, Drills, Tire-Shrinkers, Punches, Shears, produced anywhere in the WORLD.

Once tried, always used.

There's a reason — QUALITY.

No. 100 Royal

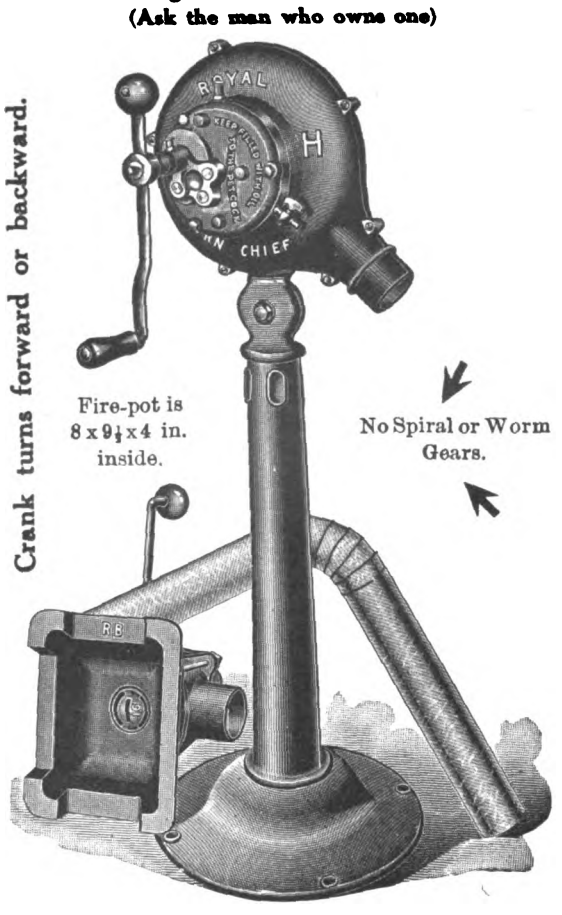
The most popular forge ever made



Fan, 12 in.
Hearth, 31½x45½ in.

Royal Blower

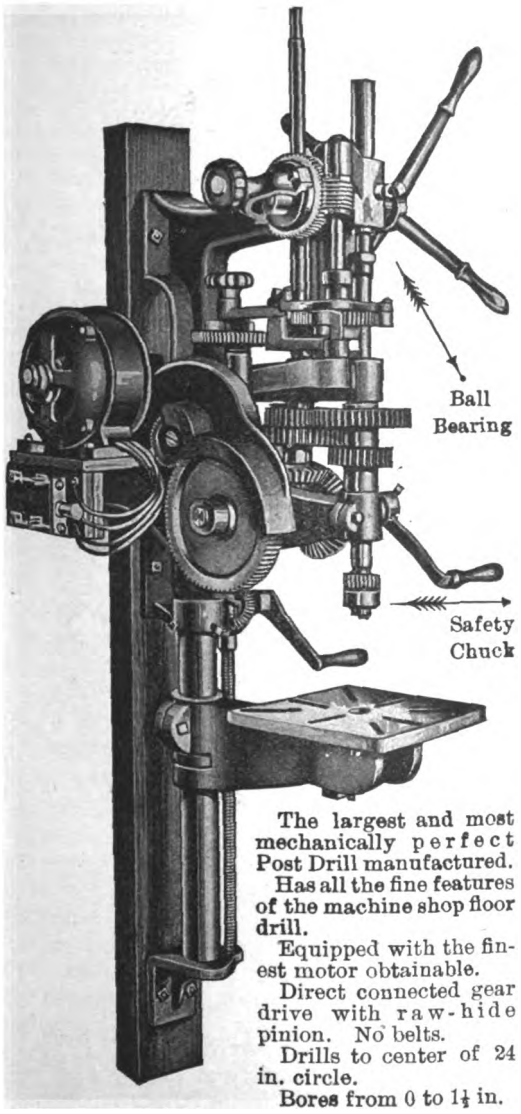
(Ask the man who owns one)



FORGES BLOWERS

PUNCHES SHEARS

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 raw-hide pinion. No belts.
Drills to center of 24 in. circle.
Bores from 0 to 1½ in.

DRILLS TIRE-SHRINKERS

Over 200 different styles of TOOLS. We can suit every need.

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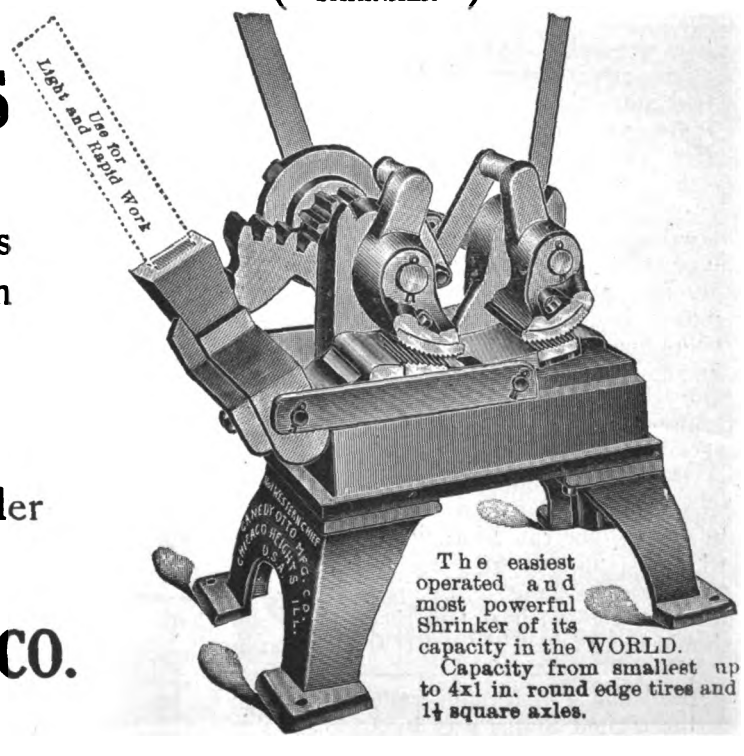
Give name of supply dealer or jobber.

CANEDY-OTTO MFG. CO.

CHICAGO HEIGHTS, ILL.

No. 1½ Western Chief

(TIRE and AXLE SHRINKER)



The easiest operated and most powerful Shrinker of its capacity in the WORLD.
Capacity from smallest up to 4x1 in. round edge tires and 1½ square axles.

ceive the wheels which may be those furnished with a defunct traction engine, or common iron pulleys may be used, as can be obtained. If square shaft is not to be had, cold-rolled steel shafting may be used, and this is shown as the axle in Fig. 2. A few short and solid blocks are bolted around the axle as shown. This cart will carry almost any load likely to be placed upon it. The scantling fastened to one side is for guiding the truck while being moved by hand.

A Monkey Wrench Vise.

When an odd job must be done, such as fitting a key or filing some other piece of metal, the want of a vise in which to hold the object to be worked, is immediately felt and the filing goes on in a loose manner while the work is held as

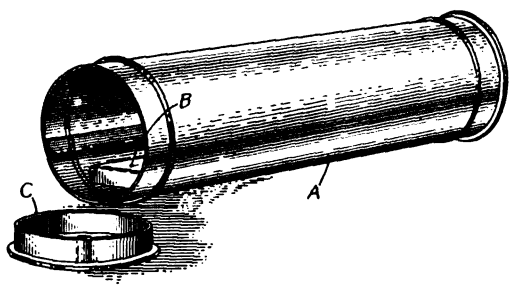


Fig. 5—Smith's forge oven.

best it may, between the fingers or wedged into a corner of a window casing. Sometimes the key is thrust into a crack in a board. One man has been in the habit of pinching the key between the edge of a door and the door-jamb. Somebody would hold the door against the key, while the filing was being done.

The method illustrated by Fig. 3 herewith, shows how the writer often improvises a vise. A common monkey wrench is closed against the key as hard as the screw can be turned with the fingers. Then the key is removed and the wrench-screw is given about a quarter of a turn more to close the wrench still farther. Next, the key is driven into the wrench with a hammer, taking care to strike blows which will not damage the tongue. After one edge of the tongue has been fitted, reverse the key and fit the other side. If the barrel proves a little too large, the tongue may be driven bodily into the wrench and the round portion of the key left projecting upward in position to be easily dressed down to size.

Potato-Roaster and Smith's Oven.

Dinner in a "hash-can," month after month and year after year becomes mighty monotonous, and anything which will vary the dinner-pail diet is welcome indeed to the shop noon hour. Baked potatoes form a most welcome addition to the 12 o'clock menu, but it isn't every shop which carries oven facilities, although the core boys frequently manage baked potatoes and other oven cooked foods.

Potatoes, when thrown into an oven for baking, frequently come out with the side in contact with the bottom of the oven, badly dried out and quite hard. A new utensil for obviating this trouble has appeared in the market. As shown by Fig. 4, it consists of a strip of heavy tin, the ends turned downward for feet, and several half-round pieces turned upward along the length of the utensil.

The potatoes should be well washed, then impaled upon the turned-up tin lips as shown, and the apparatus placed in the oven until the potatoes are fully baked. Aside from keeping the potato from contact with the hot stove-metal, the tubers are placed so they take up very little room in the oven, and they can be very readily removed from the oven when fully baked.

Fig. 5 shows an oven by means of which the forge shop mechanic may have as many baked potatoes as the core boys. It is just a bit of stove pipe, 12 to 24 inches long, with close-fitting covers for each end. One of the covers being removed in the engraving, the pipe or funnel A, being open at one end to show the potato roaster in place at B. The loose head is shown at C, and is made of a band or ring of sheet iron, with a circular head rolled over upon the end of the ring. This type of head used to be common for closing thimbles in chimneys when the stove pipe was not in use, but they are not much in evidence nowadays but can be easily made by the smith who rigs up one of these ovens. To use the oven, simply hang it up on a couple of wires where the forge heat will reach the oven which should be "loaded" about 10:30 for noon lunch.

The balance of foreign trade last year in favor of the United States was $653,140,750.

Correspondence

STEEL WORKING.

Making Cold Chisels and Method of Tempering For Best Results.

From C. Smith, Pennsylvania.—No doubt it will always remain a mystery as to who made the first cold chisel and also no doubt the inventor never thought of the usefulness of this cutting tool and the trouble that would go with it. As probably he only had charcoal steel to work with, he never thought the time would come when steel would be made in combination with other substances and be so far superior to anything he had to work with. Now we have about 200 grades of steel for all purposes. I have been making cold chisels for 46 years and I am still in the laboratory trying to find out by practice and use the best kind of steel with which to make cold chisels. I study and use all the knowledge I have trying to get the best results in making a cold chisel from cast steel. The blacksmith does not make the steel but only works it. The steel-maker has had years of experience but how many blacksmiths are able to do justice to the maker of the steel by working and tempering the steel correctly?

Few smiths ever think that the tempering of steel is graded like the degrees on a thermometer. They do not know that the rays of the sun affect the color and deceive the eye as to the grade of heat. To have a knowledge of working steel educates. It opens wide the door to a line of information that is astonishingly useful. It puts something under your thinking cap. Why does the steel chemist try so hard to produce strength and toughness in steel and is often defeated by the ignorance of the blacksmith in the practical working of the steel?

Let one smith make a number of cold chisels and they will do a good percentage of work and another smith's cold chisels using the same kind of steel will break. How can blacksmiths be taught to make a good cold chisel? Why can one smith temper a cold chisel blindfolded that will do good work and another smith, although he has worked metal a number of years, cannot be depended upon to make a cold chisel tempered to do service in cutting iron. Some blacksmiths lack patience and refuse to learn the secret of being good workers in steel and so are a loss to a firm where this knowledge is required.

I test chisels that I make on a block of iron and am surprised at the difference of color required to produce the requisite hardness to stand the hammer blows and not break. I find that when steel will stand being made into a diamond point it will stand to be used for a cold chisel. I find the diamond point shape the severest shape to put a steel cutting tool in to stand the surprise of the hammer blows. A cold chisel should never be punished with a hard blow. Strike judicially and give it a show. Nine out of ten blacksmiths put steel into water too hot, 85 per cent. beyond the required heat to get the temper wanted, and the excessive heat contributes to brittleness. A smith generally does not have a good show at steel because the hardware store has only one kind and no one knows whether it is good or bad. The forgeman finds its nature by working and using it. Should he not be of an investigating mind, he might have a fine steel and not know it. Steel doesn't harden alike, so don't condemn it by one method of hardening.

There are a number of methods of tempering steel and all worthy of trial. Do not expect to ever get a good reliable temper on bad steel, scrap it and save time. A good steel for cold chisels always pays. Stick to it when you get the right brand. Always lay steel on top of the fire and not in it. Work at a flame color. Do not judge the tempering of steel by the color, use the fine file test for best results. Considering the steel to be good the touch of a saw tooth will answer in many cases.

Good Work and Good Prices.

From J. H. Higden, Texas.—As I am, you might say, a new subscriber to your journal, I want you to know what I think of it. I find it the best I ever read, and don't see how we could get along without it. I am in a small place and have a good trade, but I never turn anything down. I believe in doing everything I do right. I get from $1.25 to $3.00 for shoeing. Other shops around here shoe for a dollar. I do the work just the same, and your journal helps me do this.

I would like to say a few words to H. F. Myers of Pennsylvania, in regard to cold tire setting. I have never used one and don't aim to for many reasons. In nearly all cases I find loose spokes in the rim. How can a cold setter tighten these spokes? Impossible, I say. Take the tire off, wedge the spokes well, drive the rim up tight, sawing between the rims if necessary, then take a bit about the size of the tenon and bore it off so your tire will not rest on the end of the spoke. Trace your wheel and if the tire don't shrink too much then your wheel will give satisfaction. One of the reasons why I do not favor cold setting is because it does not shrink the tire at all, just knocks a kink in it. Now, this may jump on some good brothers but I don't mean any harm at all, it is a fact, however. If anyone wants to know the rest I can tell them. Stay with The Blacksmith and Wheelwright and you will come out all right.

Note by the Editor.—Although we have no reason to question our friend's judgment, much less his ability as a blacksmith, it should be said that possibly he would change his opinion of cold tire setting if he would try a cold tire setter. The opinion of one concerning a tool or a machine he has never used is not so reliable as by one who has given such machine or tool a trial. The cold tire setter most assuredly shrinks the tire, and does not "knock a kink in it." We have never advocated cold tire setting for the reason that it does the work better than it may be done by the hot method, but for the reason that it does the work quicker, while it may be done satisfactorily, if care and judgment be shown, by either method.

Time turned into productive results is about all the blacksmith has to sell, and time is thus of the greatest value to him. If he can save time he saves money; not time for idleness but time for doing more work, or for what amounts to the same thing, doing work at less cost.

At the same time, Mr. Higden's views are interesting and instructive, and just as good as our own, while "in a multitude of opinions there is wisdom."

A Veteran of 84 Years.

The portrait shown herewith is that of the venerable Zepherin Tremblay of Manchester, N.

Zepherin Tremblay.

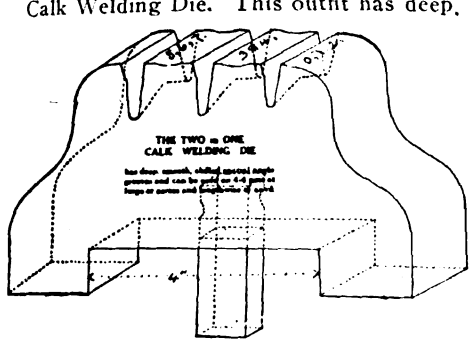
H., who was mentioned in our September issue, and who is still hale and hearty at the age of 84, after having worked at the forge 70 years. May

Whitman's Sultan Engine Book.—The Whitman Agricultural Co. of 6926 South Broadway, St. Louis, has recently brought out an engine book that every man who intends to invest in a gasoline engine ought to get and read before purchasing. It contains a lot of valuable information with respect to gasoline engines, and especially with respect to the "Sultan Engine" which is manufactured by this company. Write for it at once to the address given above.

Ice Cutting Calks, manufactured by Henry Wooldridge & Sons, Lye, Stourbridge, England, will be found described in an advertisement on another page. These calks are manufactured from special Sheffield steel, and are said to be unbreakable, untwistable. No special design of shoe is required in using. This concern sells only to blacksmith's supply houses, but if your supply house does not furnish them, we would advise you to write direct to the firm in England, and they will perhaps find a way to supply you.

Two in One Calk Welding Die.

In this issue will be found the announcement of the Cleveland Shaft Spring Company of 2232 E. 90th Street, Cleveland, Ohio. We illustrate herewith and briefly describe their Two in One Calk Welding Die. This outfit has deep,



smooth, chilled, special angled grooves, which grip the calk near the shoe, causing a complete weld. It saves the time of resharpening. The grooves crowning at center produce a self-cleaning die. If your dealer does not keep these dies write direct to the manufacturers as above for further particulars.

Dayton Fifth Wheels.—Our readers who have not already tested the fifth wheels made by the Dayton Malleable Iron Co., of Dayton, Ohio, should do so at the first opportunity. You can get these fifth wheels of your regular dealer or if he hasn't them he will get them for you. You will find in this issue a description of these fifth wheels.

"Boss" Blacksmith Aprons.—The California Tanning Company, 1905-7-9 Shenandoah Avenue, St. Louis, Mo., comes before our readers again in this issue with an illustration of their blacksmith aprons, which they can supply with or without bibs, and also their Dandy New Muleskin Aprons with or without bibs. A catalogue giving full particulars as to the various styles, sizes and prices of these aprons will be sent on application. A miniature apron which will bring joy to the hearts of the young candidates for the blacksmith trade in your family will be sent free on application. Write at once and then you won't forget about it.

he round out the century mark! May he have the peace and content that should come and does come with such a life of usefulness and industry! May God bless such men and give them the final rest and reward that should come and does come after a life that has given far more to the world than it has taken from the world!

Removing Old Babbitt.

James Francis in The Crow Bar.—When a journal bearing is to be relined with soft metal, it is necessary first to remove the old babbitt. This is usually done in one of two ways, namely, either by chipping it out with a cold chisel or by melting it out over a fire.

Chipping is a slow method but in some cases it is preferable. To chip the babbitt out of a bearing, procure a narrow cape chisel, say ¼ to ⅜ inch wide. Then cut through the babbitt lengthwise of the box right down through the middle. Don't try to get under the babbitt and drive out the entire thickness of the babbitt at one cutting. Instead of that drive out a chip nearly ⅛ inch thick. Then go over it again and get another eighth, and unless the babbitt is very thick indeed the second cut will bring the groove down to the cast iron. After the groove is cut, it is very easy to drive the chisel under the babbitt, first at one corner then another, gradually loosening it and tearing the half-lining bodily from the journal bearing or cap, as the case may be. In very long bearings it may be necessary to cut a cross-groove midway between the ends, but usually a groove lengthwise down the center will answer every purpose.

When babbitt is to be melted out instead of chipped out, procure a large iron pot. A kettle is not as good. An old-fashioned pot, made round at the bottom with three short legs and without the jog with which kettles are fitted, should be suspended over the forge or other fire used for the purpose and should not be placed directly upon the coal. Hang up the pot an inch or two above the fire. Then there will not be much danger of burning it. Place a few pounds of babbitt metal in the bottom of the pot. Heat slowly and carefully, hot enough to melt the babbitt but not hot enough to make the pot red hot.

As soon as the babbitt is melted, place in the pot the bearing or bearings from which the babbitt is to be removed. You can put in as many as the pot will hold if you have that many to do. Just pack them in as closely as possible, placing them on end, one end resting in the babbitt in the pot and the other end of each bearing extending up. Let the fire be kept steady, not hot enough to make the pot red hot but hot enough to keep the babbitt in a very fluid condition. If the job is to be hurried, a cover placed over the pot—a piece of tin or sheet iron—will keep in considerable heat and cause the melting out to take place several minutes quicker than when the pot is left uncovered.

Don't try to keep the melted babbitt metal clean, no matter if there is dirt, coal and other refuse on the surface. Let such dirt stay there. Ofttimes I throw some dirt from the forge directly upon the surface of the babbtt while melting out boxes. This is for the purpose of preventing oxidation of the babbitt metal. Oxidation causes a lot of dross to form and uses up a corresponding weight of babbitt metal which could be saved by covering the top of the babbitt with any substance which will prevent air from reaching the babbitt.

Just before the babbitt melts from the bearings, retard the fire a little, for very little more heat will be required, and none after the babbitt is once melted. Babbitt should never be heated too hot. When at a red heat it oxidizes readily and a large percentage goes off in gas

which is turned into dross. The old-time rule for heating babbitt, to heat it just hot enough to char or blacken the surface of a newly dressed pine stick, is a good one; but pine is scarce nowadays, and in testing babbitt with white wood. poplar or other substitutes for pine, care should be taken that the babbitt is not heated hotter than the old-time rule calls for, viz., to barely blacken or char the new clean surface of pine.

There is one exception, however, to this rule. When bearings are to be poured, especially steel bearings, where there is a very thin form of soft metal between shaft and casting, then it is necessary to heat the babbitt hotter than is required when a considerable thickness of bearing is to be poured. In pouring thin linings, it is also necessary to heat the boxes and incidentally to heat the shafting as well. Let both be heated so hot that water will sizzle when thrown upon them. This being done, there is usually little trouble in pouring perfect boxes.

A Typical English Shop.

From Charles Barker, Massachusetts.—I enclose herewith a picture of a typical English blacksmith's shop, and I would like to call the attention of your readers to a feature much neglected by the average American blacksmith, that is the sign adornment. The usual American sign reads: "William Smith, Horse Shoer;" that's all. But here is a sign which says something. Note the line, "Great care taken with lame horses." That line alone would attract some transient trade. "Ask prices." That has the true business ring. When a prospective customer comes in for prices, it invariably means another job, provided the shop owner has a little business tact. So many blacksmiths are satisfied with "everybody knows me" that they lose sight of the fact that everybody does not know how well they can do a job, or anything else other than simply horseshoeing.

Note the shop signs.

There is nothing like "blowing a horn" for yourself nowadays. The other fellow will certainly never do it for you. The sign attached to the chimney reads: "A. Dickinson, R. S. S., Prize Shoeing Forge." The R. S. S. signifies the proprietor is a registered shoeing smith, having served his time of apprenticeship at the trade and successfully passed his examination before the Board of Registration. The sign facing the street contains the announcement of the prize winning records. The slanting sign is so arranged to meet the eye of travelers coming up a road toward it. The top line would cause an ordinary American to infer that it might be a barrel factory. When I asked Mr. Dickinson about the hoops, he said, "It's what you call in this bloomin' country, tires." The proprietor is seen in the picture standing next to his little child.

One Price to All.

From C. I. Eastwood, Oklahoma.—I have worked at the trade for a number of years and I do not think that I have yet learned it all as I learn something every day. I have been in Oklahoma for 14 years, and I find this a very good country for my trade. I am in town of about 6,000 people and it has the natural resources for growth and prosperity. We have five shops and some of them work for just what they can get. I do not think that is a very good way to do business. Do you? I charge one price to all and if they do not want to pay it they can go to some other shop, as I am not running a shop where I will take what I get. My shop is 24x80 feet with two fires but all hand machines. I am going to put in electric power soon.

Certain Useful Kinks.

From G. R. Keller, Michigan.—As I have received a great deal of information out of your paper I thought I would try to give you a few of my ideas, which may be of benefit to some brother craftsmen.

My way of springing in spokes is to take a ⅞ turnbuckle and weld pieces on the stub ends about 3 inches long and hollow them out so one end will fit the hub and the other the felloe. Turn the turnbuckle with a short bar of iron. This will serve as a jackscrew which will lift the felloe to the required height.

To straighten stove lids. Lay a weight on one end of the lid; say about 5 or 6 lbs. Hold the other end with the tongs and have a block to rest the tongs on. Hold the bent part over the fire and when nicely red the weight on the opposite end from the tongs will bend the lid down straight. Do not try to bend out of the fire as the air chills the cast the minute it is taken out and causes it to crack.

To temper a coulter and keep it from warping, plunge it square in the center of the slack tub, back down. If not in the center of the tub the point will warp to the side with the least water.

When driving on a horse shoe commence at the toe and drive every other nail opposite each other back to the heel. This will spread the hoof about ⅛ or 3-16 of an inch.

QUESTIONS FOR OUR READERS

You are invited to ask questions freely on all points pertaining to your work. Our subscribers who have solved successfully the problems which confront you will take pleasure in imparting the results of their experience for the benefit of their fellow-craftsmen.

Balancing Separator Bowls.

From E. B. Forrester, South Dakota.—What are the essential necessities governing the balancing of cream separator bowls? How can they be balanced in an ordinary blacksmith shop and in the simplest manner where there is no turning lathe? I would like to hear from Mr. Hobart on the subject.

Heating Rivets.

From Karl Rath, Alabama.—Will some reader of The Blacksmith and Wheelwright please tell me how to build an oil burning furnace to heat rivets? I would like to have an answer as soon as possible.

(Note.—In answering this question, we hope our reader will submit sketches and full details.)

Greenwood Patent Horseshoes.

A subscriber asks where the Greenwood Patent Horse and Mule Shoes are made. Possibly some reader may be able to give the information. If so, we shall be glad to have him send it to us.

Acid for Solder.

From T. Bros., Barnes Corners, New York.—Can you tell us through the columns of The Blacksmith and Wheelwright what kind of acid to use to make solder flow on brass, cast brass especially?

ANSWERS TO CORRESPONDENTS

Under this head will be found each month replies to questions asked in previous issues. Our readers will appreciate the importance to inquirers of furnishing the desired information as promptly as possible.

Elements of Welding.

From W. A. Gillentine, Texas.—In the September number of The Blacksmith and Wheelwright I saw a communication from C. Smith, Pennsylvania, on tire and axle welding. I feel timid in taking issue with a man of his age and experience, but in the interest of the less experienced I will do so. There are three essentials in any job, viz., quality, neatness and speed. Brother Smith's method will likely get the quality and a certain degree of neatness, but how a shop can pay standard wages on such long drawn out methods is a puzzle.

Why any one should have much trouble in welding when the reasons are so apparent I don't see. When you place an axle, tire, or anything on the anvil and it fails to weld, what is the reason? You well know that cold metal won't weld. You should know that if too hot it won't weld, and if it is just hot enough and don't weld then there is dirt and scale on it due to a dirty fire, or you may have had the metal too near the bottom or top of the fire. Don't blame the coal. I have welded steel in the poorest railroad coal, and I could just as readily as with any other.

For neat and rapid work coal should be wet up in a tub or other vessel and put on the forge like mud. It should be kept packed around your fire so as to confine the heat. If you are welding an axle, cut it ⅜ of an inch longer than it is to be finished. Stave both ends enough to have some to forge out. Make a plain short bevel, place in the fire with the heel of your weld in the main part of the fire, bevel down, and bring almost to a welding heat. Turn over and put on compound and as soon as it reaches the welding (not melting) heat, turn the bevels down about five seconds, and take the anvil. Now don't hurry; you have time to throw both pieces on the floor and then pick them up and weld them. I have done it often. Start the weld with a light hammer, 2 or 3 pounds, then let your helper in with a sledge in good earnest. Smooth up with a flatter. One heat is enough for any weld and you could not hold a job in any up-to-date shop unless you can make one heat go on an axle or tire. I bevel short and lap my tires short, place the side with lap on top more in the fire than the other so it will heat by the time the bottom lap does and move them to or from me as the heat appears more in one or the other. When I have a regular welding (not melting) heat I remove to the anvil, weld and finish at one heat wide or narrow. I hammer in the edges and never trim. I would go more into detail but fear I would take too much space.

"Smile and Push" is a good motto—and remember, you don't have to be rich to be happy.

The money in circulation in the United States has increased 46 per cent. in ten years.

Red Tip Calks.—The special attention of every reader of this paper is called to the new full-page announcement which appears in this issue from The Neverslip Mfg. Company of New Brunswick, N. J. This advertisement explains the merits of the Red Tip calks. These calks enable the shoer to sharpen more horses in a given time than by the old-fashioned back-breaking method. These calks are easily and quickly adjusted. They not only lighten labor for the shoer, but give satisfaction to customers. The same company manufactures a line of horse shoes made especially for Red Tip calks and these shoes are highly recommended by all who have tried them. There is no better fitting or more popular shoe made than the "B" Pattern Iron and Creased Steel Neverslip Shoes, and for light fast horses the Extra Light Steel shoe fills every requirement. An interesting advertising feature in connection with the sale of the Red Tip calks is the coupon premium system. A coupon is packed in every box of Red Tip Calks. These coupons have a real value and are exchangeable for over 2,000 premiums, all of which are useful articles. Every reader of this publication who has not received the Neverslip Premium Catalogue should send for it without delay. Many horseshoers have obtained a large list of handsome and useful articles for their homes by saving and sending in the Red Tip Coupons. A new advertising feature inaugurated by the Neverslip Mfg. Company is found in their moving picture slides, which are furnished free to our readers on application. Moving picture shows are plentiful now, and if there is one in your town it would undoubtedly pay you to send for a moving picture slide, upon which your name will be printed, with the statement that you are the local agent for the Red Tip Calks, and for a very small sum you can arrange with the manager of the local picture show to use a slide of this character at every performance. This is good advertising for you and it will pay you to investigate the matter. Address all communications to The Neverslip Mfg. Company, New Brunswick, N. J., and in your correspondence be sure to mention The Blacksmith and Wheelwright.

Corona Wool Fat.—C. G. Phillips, the Wool Fat man, who manages the Corona Mfg. Company of Kenton, Ohio, announces in his full-page advertisement in this issue that he wants to send a can of Corona Wool Fat to every blacksmith and horse shoer in the country on 20 days' free trial. All you have to do is to cut the coupon out of the advertisement on another page, fill in your name and address, and mail it to him, or you can send a postal card if you do not want to bother with the coupon and a can will be promptly sent to you. If you are satisfied after you have tested it you can send him 50 cents for the can. He says it is the greatest of all healing remedies for corns, sore and tender hoofs, cuts or wounds. He wants blacksmiths everywhere to act as agents for the sale of Wool Fat, and they can make a little money easily on the side in doing so. Ask Mr. Phillips for terms and you will get a prompt response. No one should fail to read this full-page announcement.

WORKING TOGETHER.

The Blacksmiths, Wagon Makers and Horseshoers of Kansas.

The seventh annual convention of the Blacksmiths', Horseshoers' and Wagonmakers' Association of Kansas, which convenes at Salina, November 12 and 13th, will be a convention of unusual interest. A large attendance is looked for. This association has been in the habit of getting out a year book, and the one for 1913 is unusually lively and interesting. Moreover it is filled with the fraternal spirit and the work for this grand association is beginning to permeate the entire craft in its own locality. We herewith reproduce some of the articles in this year book. They will be read with interest by blacksmiths everywhere. It may be remarked that this little book has some forty pages and contains more than enough advertising to pay for its publication. It suggests the idea that organizations elsewhere might get out a similar work. It all goes to help the cause of co-operation as opposed to competition and price cutting. The extracts follow:

The Lien Law.

From President George W. Wilson.—On coming before you again in our year book, we have many things to contemplate. The best of these is the Lien Act, passed by the Legislature at its last session. The many experiences in lawmaking, of which some are so vastly inconsistent, with acts of real gentlemen,at times, I was almost forced to lose confidence in mankind, but I came to the conclusion that if they beat me it would be while I was watching; I never took my eyes off the game, though many times I was bluffed, but took a new deal at once. Enough was done, when I won, and got the pen with which the Governor signed the bill. There is victory enough for us all, and enough for those who do not belong to our association. Even the Automobile Repairers, who should contribute to the defraying of a part, at least, of the expenses, which would be no more than fair, as they have the security the same as we; also the fifteen hundred mechanics over this State, who do not belong to our association.

It should be their first move to join us, and contribute their mite and help pay the expense incurred. We now have a law whereby we cannot lose what we earn. If we will only do business ourselves. We have the best mechanical organization in the State. It is the highest aim of our association to study economy and practical business. Let this be the incentive to use our best judgment, to promote the welfare of our vocations.

Faith and Works.

From John Massey.—It will be a sad story to tell if the most useful and intelligent mechanics of the past, as well as the beloved character of smithy fame should be crowded out of our modern civilization.

The blacksmith of to-day cannot subsist on the small amount of hand work that may be thrown to him after the factory and merchant has had their chance to supply the farmer, teamster and other consumer.

In the past there was such a variety and quantity of work that no one else could do that a blacksmith could exist in any community where he might establish himself with a forge and anvil.

Drop forgings, malleables and machine made articles of every description are now offered for sale so generally, and at such a price that they cannot be made by hand.

What then, is the blacksmith to do? Light can be thrown on the problem by asking, are there any successful blacksmiths to-day, and if so, how are they meeting the situation? I take two blacksmiths (actual cases), each one is located in a good farming section, thirty miles apart and with about the same capital and surroundings twelve years ago. Mr. A. was afraid the factories were going to take nearly all his work away from him, so he began to hedge by cutting down his stock and shop equipment to the lowest stage. He did just what work was brought to him, and told everybody that the blacksmith business was not what it used to be. This pleased the storekeeper who put in a full line of plowshares, singletrees, etc., and the whole community learned that the only place to get such goods was at the hardware store.

Mr. B. had faith in his business, in himself and in the future. So he stocked up with everything in his line that a customer needed, kept up his shop equipment and his community soon learned that the place to get a good plowshare, well fitted, a clevis, singletree or bolt was at the blacksmith shop. In the winter months he makes up singletrees, wrought goods, eveners, etc., and gathers up plowshares and cultivator shovels to point, and by spring he always has a room full of done-up work with the owners' name on his articles. In this way Mr. B. makes money on the stormy days in winter and when the busy spring days come he is ready for other work.

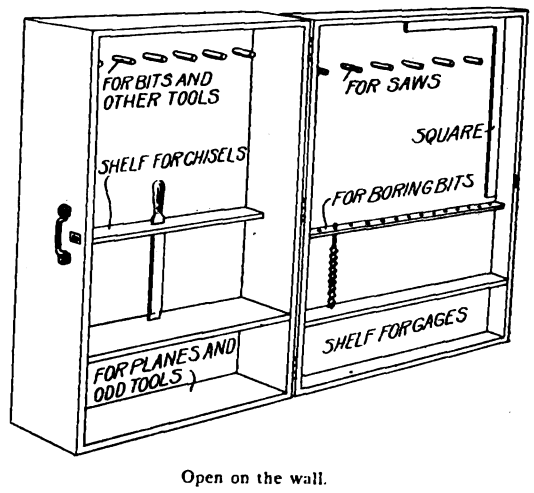
The hardware stores also carry some of these goods, but the blacksmith knows just what is needed and he has the first chance at the customer because he has catered to their wants and has what they need.

Mr. B. had faith in his business, in himself and in the future. He is one of the prosperous men of his town, has made more money than any other man in town according to his investment. Is a member of the town council and his family is respected and thought as much of as the banker's family. He has cleared a thousand dollars a year, while Mr. A is worth no more than he was twelve years ago.

Would any merchant or business man make a success if he took hold of his business as many of our blacksmiths do to-day?

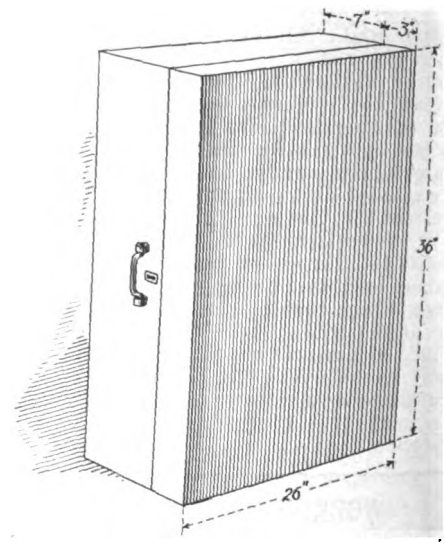
A Good Tool Cabinet.

From J. P. O'Brien, Pennsylvania.—I enclose a sketch of a tool cabinet to fasten on the wall



Open on the wall.

over a work bench. It is convenient for the workman and a safe kit in which to leave his tools at night. All he has to do is to close the door and lock it. The cabinet can be made any size to suit the amount of tools that is to be placed in it. The illustrations show the size of



Closed

the one I use, together with the cabinet open and closed and in shape for carrying in the hand if necessary.

Result of Competition.

From C. I. Eastwood, Oklahoma.—I have been in this town about one year. We do not get the best prices in the world. The competition is hard. If they cannot get one price they will take just what they can get, but I have got one price for all, and if they do not want to pay it they can go to some place else.

Shop Economy.—Many blacksmith shops in all parts of the country can use a lathe to advantage. In fact a lathe in the hands of a man who understands how to use it and is situated where certain kinds of work can be obtained is a money making proposition. Sears, Roebuck & Company of Chicago have an attractive announcement in this issue of a lathe which they are now putting on the market at a reduced price. They make a variety of lathes at a variety of prices. See their advertisement on another page and either cut out the coupon attached to it and send it to them, after filling in your name and address, or if you do not want to mutilate your paper write to them for catalogue No. 73B42, which will be sent to you without charge.

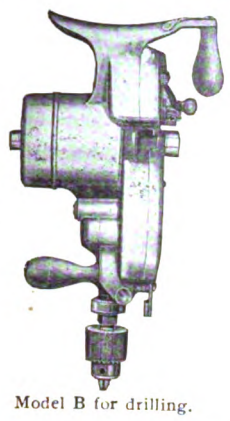
Horse Rasps.—Heller Bros. Company of Newark, N. J., in their advertisement in this issue have an illustration of their "Horse-Rasp of Quality," which is an improved horse rasp with keen cutting hard teeth, made in all patterns and cuts, "Slim," "Light," "Slim Light" and "Fine Cut." They want to send their new catalogue giving full particulars concerning their rasps to every reader of The Blacksmith and Wheelwright. All you have to do is to send a postal card and a catalogue will be promptly sent to you.

Badger Belt Power Combined Punch and Shear.—This tool, illustrated in our advertising department and manufactured by the Rock River Machine Company of Janesville, Wis., will shear 5x¼ inch band iron, ½x4 flat bars and one inch round bars. It will punch a ⅝-inch hole in one-half inch plate and it will punch to center of 13-inch plate. This will be found to be an ideal blacksmith's tool and ought to be in every blacksmith shop that uses power. Write for catalogue and full particulars and prices to the company as above.

A Machine Shop in Itself.

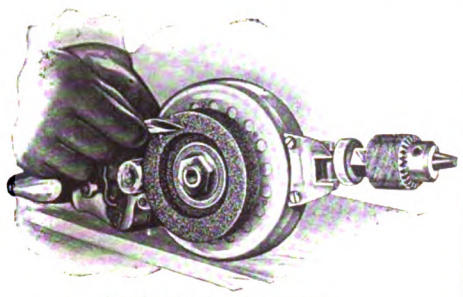
"A machine-shop in itself" is the name applied by an enthusiastic owner to the Temco Model B Portable Electric Drill. This remarkable tool has four uses that give it an especial value to a wheelwright or repairman for wagon or automobile work.

Temco Model B has a drilling capacity in steel of ⅜ in. and a tapping capacity



Model B for drilling.

in cast iron or thin sheet metal of 3/16 in. It has two unusual and valuable attachments,—first a quick-attachable emery-wheel for tool sharpening, second a handy valve-grinder that makes the reseating of valves a safe and sure operation. The Temco is attached to any ordinary lamp-socket, alternating or direct current. Its length over all is 15



Attachment for sharpening.

inches and weight only 11 lbs. The motor is a special high-speed motor designed and built particularly for this use. Cost of operation of the Temco Model B is one cent an hour.

Any reader of The Blacksmith and Wheelwright interested may secure a Temco catalogue showing the complete Temco line, by writing the Temco Electric Motor Co., 155 Sugar Street, Leipsic, Ohio.

Giant Grip Horseshoes.

We wish to call the special attention of our readers to the new announcement which appears on another page this month from the Giant Grip Horse Shoe Co., Oshkosh, Wis. Although the Giant Grip horseshoe has long been recognized as of great merit, the company has recently made improvements which will undoubtedly interest our subscribers.

Giant Grip Horseshoe.

After several years of experimenting they have at last designed and manufactured a toe-clip (patent applied for) which has been successfully tried out and is put on the market with the strongest confidence that it will win deserved popularity. This toe-clip is reenforced on both edges and is said to be the strongest that has ever been put out by any horseshoe manufacturers. Besides strengthening the clip the side reenforcements prevent the steel from cracking at the corners. This toe-clip requires no further work except heating and bending up. It is manufactured out flat with the shoe so that when bent up it sets a great deal further forward on the shoe than any other toe-clips which are manufactured already bent up.

The Giant Grip horseshoes are drop forged and are made of dead soft open-hearth steel, this steel being made by special analysis for the manufacturers who state that this is the toughest steel made, so that the shoe is practically insured from breakage of any kind. Of course the importance of a good non-slipping shoe during the winter months

Toe Clips.

is self-evident and does not need explanation in these columns, and the Giant Grip calks which are made for use with the Giant Grip horseshoes are made with a view of getting the best possible service out of the calk, and at the same time preserving the non-slipping qualities until the calks are completely worn out. These calks are made in regular and extra long blades, and round steel center calks are also furnished, if desired.

The following testimonial is one of many unsolicited letters received by the manufacturers from users of the Giant Grip shoes and calks:

"Marlboro, Mass, April 2, '13.

"Giant Grip Horse Shoe Co., Oshkosh, Wisconsin.

"Gentlemen:—We have been using your shoes and calks for two seasons and have had great success with them. On our city streets, they have saved our horses from many a bad fall on slippery pavements. We have tested your calks on teams with one horse shod with screw calks and the other shod with Giant Grip, and the Giant Grip calks easily proved their superiority by far, outwearing, and slipping very much less than the old style screw calks.

"We found that the Giant Grip calks were very superior when used on our horses when harvesting ice. We are using your shoes with dull mud calks during the summer.

"We are shoeing eighteen horses, weighing from eleven hundred to fifteen hundred pounds.

"Yours truly,

"Lake Williams Ice Co.,

"By Robert Howe, Manager."

Readers can get a good idea of the appearance of the Giant Grip horseshoe and the Giant Grip calk by the accompanying illustrations.

Probably your dealer can supply you with the Giant Grip shoes and calks, but in any event you are urged to write for interesting literature, price list, etc., direct to the Giant Grip Horse Shoe Co., Oshkosh, Wis., and in doing so mention The Blacksmith and Wheelwright.

Borax-ette for Welding Toe-Calks.—Our readers who have never investigated the merits of Borax-ette, would do well to send for a free sample which will be furnished to anyone asking for it by the Cortland Welding Compound Co., of Cortland, N. Y. This preparation is said to be far superior to common borax for welding, and that it makes steel weld like iron.

WANT ADVERTISEMENTS

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

will be inserted under this head at 2 cents a word, including the address for each insertion, payable in advance; but no advertisement will be accepted for less than 50 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 FOR INVENTIONS.

H. W. T. Jenner, patent attorney and mechanical expert, 608 F St., 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.

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.

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.

PATENTS.

C. L. PARKER, attorney-at-law, and solicitor of patents. American and foreign patents secured promptly. Handbook for inventors sent free upon request. 926 G street, Washington, D. C.

CASH FOR YOUR BUSINESS OR REAL ESTATE.

I bring buyer and seller together. No matter where located, if you want to buy or sell, address FRANK P. CLEVELAND, 975 Adams Express Building, Chicago, Ill.

MECHANICS.

Send for a circular describing "Mechanics' Companions," a tri-square, a centering square, a caliper, rule and protractor. Address J. O. HESS, Oran, Mo.

BLACKSMITH.

Here is your opportunity to be an expert blacksmith without help. As life is short, get Toy's Modern Methods of doing hard jobs easy, forging and welding all kinds of steel solid. Also tempering all tools to a standard by colored charts. This is real plain information, not theory, all for $1.00. Send for free samples first. W. M. TOY, Sidney, Ohio.

BROTHER,

Accidentally have discovered a root that will cure both tobacco habit and indigestion. Gladly send particulars. No drugs. G. S. STOKES, Mohawk, Fla.

DON'T PURCHASE A TRIP HAMMER

Until you have asked for a price from the COLEMAN IRON WORKS, Elmira, N. Y., U. S. A.

WANTED.

WANTED—Traveling men who visit the carriage implement and livery trade make big commissions selling our steel and rubber tired wheels, poles and shafts as a side line. Why don't you try it? THE BOOB WHEEL CO., Cincinnati, Ohio.

FOR SALE.

McGovern and West power tire shrinker, Moyer and Defiance hub boring machine. All as good as new at one-third the price of new ones. Address, 554 Freeman Avenue, Cincinnati, Ohio.

FOR SALE.

General blacksmith and wagon repair shop; new dwelling house and about an acre of land, located in a thriving German Catholic settlement in a good farming community of Central Wisconsin. Fine chance for the right man. For particulars address A. J. Martin LBR. CO., Bloomer, Wisconsin.

FOR SALE.

Guaranteed Brooks Cold Tire Setter; a bargain; cash or part cash and short time on balance. Write for particulars. P. O. Box 325, Wichita, Kansas.

LEARN TO PAINT

automobiles and carriages by new, best and latest process. Good money in it. I can teach you how to do first-class work. J. FRAHLICH, Mayfield, Ky.

SITUATION WANTED.

An experienced carriage painter, striper and finisher wishes a job in some quiet country town with some blacksmith building enough work to keep a painter going. Address W. A. RIGGLEMAN, Jamestown, Ohio.

FOR SALE.

Blacksmith shop (new) also new dwelling house. Good opening for right man. For full particulars and price address L. L. JAMES, Medora, Indiana.

PATENTS SECURED.

Prompt attention. Legal protection our specialty. Our clients receive personal service. Booklet free. HARRY PATTON CO., Suite 352, McGill Building, Washington, D. C.

FOR SALE.

Good general shop electrically equipped. Best location in Illinois and best prices. Doing good business. Address for full particulars W. R. POLK, Milan, Illinois.

FOR SALE.

Only shop, good place. Cleared price of place in the last fourteen months. Bargain for some one. Address for particulars JOHN PRINTZ, New Richland, Ohio.

FOR SALE.

Power blacksmith and wood shop combined, stock and tools. Good trade for three men. For particulars write E. D. SATTERLEE, East Otto, New York.

FOR SALE BY FRANK P. CLEVELAND.

FULLY EQUIPPED BLACKSMITH SHOP in Bremer Co., Iowa. Shop building 26x60; shop is fully equipped with all necessary tools and machinery; price $2,750.

BLACKSMITH AND IMPLEMENT BUSINESS in Mitchell Co., Iowa. Shop building 60x24, valued at $2,500; stock on hand will invoice about $5,000; receipts average $2,500 per month; real estate, stock and business will require an investment of about $8,000.

8-ROOM RESIDENCE, BLACKSMITH SHOP AND TWO LOTS in Jennings, Louisiana; price $4,000; also 6-room house, barn and lot valued at $1,000; good opening for practical blacksmith.

BLACKSMITH, WOOD WORKING AND REPAIR SHOP in Waushara Co., Wisconsin; wood working shop 24x40; saw mill 24x60; grist mill 20x28; engine room 12x24; profits average from $1,500 to $2,000 net per year; price $6,000.

BLACKSMITH SHOP at a good point in Beadle Co., South Dakota; stock and tools invoice about $1,200; rent $10.00 per month; good opening for practical workman.

BLACKSMITH AND WAGON SHOP in Saginaw Michigan; shop building 25x78; barn 18x24; 8-room house and two lots; about $8,500 required.

BLACKSMITH AND WAGON SHOP in Morris Co., Kansas; shop building 20x40; will sell shop building and tools for $1,000.

Write me for detailed description. I bring buyers and sellers together. No matter where located, if you want to buy, sell or trade any kind of property or business, address FRANK P. CLEVELAND, 975 Adams Express Building, Chicago, Illinois.

BUILD YOUR OWN AUTOMOBILE OR TRUCK.

Four cylinder motors, new.....$70.00
One ton truck axles, new.....per pair, 25.00
Sheldon jack shafts with bevel gears.... 35.00
AUTO PARTS CO.,
513-31 Jackson Blvd.,
CHICAGO, ILL.

FOR SALE.

1 to 100 H.P. gasoline engine values. All kinds of auto motors. Chassis parts for autos and trucks. State your requirements and save money. BADGER MOTOR CO., Milwaukee, Wis.

FOR SALE.

Used and rebuilt lathes, $90, $140, $150, $190, $225, $250, $300; Planers, $90, $150 and up; Shapers, $45, $135 and up; Millers, $150, $290, $325; Drills, $15, $38, $48, $60; Band Saws, $50, $75; Moulders, $45, $175, $250; Saw Table, $15, $35; Gasoline Engines, 5, 6 and 8 h.p., $50, $75, $100; Other bargains. New jointers, $67 up; practical combination wood workers, $85 up; power helve hammer with rubber bumpers, $85. BICKNELL, Janesville, Wis.

FOR SALE.

Blacksmith shop in good town of 4,000, on easy terms, with or without stock and tools. For particulars address A. J. BURGER, Tomahawk, Wisconsin.

FOR SALE.

Good blacksmith, wheelwright and paint shop, size 40x40. Two stories with additional shed for lumber. Have work for seven men. All power by electricity. Good auto trade. Centrally located in a town of six thousand inhabitants. Address, ELI BUZZARD, Stroudsburg, Pa.

FOR SALE.

Brooks Tire Setter, practically new. Set of blacksmith's tools. Will also sell or rent my shop and dwelling. Address for particulars H. S. Bynes, Gibson, Ga.

FOR SALE.

Brick blacksmith shop in a good Southern Minnesota town. Price $800. Address MRS. ANNA TRAUTMAN, 603 W. Franklin Ave., Minneapolis, Minn.

BUSINESS WANTED.

I am looking for a good location. Will pay cash. Send full description in first letter. Address, BLACKSMITH, Box 975, Cherry Valley, Illinois.

FOR SALE.

Blacksmith and wood shop with stock. Wood shop 30x82, two stories. Blacksmith shop 30x45. Two forges, one machine lathe, one 20-inch Deloch planer, one 36-inch band saw, one ten-inch jointer, one tenon machine, one wood lathe, one 42-inch grist mill, one No. 2 Diddell saw mill, one 20 horse power I. C. H. gasoline engine, one half acre land on main street, busy part of town. Am doing a fine business in automobile repairing. Work for six men. Will sell for $5,000, $2,500 cash; terms to suit purchaser for balance. Address for further particulars Box 74, Grifton, N. C.

FOR SALE.

First class power shop. Six-room dwelling in good shape. Plenty of work. Going West on account of health. Price right. Address for full particulars R. E. Keene, Wilsey, Kansas.

A BLACKSMITH WANTED.

One who can do general repairing and horseshoeing. Would rather have a married man. Steady work. Will rent or sell to right man. Address for particulars, J. H. Kruse, Sabula, Iowa.

FOR SALE.

Blacksmith shop, tools and materials. New five-room house. Good territory. Only shop in town. For particulars address M. Larsen, Voorhies, Iowa.

FOR SALE AT A BARGAIN.

One Barnes Power Drill, one 16 horse power gasoline engine same as new. Address for particulars H. M. LOWERY, Summit, Ga.

FOR SALE OR RENT.

Shop 20x46. All tools $1,200. Town of 900 inhabitants. An all around shop. Two stores. Write for particulars to A. K. PRIBBENOW, Poynette, Wis.

WANTED.

An all around blacksmith. Must be good on horseshoeing. Good wages. Must be a sober man. Address W. F. RADICHEL, Hortonville, Wis.

FOR SALE.

Blacksmith's shop. One of the best locations in Northwestern Ohio. For further information write to J. A. REES, Risingsun, Ohio.

AUTOMOBILE REPAIRS.

Blacksmiths who own automobiles or repair automobiles in their shops should subscribe for the "Automobile Dealer and Repairer," a handsomely illustrated monthly magazine of 100 pages devoted exclusively to automobile repairs. The only magazine of the kind in the world. The "Trouble Department" with five pages of numbered questions each month from car owners and repair men, which are answered by experts on gasoline engine repairs, is worth many times the subscription price, which is $1 per year, or 15 cents per copy. Postal cards will not be answered. CHARLES D. SHERMAN, 52 Windsor Avenue, Hartford, Conn.

FOR SALE.

Blacksmith shop equipped with power. All tools necessary. House and half acre of ground. A bargain to the right party. For particulars and price call on or address M. A. CAMPBELL, R. R. 8, Box 28, Clay Center, Kansas.

FOR EXCHANGE.

A fine modern residence, good shop, fine machine tools. Want to retire to a well improved little farm. The Southwest preferred. Would keep tools if preferred. Dwelling property cost $5,800 three years ago clear. What have you to match it? C. A. ZANDER, Littleton, Ill.

POWER

In this department an expert will reply to any questions our readers may propound as the result of their experience, or inspired by a desire to become acquainted with the value of power in the shop. All inquiries should be addressed to the Editor of THE BLACKSMITH AND WHEELWRIGHT, P. O. Box 654, New York City.

KEEP THE POWER AT WORK.

The Profit in Gasoline Engines Is Made from Constantly Using Them.

From A. A. Andrews, Ohio.—Men who are accustomed to supervise large numbers of men know that it is necessary for them to keep their men at work continuously and to have the men do the work rather than to do it for them. There is many a young foreman on trial who "falls down" at his first job of supervision because he wants to do too much of the work himself instead of letting his men do it.

Now this same condition often exists when machinery is first introduced into a shop or factory. Not only the foremen or owners, but the men, too, have been accustomed to do things by hand and they quite naturally keep on doing it that way. Indeed to use machinery often does require a little training in order to get as good or better results than from hand work.

The writer was recently in a blacksmith shop in Wyoming, and it was a nice shop, too, and the owner had a gasoline engine. He had had it about a year, and as his shop was located alongside of his house, it happened that the engine was standing in his yard when I arrived. He had it belted to a pump gear which was supposed to operate a house and garden pump by passing a bolt through a connection from the pump gear to the pump handle. However, he had been having a little trouble in starting the engine, so that they had disconnected the pump handle and did the pumping by hand.

Now, think of that. A presumably good engine standing idle day after day, his wife pumping the water by hand, and all of the machines in the blacksmith shop standing idle!

Inquiry as to why the engine did not start availed nothing, but it took the writer about three minutes to start the engine. The only trouble was that when starting this make of engine you are supposed to close a slide that operates in the air intake pipe. This shuts off a part of the air and, at the slow speed at which one is able to turn the engine over when starting, creates a greater suction of air and a greater suction upon the gasoline feed, thereby ensuring a better mixture in the cylinder for the first two or three charges. As soon the engine "takes up," or fires regularly, you must open the slide again because at the higher speed the engine will need more air. Then, too, the closed slide gives a slightly richer mixture, which is what you wish when the engine is cold, but when it warms up you want a little less gasoline.

Now the instruction book for this engine was in the battery box, but unread. And it said to close this air slide so it would be open but one-quarter of an inch. And my friend, the blacksmith, when he set it, left the slide open more than half an inch. Just that much difference kept the engine from starting easily and indirectly kept the blacksmith from using the engine in his shop.

There was a drill press in that blacksmith shop, too, but there was no sign of hooking this drill up to the engine. Would you believe it, they actually were turning that drill by hand? And a perfectly good engine standing right outside the door.

Well, I spent four days around that place and before I left I was nearly sick because of the things I could see they had done by hand with a right good engine alongside of them and fairly aching to be of help.

One day I was about four miles from the blacksmith shop on a ranch. The owner was showing me around and among other things he showed me a set of skids or sleds fitted under a wagon body. These sleds had been made last winter. They had taken a number of logs, shaped them roughly for runners and had bound the bottom surfaces with iron, which was bent up in front and brought back over the front ends of the logs. There were three or four holes in each of the four runners, and spikes put through these fastened the runner and beams together. Then there were quite ingenious ways of fastening all four together so that they could not get loose and yet would stand the terrific bouncing and jarring that they had had to sustain while going over rough country with a light snow and heavy loads. Practically all of the ironwork was made out of odds and ends that they happened to have around. All the holes had been made after the pieces were shaped. They told me that four men had worked all day and until midnight last winter to make that sled. And the blacksmith and his helper were two of the men. The engine standing by their side was helpless and—I imagine—almost bursting from the cold weather and its desire to help on that job. I am quite sure that the two men and the engine could have done that job in four hours easily. Of course they would have had to have the engine hooked up to the machinery, but in that blacksmith shop I remembered seeing, besides the drill press, a circular saw and almost everything necessary for such a job.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, ETC., OF THE BLACKSMITH AND WHEELWRIGHT.

Published Monthly, at 71 Murray Street, New York City.

Required by the Act of August 24, 1912.

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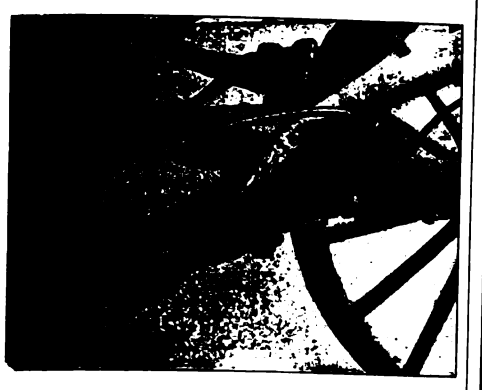
Known bondholders, mortgagees and other security holders, holding 1 per cent or more of total amount of bonds, mortgages or other securities: No bondholders, mortgagees or other security holders.

M. T. RICHARDSON COMPANY,
M. T. RICHARDSON, President.

Sworn to and subscribed before me this 23d day of September, 1913.
[L. s.] (Signed) W. H. ROSE,
Notary Public, No. 68.
(My commission expires March 30th, 1915.)

Rouston's Non-Breakable Hold Fast Shaft Springs.

We present herewith two illustrations showing the shape of these springs and the manner of adjustment. They make a perfect anti-rattler by bearing lightly on the top of the shaft eye, the main



pressure being on the coupling ears which are stationary and vary in distance from bottom of the axle. They have adjusting sleeves to take up the space between the spring bars and the bottom of the axle, thereby placing the coil in the right position to give the proper tension.

Every man who has a spring wagon ought to invest in these shaft springs to save his horse's back. For further particulars concerning these springs write to the Cleveland Shaft Spring Co., 2232 E. 90th Street, Cleveland, Ohio.

Taps and Dies.—The Armstrong Manufacturing Company of Bridgeport, Conn., have added A. L. A. M. dies and taps to their line. These dies will fit their regular No. 1 and No. 2 genuine Armstrong stocks. Dealers will find it to their advantage to stock these goods as there is a growing demand for them; not only by garages but by mechanics who repair their machines.

20th Century Shafts.—These are made by the Pioneer Pole and Shaft Company of Piqua, Ohio, and will be found illustrated and described in their new announcement in this issue. They are constructed solely of the best quality and design of drop forgings and steel stampings and the best quality of hickory timber which can be obtained. But consult their advertisement and write for catalogue and price list to-day while you are thinking about it.

Carriage and Wagon Hardware.—The Eberhard Mfg. Company of Cleveland, Ohio, has enjoyed for a very long time the reputation of making carriage and wagon hardware that is at all times dependable and satisfactory. Some of their products will be found illustrated and described in their full-page advertisement in this issue. Of course these are only a few of the great variety of things they manufacture. Remember that the trade mark of this company is an "E" in a circle, and when you buy carriage and wagon hardware look for this trade mark.

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FORGECRAFT. By Charles Philip Crowe of the Ohio State University. Published by R. G. Adams & Co., Columbus, O. This is a valuable work on the specific subject covered by the title. It is intended for the student and the apprentice as well as for the man who works at the forge. Part I treats of tools and materials with instruction for using them to make certain shapes and dimensions. Part II treats of welding wrought iron and steel, with instructions for preserving the strength of the metal. Part III covers the treatment of steel with instructions for making types of tools that are in common use. The book is unusually well illustrated; that is to say, the illustrations are largely taken from photographs showing the work being done, thus being object lessons next in value to going into a shop and watching the smith as he does the work. There are also line cuts, and the text is clearly expressed and so arranged that the reader is able to get the information he seeks without much trouble or delay in turning over leaves. It is substantially bound, well printed and the paper is supersized and calendered.

Harvey Bolster Springs. — These springs are a great saving and comfort on a farm wagon. This company also manufactures automobile, wagon and carriage springs which are guaranteed. Write for catalogue to the Harvey Spring & Forging Co., Box 101, Racine, Wis., from which you will get full particulars.

Absorbine.—The testimony in favor of Absorbine by those who have used it is too strong to be disregarded. Every man who tries this preparation on a horse becomes enthusiastic as to its merits. W. Austin Cope, of Jerseyville, Ill., had a mare with an enlarged hock the size of one's two fists. It was caused by a bruise. After doctoring some weeks with a veterinary and getting no satisfactory results, he concluded to try Absorbine. In less than a week the lameness was gone and the hock was entirely cured, so Mr. Cope says. He used hot water and woolen cloths for steaming the hock once a day and rubbed Absorbine in thoroughly three times a day.

Stands Every Test.

Gentlemen:—I have tested your Corona Wool Fat thoroughly and find it to be all and even more than you claim for it. I have acted as your agent for the past five or six years and always tell each customer that he can have his money back if he is not satisfied, and have never had anyone to call for his money yet. It is with pleasure that I recommend your remedies. Yours very truly,

D. M. PAXSON,
Redkey, Ind.

Wonderful CURES

MADE WITH CORONA WOOL FAT

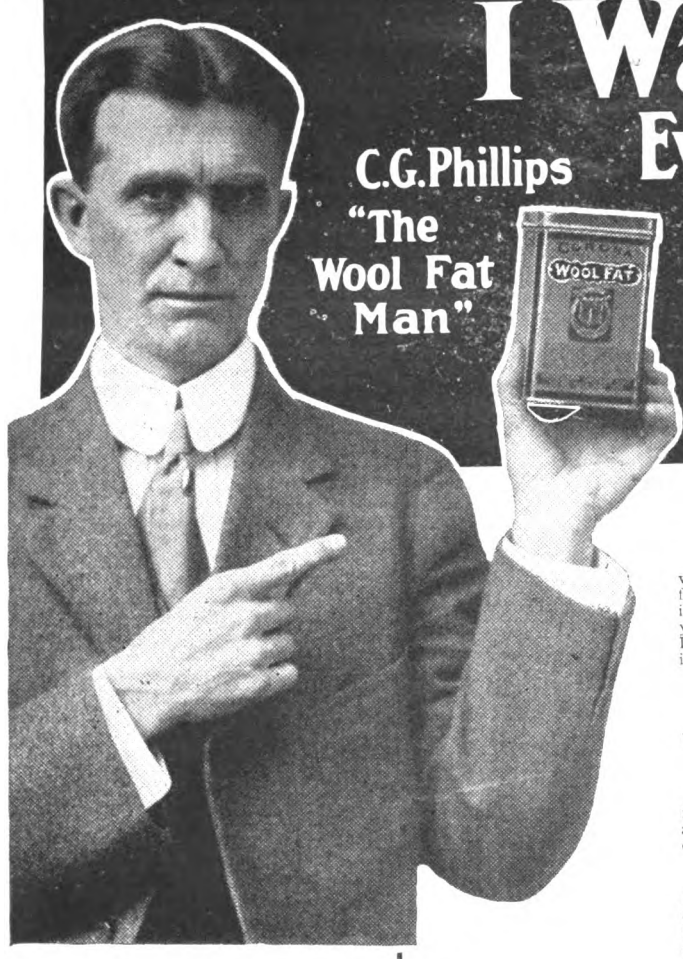
Most astonishing results are being obtained in treating such cases as Cracked Hoofs, Wire Cuts, Collar Boils, Scratches, Sore Shoulders, etc., by thousands of farmers, horse owners, and blacksmiths in all parts of the country. We get scores of letters every day proving that Corona Wool Fat is a wonderful remedy. Big packing companies buy Corona Wool Fat by the barrel to keep their draft horses' feet and hoofs in condition for every day work. Blacksmiths and horse shoers are selling Corona Wool Fat like hot cakes.

CORONA WOOL FAT

is unlike any other healing remedy you ever heard of or used. It contains no grease or oil—nothing but the fatty secretions of the wool of the sheep. It does not burn—causes no pain— will not blister—

Heals Without Leaving a Scar.

Corona Wool Fat is the most surprising remedy you ever used, and will actually grow a new hoof on animals suffering from quarter cracks or any other hoof injury.



C.G.Phillips "The Wool Fat Man"

I Want To Send Every Blacksmith and Horse Shoer This Big Can of CORONA WOOL FAT

On 20 Days' FREE TRIAL

Just mail me the coupon below with your name and address—a post card will answer the same purpose—and I will send you a big can of Corona Wool Fat for you to try on any case that comes into your shop. If it does not prove satisfactory—simply return the can cover and I will not charge you a penny. If you are satisfied, then you can send me 50c. for the large can I have sent you. I take all the chances—give you an opportunity to test the greatest of all healing remedies for sores, sore and tender hoofs, cuts or wounds.

YOU CAN BE MY AGENT

Hundreds of Blacksmiths and Horse Shoers are making money selling Corona Wool Fat to their patrons.

HERE'S THE PROOF

Dear Sirs:—Enclosed find draft for $24.50 for 2 dozen 2 pound cans Corona Wool Fat and 3 dozen 12 ounce tins. Please rush the order as I have several calls.

PEARL CARROLL, Pana, Ills.

Dear Sirs:—Please find enclosed check for $63.60 in full of account. Everybody that buys Corona Wool Fat from me seems highly satisfied and they tell me it does the work better than anything they ever used. WM. S. KING, Danville, Ills.

Dear Sirs:—Find enclosed, check for 3 dozen 12 ounce tins and 1 dozen 2 pound cans Corona Wool Fat. I have given Corona Wool Fat a good trial and it is great; am selling it fast. Have cured a case of scratches and sore shoulders and am well satisfied with it.

M. R. HESS, Blacksmith,
Van Buren, Ohio.

Many cases of scratches and grease heel have been nipped in the bud because the horseshoer called attention to the condition and applied Corona Wool Fat. After you have sent for a trial can, as per this offer, and it has demonstrated its merits and efficiency, you will want to become an agent and sell Corona Wool Fat to your customers. This you can do through your Jobber or by writing us direct.

The following Heavy Hardware Stores have already placed large orders for the Spring of 1914. Each has a special proposition to make to you:

Shadbolt & Boyd Iron Co.....Milwaukee, Wisc.	Sligo Iron Store Co.....St. Louis, Mo.
Nichols, Dean & Gregg.....St. Paul, Minn.	Bonnlwell-Calvin Iron Co.....Kansas City, Mo.
E. D. Kimball & Co.....Chicago, Ills.	Robison Heavy Hardware Co.....St. Joseph, Mo.
Mossman, Yarnelle & Co.....Fort Wayne, Ind.	Baum Iron Co.....Omaha, Nebr.
Morley Bros.....Saginaw, Mich.	Omaha Heavy Hardware Co.....Omaha, Nebr.
Beard, Campbell & Co.....Port Huron, Mich.	The Des Moines Iron Co.....Des Moines, Iowa.
Jones Hardware Co.....Richmond, Ind.	Sieg Iron Co.....Davenport, Iowa.
McLean & McGinnis.....Pittsburgh, Pa.	W. J. Holliday & Co.....Indianapolis, Ind.
Love, Montgomery & Co.....Pittsburgh, Pa.	Orr Iron Co.....Evansville, Ind.
Lyle Bros.....Pittsburgh, Pa.	Fulton, Conway & Co.....Louisville, Ky.
Miller & Stein.....Wheeling, W. Va.	E. Scott Payne Co.....Baltimore, Md.
Beck & Corbitt Iron Co.....St. Louis, Mo.	Heavy Hardware Co.....Toledo, Ohio.
Minneapolis Iron Store Co.....Minneapolis, Minn.	

WRITE ME TODAY.
Try Corona Wool Fat yourself. Watch results—then send me your order.

C. G. PHILLIPS,
"THE WOOL FAT MAN," Mgr.

THE CORONA MANUFACTURING CO.
90 Corona Block, KENTON, OHIO

WIRE CUTS

SORE SHOULDERS

COLLAR BOILS

IT WILL CURE

Hard and contracted Feet, Mud Fever, Split Hoofs, Corns, Grease Heel, Thrush, Quarter Crack, Cuts, Barb Wire Wounds, Sore Teats of Cows, Ulcer, etc. OUR GUARANTEE IS ON THE LID OF EVERY CAN.

I have sent out over 100,000 cans in the past 8 months, and now have more than that number of satisfied customers. You need it, I have it for you and you can try it out on the "before you pay" plan. Now, all I ask is a fair, square trial on its merits.

C. G. PHILLIPS.

20 Days' Free Trial Coupon

CORONA MFG. CO.
90 Corona Blk., Kenton, Ohio

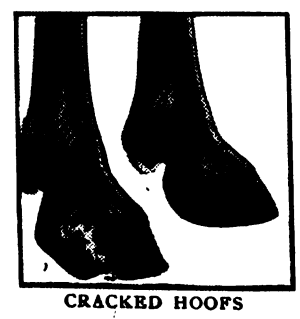
Gentlemen:—Please send me the trial can of your Corona Wool Fat. It is understood that I am to use this for 20 days in accordance with directions, and if I am satisfied with the results I will send you 50 cents to pay for it. If it does not do as you claim I will owe you nothing

Name.....

P. O.....R.F.D.....

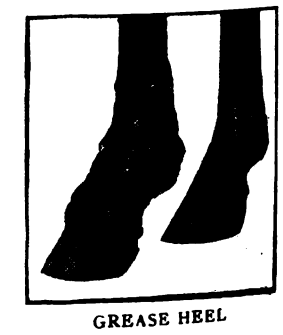
County..... State.....

SORE TEATS



CRACKED HOOFS

SCRATCHES



GREASE HEEL

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.

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 principles 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 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.....C. B. Schultz 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
Pittsburg, Pa.....McLean & McGinness	Wilmington, Del.....Delaware Hardware Co.
Portland, Oregon.....J. E. Haseltine & Co.	Bridgeport, Conn.....Chapman & Bangs Co.
Ft. Wayne, Ind.....Messman, Yarnelle & Co.	San Antonio, Texas...Heusinger Hardware Co.
New Orleans, La.....Jos. Schwartz Co.	

SHELDON

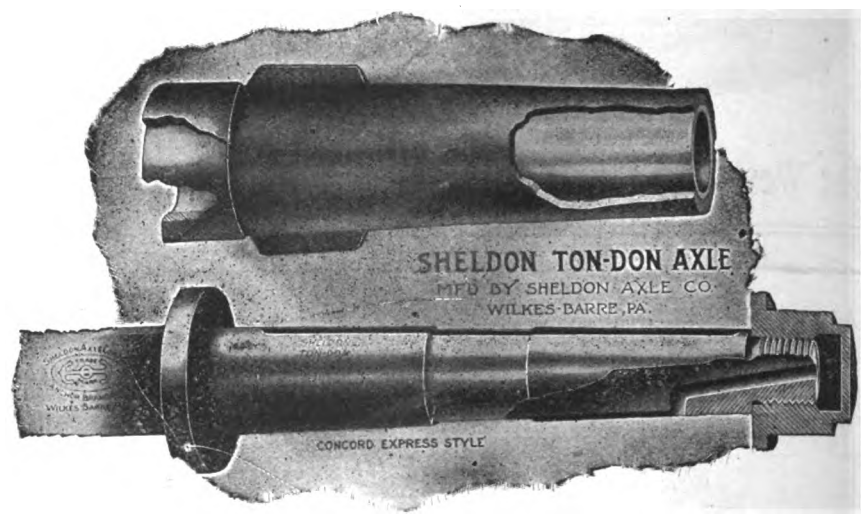
"TON-DON"

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 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.

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

ROLLING MILLS AND FACTORIES } JOLIET, ILL. POUGHKEEPSIE, N.Y.

CHICAGO, ILL.

No. 400 BLOWER with its Whirlwind Tuyere has no Equal or Comparison.

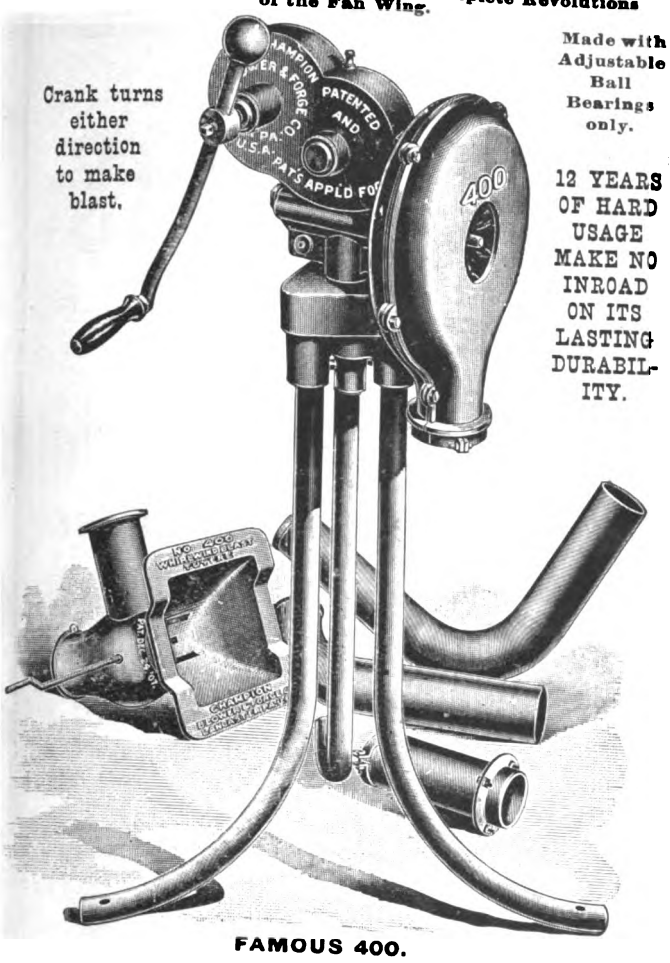
Endorsed by over 600,000 happy users as the Blower that has Multiplied Profits and reduced hard labor to its minimum.

Each turn of the Crank produces 46 Complete Revolutions of the Fan Wing.

Crank turns either direction to make blast.

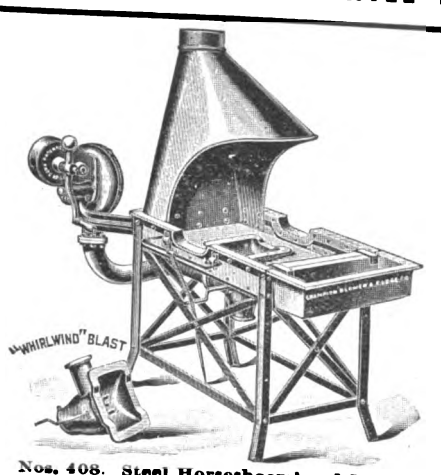
Made with Adjustable Ball Bearings only.

12 YEARS OF HARD USAGE MAKE NO INROAD ON ITS LASTING DURABILITY.

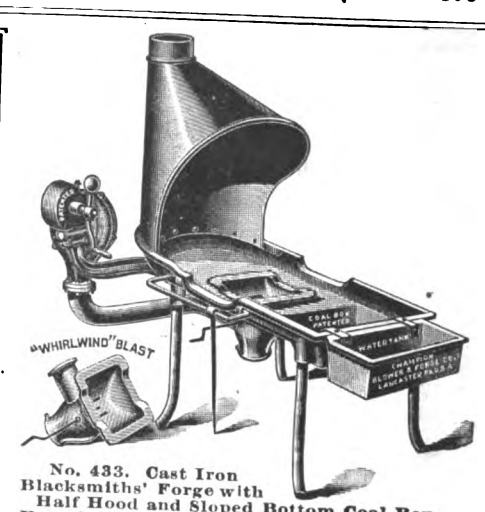


FAMOUS 400.

THE 400 CHAMPION



Nos. 408. Steel Horseshoers' and Blacksmiths' Forge with Half Hood. Hearth 30 x 36 in. Fan 12 in. in diameter.

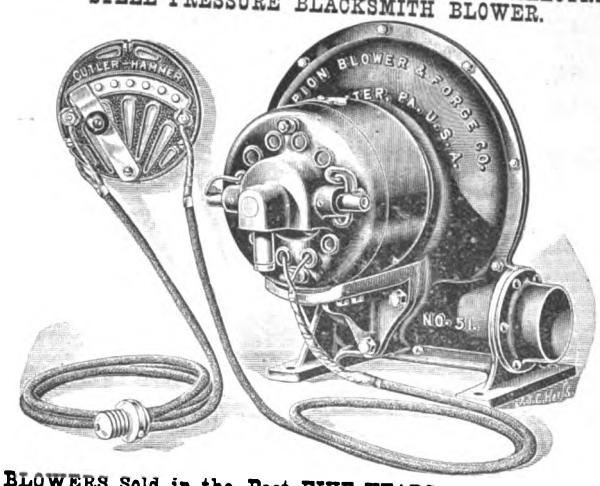


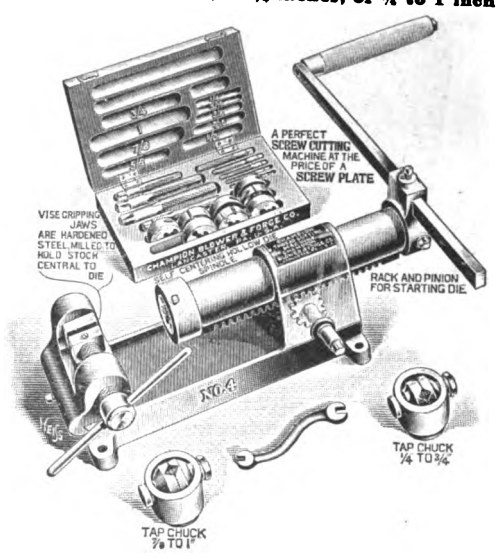
No. 433. Cast Iron Blacksmiths' Forge with Half Hood and Sloped Bottom Coal Box. Hearth 32 x 45 in. Fan 12 in. in diameter.

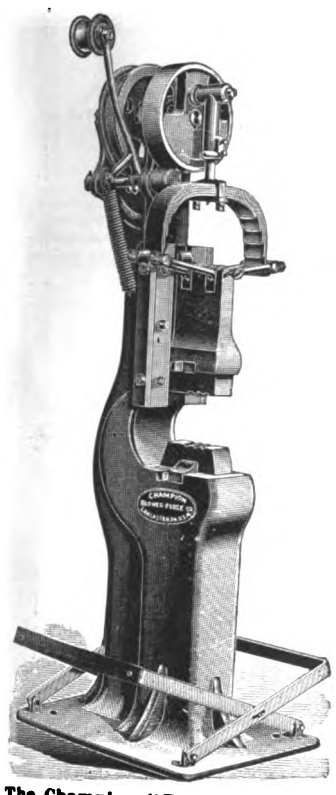
CHAMPION THREAD CUTTING MACHINE.

Made in two sizes. ¼ to ¾ inches, or ¼ to 1 inch

THE CHAMPION ONE FIRE VARIABLE SPEED ELECTRIC STEEL PRESSURE BLACKSMITH BLOWER.



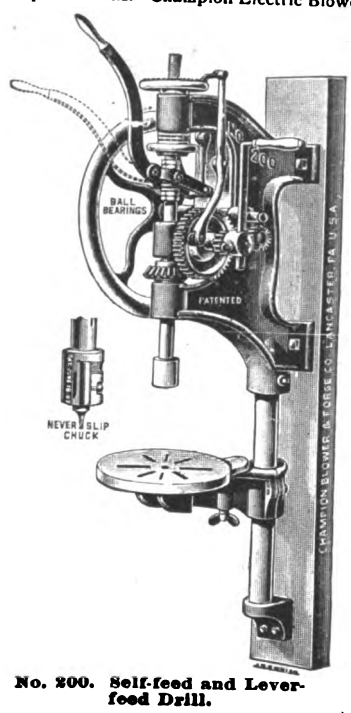




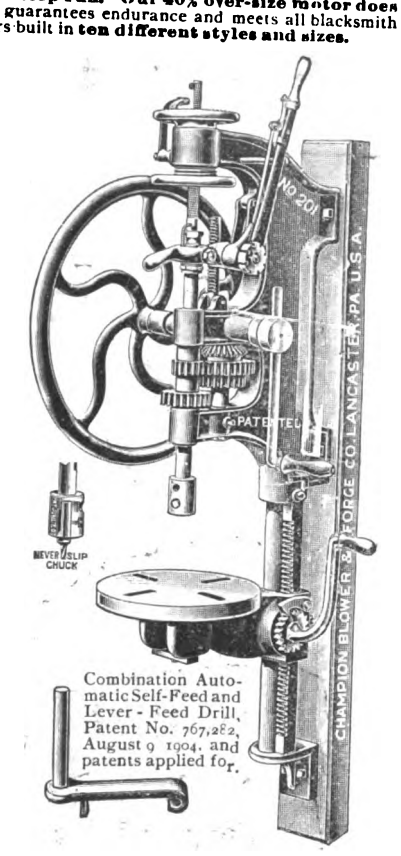
The Champion "Patented" Power Hammer. Weight of Ram 65 pounds.

30,000 CHAMPION ELECTRIC BLOWERS Sold in the Past FIVE YEARS.

Champion Electric Blacksmith Blowers are all tested before leaving our works with a continuous **ten hour, highest speed, non-stop run. Our 40% over-size motor does this with ease,** prevents all over-heating, guarantees endurance and meets all blacksmith shop conditions. Champion Electric Blowers built in **ten different styles and sizes.**



No. 200. Self-feed and Lever-feed Drill.



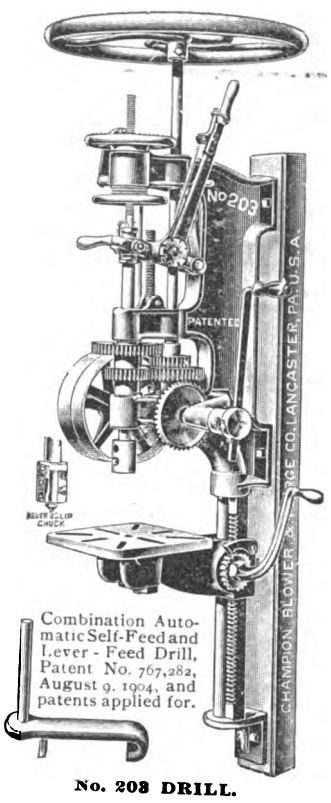
Combination Automatic Self-Feed and Lever-Feed Drill, Patent No. 767,282, August 9 1904, and patents applied for.

No. 201 DRILL.

THE CHAMPION LATEST INVENTION!

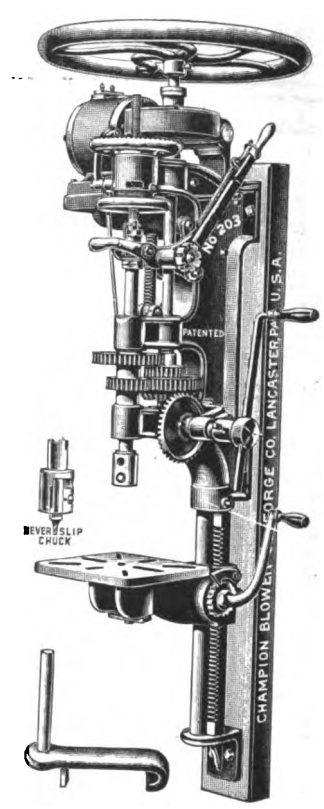
Observe the Double Compound Lever-Feed.

On the **Champion "Patented" Automatic Self-Feed and Double Compound Lever-Feed Upright Post Drills.** Made with Cut Gears and Ball Bearings.



Combination Automatic Self-Feed and Lever-Feed Drill, Patent No. 767,282, August 9. 1904, and patents applied for.

No. 203 DRILL.



The Double Compound Lever-Feed produces 80 per cent more pressure or drills holes 80 per cent larger, with the same labor, than any other Lever-Feed Drill.

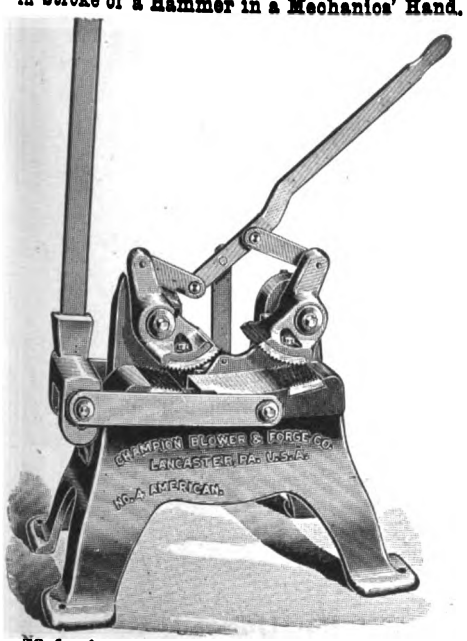
Remember

There is no TURNING BACK of the FEED SCREW NUT WITH EITHER FEED.

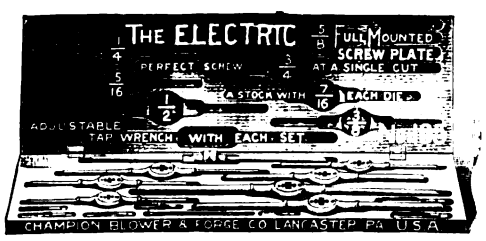
No. 203 Champion Combination Automatic Self-Feed and Double Compound Lever-Feed ELECTRICALLY DRIVEN Upright Post Drills.

This Drill has the motor direct connected to the upright back gear shaft, which represents what we consider a perfect up-to-date Electric Drill and one that is worthy of most careful consideration from the up-to-date mechanic. It represents simplicity, durability, and no loss of power.

THE POWER HAMMER With the Flexibility in Stroke of a Hammer in a Mechanics' Hand.



No. 4. American Tire and Axle Shrinker.
Will shrink up to 4 x 1 inches round edge tire, and axles up to 1¼ inches.



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THE

BLACKSMITH AND WHEELWRIGHT

Vol. LXVIII. No. 6. NEW YORK, DECEMBER, 1918. TERMS: ONE DOLLAR A YEAR

EASY LOADING TRUCKS.

New Design with Full Specifications for Construction of a Useful Vehicle.

BY WAGON MAKER.

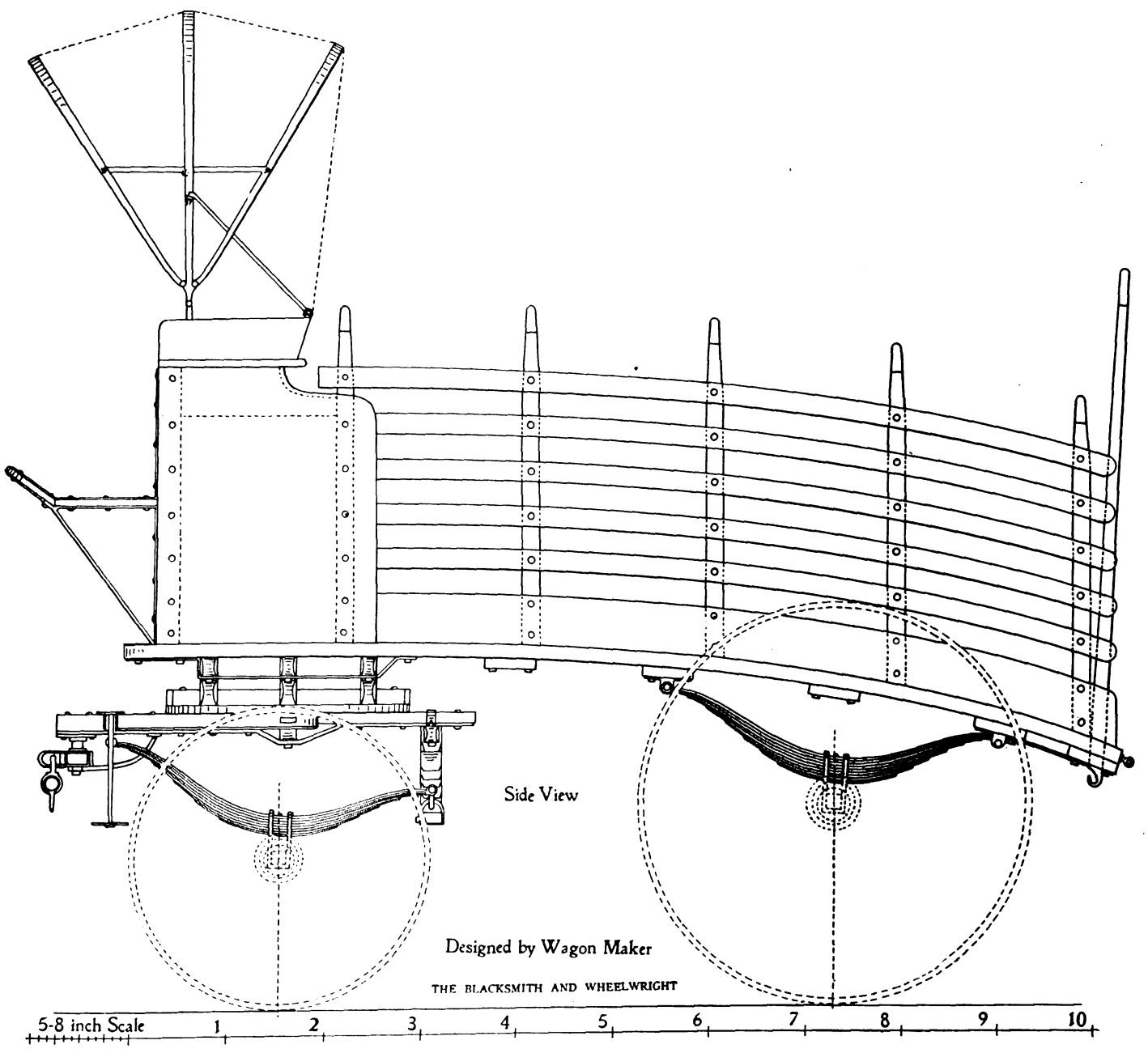
The loading of the curved trucks is always from the rear end, and the curving is done to facilitate the loading. For instance, the general height of a truck is about 45 inches from the ground, and the loading of heavy boxes is thus most difficult. The usual practice is to have two or three stakes resting on an iron rail on the rear end on which the boxes are slid up or down. The curved truck is but 31 inches high, or 14 inches lower than an ordinary truck, which is considerable. The three stakes in the rear are made to shift, having a hook on the lower end to hook in the iron rail, and of the same slant as the rear platform. Some of the stakes are shown on the side view.

The length of the truck from front part to rear end is 10 feet 5 inches, and its width across is 54 inches on the sills; between the posts 49 inches. Width across the front board below the seat 39½ inches, across the seat on top 42 inches and the three bows the same width on the outside. The size of the bows is 1x1½ inches, and the height of bows from top of the seat board to the outside of the center bow is 3 feet 7 inches, or 3 feet 6 inches on under surface of the center bow. The length of the top is 39 inches. These tops have two top joints to spread the bows apart. There are two stays to hold the top in position when up. These tops can be folded together and dropped parallel with the seat.

Construction of the Body.

The length of this style of bodies is from 9 to 12 feet, and from 4 feet to 4 feet and 6 inches wide across. Some are 2 inches wider, or 4 feet 8 inches. The size of sills is from 1⅜ to 1⅞ inches thick, and from 4 to 6 inches wide. The practice in the construction of such trucks has been to use two side sills only, with cross bars, mortised into the sills ⅝ or ¾ inch below the top surface of the sills for the thickness of the bottom boards.

Trucks in daily use which are sometimes overloaded have shown considerable weakness, and the result was that they sagged in the center of the platform. To prevent this the construction has been changed so that the structure will carry twice the amount of load without sagging. For heavy trucks the side sills are made 1¾x6 inches. By making it 6 inches wide, the rear side loops can be bolted directly to the sills. Another sill 1¾x4 inches is in the center. On each side of the center sill and on each side of the inside surface of the side sill is screwed an iron or steel plate ⅜x1¾ inches. Each end cross bar is mortised into the side sills, and the center sill is mortised into the cross bars. Besides the end cross bars there are six others. First is the rear transom bar, which is notched in so that the bottom boards rest directly on it. Besides the transom bar are five others, all the same thickness, width and length. These cross-bars are bolted directly under the sills, and the empty spaces between the cross bars and bottom boards are filled up with extra pieces. Lack of cross bar tenons will weaken the side sills. When the rear end cross bar is mortised into the sills it weakens the construction. The new way is to use another cross bar, 1½x6 inches. The sagging is entirely prevented by the use of the extra center sill and four edge plates. The three are bent to shape after they have been dressed and mortises made for the stakes.



Bending of the Sills.

The sills are dressed straight and square on both edges. The stake mortises must be made on the slant so that when the sills are bent the mortises must be in a vertical direction. This is done by marking the curve on a board on which the lower edge of the board is horizontal and the curve in the right position, the same as drawn on the side view, with stakes drawn in a vertical direction.

To bend the sills two trestles of equal height and 56 inches long are put about 48 inches apart, on which the front part of the sills is placed after they have been mortised together, including the center sill. Put a piece 2x4 inches on top and across the sills; put two posts on top of the piece 2x4 inches, reaching up to the ceiling. Put another trestle somewhat lower than the other two in the middle of the sills.

Now force the rear end down to the curve of the pattern. If it has not the right curve in the center, the trestle may have to be raised or lowered. The four edge plates are all curved same as the patterns, the holes drilled and screwed to the sills while in that strained position, but when all the four plates are fastened to the sills they will spring back some, and will stay in that position. Some wagon makers prefer to steam the rear ends of the sills and bend them as explained above.

The lower curved side boards are sawed to shape, but the rails are steamed and bent to shape directly over the edges of the side boards one after the other. This saves timber, avoids cross grain and, in fact, saves time, as the bending is quickly done.

The front part of the body on the sides is covered with signboards, which are ¾ inches thick and bolted on through the posts. Across the

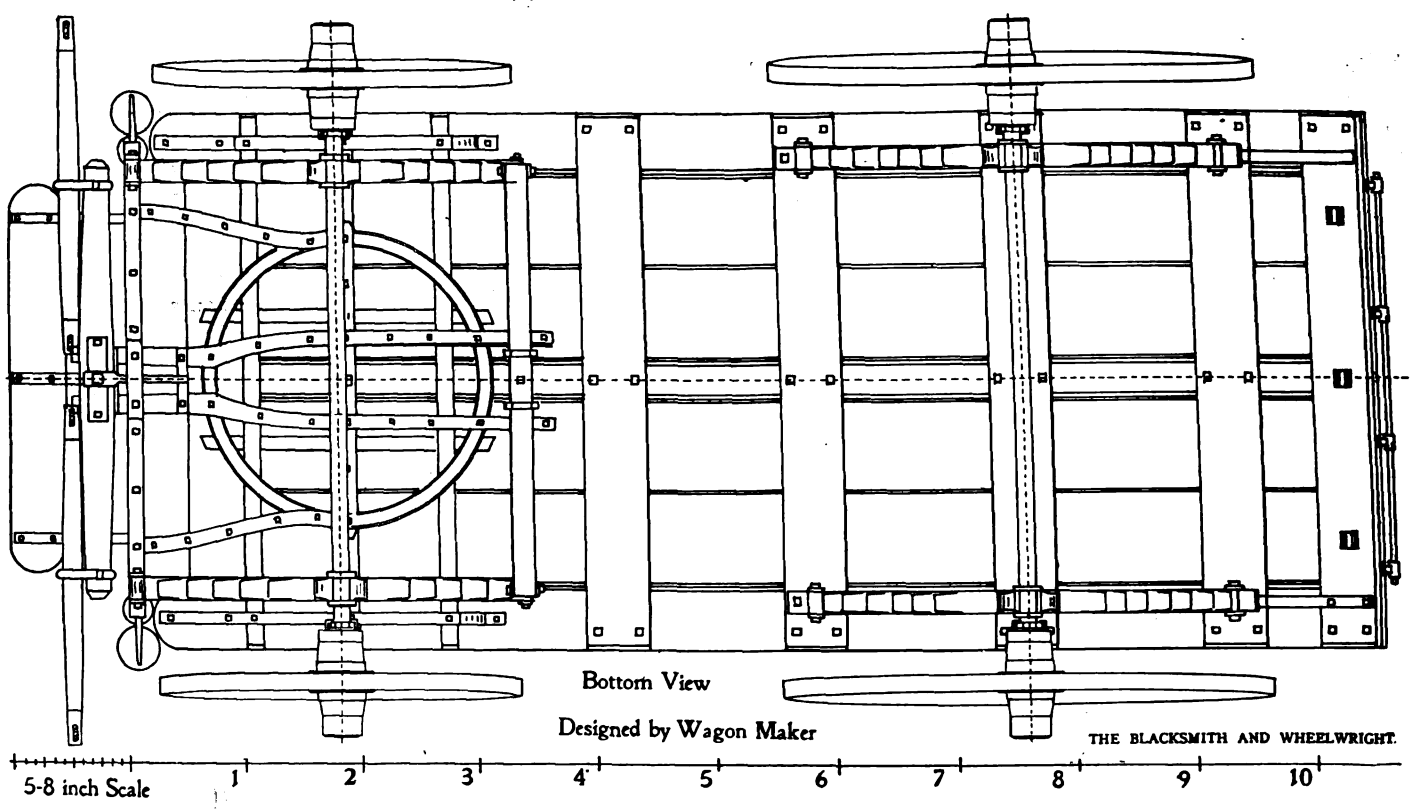
front a ¾-inch thick board is also bolted to the posts, also all the rails.

The Dimensions for a Heavy Truck.

Warner wheels, front:
Diameter of wheels without tires, 36 inches.
Inside diameter of metallic hub bands, 6¼ inches.
Length of hubs, 9 inches.
Size of spokes at square ends, 1⅞x1⅛ inches.
Thickness and depth of rims, 1¾x2⅛ inches.
Width of tread, 1⅝ inches.
Number of spokes for each wheel, 14.
Thickness and width of round edge tires, ⅝x1⅝ inches.
Thickness and width of round edge tires, 11-16x 1¾ inches.

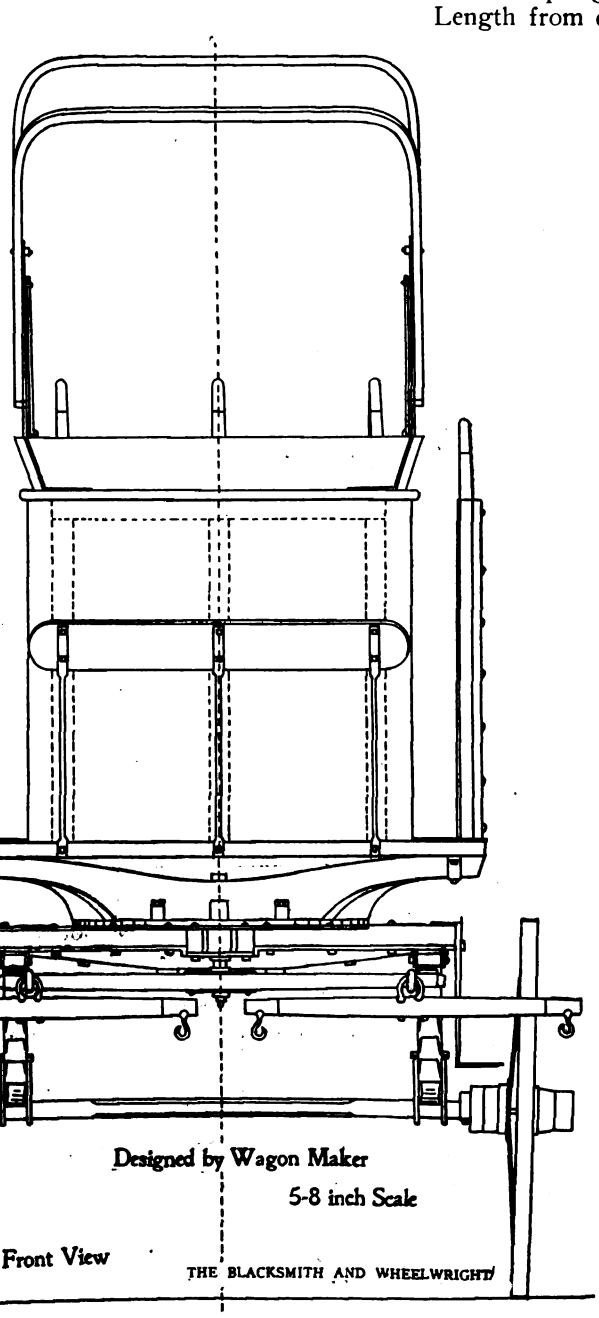
Wagon platform springs, front:
Length from centers of bolts, 40 inches.
Difference in length front and rear end, 2 inches.
Amount of curve from centers of bolts to outside, 8¾ inches.
Width of plates, 2¼ inches.
Number of plates, 7.
Thickness of plates, Nos. 2 and 3.
Clipped to axle.

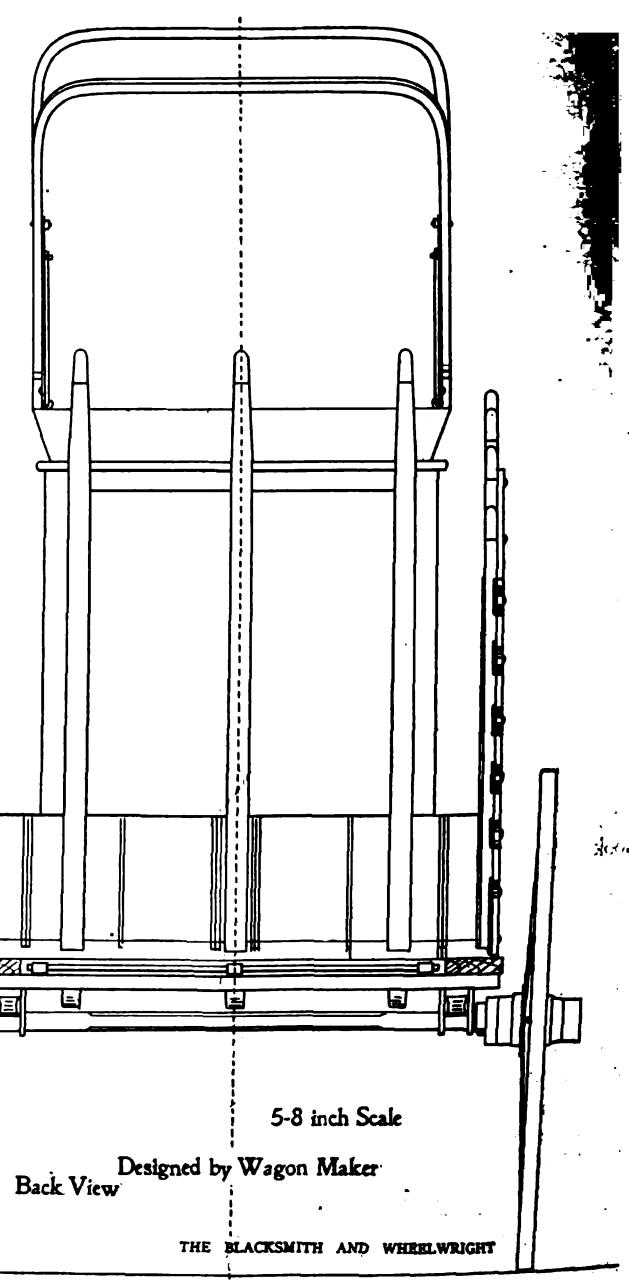
Cross spring, front:
Length from centers of bolts, 42 inches.
Thickness of plates, No. 2.
Clipped to axle.
Size of axles at square ends, 1¾x1⅞ inches.
Width of track outside, 62 inches.



Dimensions for a Medium Size Truck.

Warner wheels, front:
Diameter of wheels without tires, 36 inches.
Inside diameter of metallic hub bands, 5¾ inches.
Length of hubs, 8½ inches.
Size of spokes at square ends, 1 1-16x1¾ inches.
Thickness and depth of rims, 1⅝x2 inches.
Width of tread, 1½ inches.
Number of spokes for each wheel, 14.





Warner wheels, back:
Diameter of wheels without tires, 48 inches.
Inside diameter of metallic hub bands, 7½ inches.
Length of hubs, 10 inches.
Size of spokes at square ends, 2x1 3-16 inches.
Thickness and depth of rims, 2x2⅜ inches.
Width of tread, 1¾ inches.
Number of spokes for each wheel, 16.
Number of plates, 8.
Clipped to head block.
The rest same as side springs.

Side springs, back:
Length over all, 45 inches.
Open out to out, 9 inches.
Width of plates, 2½ inches.
Number of plates, 9.
Thickness and width for round edge tires, ½x 1½inches.

Warner wheels, back:
Diameter of wheels without tires, 48 inches.
Inside diameter of metallic hub bands, 6¼ inches.
Length of hubs, 9 inches.
Size of spokes at square ends, 1⅞x1⅛ inches.

Thickness and depth of rims, 1¾x2⅛ inches.
Width of tread, 1⅝ inches.
Number of spokes for each wheel, 16.
Thickness and width of round edge tires, ⅝ x1⅝ inches.
Wagon platform springs, front:
Length from centers of bolts, 39 inches.
Difference in length front and rear end, 2 inches.
Amount of curve from centers of bolts to outside, 8 inches.
Width of plates, 2⅛ inches.
Number of plates, 6.
Thickness of plates, Nos. 2 and 3.
Clipped to axle.
Cross spring same as side springs.
Side springs, back:
Length over all, 42 inches.
Open out to out, 8 inches.
Width of plates, 2¼ inches.
Number of plates, 7.
Thickness of plates, No. 2.
Clipped to axle.
Size of axle at square ends, 1⅝x1¾ inches.
Width of truck outside, 62 inches.
Width of platform, 52 inches.

A FEW EPITAPHS.

Quaint, Curious But Actual Inscriptions Over Some Old Graves.

From C. Edgar Thomas, London, N.—The study of epitaphs is a most fascinating and absorbing one, and one that is as instructive and interesting as it is fascinating. A desire to perpetuate the memory of the departed being peculiar to all mankind, the practice of placing inscriptions over their graves has found favor among all peoples in all ages. Again, probably no form of literary composition, whether in prose or verse, is more difficult to execute effectively than a really good epitaph, while seeing that so much has to be concentrated into a comparatively small space, it is perfectly obvious that the epitaph writer requires the very essence of literary acumen.

Blacksmithing and the kindred trades have ever lent themselves admirably to the epitaph writers' art, while the many quaint, curious, analogous and epigrammatic inscriptions that have been composed on their followers have contributed in no small measure to the best of graveyard literature. John Cruker, a bellows-maker, has thus been commemorated at Oxford:

Here lieth John Cruker, a Maker of Bellows,
His Crafts-master & King of Good Fellows;
Yet when he came to the Houre of his Death
He that made Bellows could not make Breath.

Another bellows-maker, and incidentally also "a king of good fellows," bears this epitaph over his grave in the old church of All Saints, Newcastle-on-Tyne:

Here lies Robert Wallas,
The King of Good Fellows,
Clerk of All-Hallows,
And Maker of Bellows.

A tinplate worker, one Humphrey Jones, has thus been immortalized at Ockham, Surrey. The inscription dates from 1737:

Underneath this stone doth lye
The bodye of Mr. Humpherie
Jones, who was of late
By trade a plate
Worker in Barbicanne;
Well known to be a good manne
By all his friends and neighbours too
And paid every bodye their due
He died in the year 1737
August the 10th aged 80;
His soul's we hope in heaven.

The following lines were written on Hobson, a coach and carriage builder:

Here lies old Hobson; death has broke his girt,
And here! alas, has laid him in the dirt;
Or else the ways being foul, twenty to one,
He's here stuck in a slough and overthrown:
'Twas such a shifter, that, if truth were known,
Death was half glad when he had got him down;
For he had any time these ten years full,
Dodged with him betwixt Cambridge and the Bull;
And surely Death could never have prevailed,
Had not his weekly course of carriage failed.
But lately finding him so long at home,
And thinking now his journey's end was come,

(Continued on Page 915)

A NEW HORSE CHAMPION.

Spirited Defense by the National Association Allied Horse Interests.

From George H. Webb, Secretary Commissioner.—What does the N. A. A. H. I. mean? It means a whole lot, the National Association Allied Horse Interests, for it embraces a field of sport and industry, which has been given so little publicity during the past ten years that it is an almost forgotten fact in many minds that the horse did not pass out of existence when horse cars became a relic of the past.

Primarily it will portray the reverse of that picture so often seen of the poor old nag looking over the fence at the automobile dashing by; always dashing, never stalled. It intends to boost the horse in a legitimate manner whenever and wherever it can be done.

It will encourage the breeding of more and better horses, and the use of the horse in sport and industry. It will prove that his passing is only a "motor myth," or the nightmare of the occasional pessimistic blacksmith, and everyone knows a blacksmith is never that, and that the reason for the present high prices for the King of Sports is absolutely one of supply and demand.

It will try to convince the 6,650,000 farm operators in this country that there is more money to be made in raising colts than there is any other product of the farm in proportion to the original outlay and consequent trouble, and it will not be averse to advocating horse racing under suitable conditions.

It will lend its influence to the promotion of more riding, driving and polo clubs in every part of the United States, and will endeavor to encourage and strengthen those already in existence. It will open the eyes of a few Americans at least as to what is being done for the horse in foreign countries in comparison with our so apparent infantile efforts here.

The officers of the association are well-known horse lovers in different parts of the country. Its board of directors, not yet completed, for the association is still in a constructive state, is headed by August Belmont, who has done as much, if not more, than any other one man in the United States to encourage the breeding of high-grade horses, the restoration of horse racing and the creation of interest in the economic use of the utility beast of burden.

Then there is James A. Burden, a horse lover of the highest type, a devotee of polo, and one of the most ardent believers in the future of the horse, both in this country and abroad; Dr. George C. F. Williams of Hartford, who is convinced that a high-grade livery stable in New York City would please others beside himself; T. Minor Curry of New York, who thinks and dreams of horses, saddles and harness; J. W. Kiser of Chicago, who is almost as well known in New York as he is in the great city by the lake; and the president of the N. A. A. H. I., Ralph C. Watrous, one-time Lieutenant-Governor of Rhode Island, and who believes, like the widow whose husband had been killed by a kicking horse (of course, having collected the insurance), that there's luck in a horseshoe.

E. W. A. Waterhouse of San Francisco, well known the whole length of the Pacific Coast; W. H. Grant of Kansas City, and Charles M. Roehm of Detroit, are three of the five vice-presidents to be chosen for the five districts into which the country has been divided for the association's work.

Will the association have anything to say about automobiles or motor-trucks? The old proverb, "Knock and the world knocks with you, boost and you boost alone," is just as true to-day as it ever was, so the hammer will not be tolerated in the association's kit of tools. But it will, nevertheless, occasionally have something to say in a dignified manner about the pleasure car as a factor in the high cost of living, and the comparative economic and commercial worth of horse-drawn and motor vehicles.

To the Horse Lover.

There's a reason for everything and experience is the wisest teacher, so the N. A. A. H. I. will endeavor to collate and collaborate from time to time statistics pertaining to the horse which will be of interest, not only to its members, but to the general public.

For instance, it is interesting to note that the Adams Express Co., pioneer users of autos in the express business, starting some eight years ago, have forty more wagons in use in New York City than a year ago. Experience has proven to them that the machine is less economical than the horse for short distance hauls.

Practically every riding school of any note throughout the country reports an increase in business during the past year, and if it was possible to state the actual increase in the use of saddle horses during the past three years, the figures would be more than interesting. The most healthful exercise in the world is creating a demand for saddle horses which horse dealers cannot fill at the present time.

The year 1913 is way ahead of 1912 in the demand for horses. The difficulty found, however, is in supplying the demand for truck as well as for driving purposes. Formerly the celebrated Morgan breed of Vermont was a never failing source of supply, but practically all of the horses handled in the East to-day are shipped from the Middle West. The farmers of Vermont should and can be convinced that they can raise better horses than they can afford to buy, and that they can find a ready market for all surplus stock with a wide margin of profit.

High Prices Prevail.

Notwithstanding the adoption of motor-trucks and delivery cars instead of horses for much of the hauling done in cities and towns, and notwithstanding the steady increase in the number of improved draft horses grown in the Central and Middle Western States until it has become one of the great and important industries of the country, yet the demand for good draft horses has increased faster than the supply, and they are bringing higher prices at market to-day than ever before in the history of the horse trade of the United States.

The average value of horses has increased more than 120 per cent. during the past ten years, and modern farming methods, improved farm machinery and the tendency to "return to the soil" is constantly increasing the demand for more and better horses. Such being the case, with the United States Government standing ready to give its assistance in the breeding of stock which is bound to command a profit to the breeder greater than that which can be derived from any known crop, why hesitate to turn the non-productive acres into fields of profit?

This proposition should appeal to the 6,650,000 farm operators in the United States.

Horses on the Increase.

The number of horse-drawn vehicles in daily use in the down-town district of Chicago has increased by 30 per cent. during the last two years. It is estimated that there are daily 130,000 teams on the central business streets of this city.

Statistics gathered from eleven cities in various parts of the country show an average increase in licensed horse-drawn vehicles of 40.2 per cent. per city in 1912 over 1910, and horse cars are not being installed in many places to-day.

Business Versus Pleasure.

The N. A. A. H. I. believes that the so often threatened displacement of the horse is a vital factor in the living expense of every citizen.

The average man, even in moderate circumstances, is less apt to pay attention to pleasure cost than he is to business cost. In fact, it is almost invariably true that we spend dollars for pleasure while we are striving for economy in business methods in every department of factory, store or office.

We think but little of the expense of automobiles for pleasure; in fact, but few of us know what it really does cost to run a pleasure car; but we are willing to allow that it costs much more than the horse and carriage formerly consumed of our income, and let it go at that.

But when it comes down to business, then we begin to figure the relative cost of the horse-drawn and motor-truck or delivery wagon, if teaming of any kind enters into our business transactions. Obliged as a rule to take the word of the motor-truck agent as to increased business, decrease in transportation charges, quickness of delivery, etc., resulting from the displacement of horses by power vehicles, too many business men take it for granted that if an automobile carrying us over many miles of road per day can give us increased pleasures, disregarding, of course, the mere matter of cost, then it may be equally true that the motor truck will succeed the horse and bring an increase of business comparable with the increase of pleasure from automobiling.

The man who can figure that it costs less than 24 cents a mile to run an automobile, counting in

depreciation for a three-year period, is an expert statistician deserving of a niche in the Hall of Fame. This statement does not include entertainment expense, which is no small factor in auto disbursements. If you run your car 5,000 miles a year at a cost of more than $1,200 and your salary is $2,500 a year, what's the answer?

A Misleading Endorsement.

A Tennessee sand company is quoted by a large motor-truck manufacturer as follows:

"Our truck makes six trips per day with three yards of sand or gravel, which weighs approximately 4½ tons per load, and the entire expense of driver, gas and lubricating oil averages $3.50 per day, making a total ton-mileage of approximately 1 3/10 cents per mile. Over the same hauls with our mule teams, we could only make two trips per day of 1½ yards at a cost of driver and feed per team of $2.50."

A casual glance at this statement might induce one to purchase a three-ton truck at a cost of $3,200, but why stop figuring expense at $3.50 per day for driver, gas and oil? There's that little item of depreciation, for instance. A maximum value for a motor truck at the expiration of three years of 300 working days each would be $500, unless it should be "turned in" to the maker in exchange for a new one, and then the results will be doubtful. There should be added to the daily cost of $3.50 for driver, gas and oil, depreciation, $2.72; repairs, which increase materially after the first year, including tire expense of $2.12; insurance, light, heat and taxes, $1.01, and a number of other incidental expenses, such as time lost during repairs, increased cost of garage over barn expense, repair cost of road and numberless supplies.

However, the items enumerated amount to $9.35 per day, against the $2.50 per day for mule expense figured by the sand man, or practically four times the cost per day of the mule teams. The question is not, How old is Ann, but, Why the endorsement?

A Savannah, Ga., motor-truck owner—we wish we knew his name—endorses a 1½-ton truck as follows; and, by the way, this truck is the same make as the sand man, referred to in the previous paragraph, uses:

"Before we bought our truck to deliver our goods, we secured all the information we could regarding various trucks. * * * Before we determined to buy a truck, we figured carefully the expense in comparison with teams. We figured over our repair bills, harness bills and wheelwright bills in addition to our feed bills, and after a careful calculation we were convinced that a ton-and-a-half truck such as we have bought is equal to three teams, thereby saving us in expense $1,018 per year. Competition here with the local agencies was very keen, but we have arrived at our decision after a careful examination and we do not believe that anyone will make a mistake in deciding on the * * * truck."

If it costs, as is true in this locality, including driver's wages, feed, wagon repairs, shoeing, veterinary service, barn rent, depreciation, harness repairs, liability and fire insurance, etc., approximately $1,080 a year for operating a one-horse delivery wagon, and the truck alluded to is equal to three teams, the motor truck should do its three-horse work for at least three times the cost of a one-horse delivery wagon, namely, $3,240 per annum.

The actual facts are that the Savannah man who believes in motor trucks must figure his truck as costing him a minimum of $4,316 a year, against the cost of three horse delivery wagons, which could be run at an expense of $1,076 a year less. Where does the saving of $1,018 a year come in?

A Happy Motor-Truck Owner.

A true as well as a very interesting story is told of an ambitious Yankee who sought to enlarge his field of business activities.

A well-known expressman in the city of Providence purchased a motor truck a little more than a year ago, with the expectation of trebling his business in a short time.

Much to his chagrin, he soon found that it was a more expensive proposition than his former horse-drawn delivery wagon; that it consumed more time than anticipated in the congested parts of the city; that it was difficult to manipulate in freight yards, where horses predominated; that when it was laid up for repair no substitute was easily procurable, and that in many other details it did not come up to either his anticipations or the promises of the dealer who persuaded him that it would surely treble his business.

In fact, at the end of the first year, his profits, on a greater amount of business, owing to truck express, were less than for previous years.

Realizing that something must be done to offset this loss, he conceived the idea of endeavoring to secure business for longer hauls with "return cargoes," so to speak.

The return load, one day not long ago, consited of a truck load of hay, well-seasoned hay, hay that was destined to make some hard-working horse believe that life was still worth living. In some unaccountable manner, when just outside the city limits, the hay caught fire and naturally the truck followed suit.

The owner sat by the side of the road smoking his pipe until everything destructible by fire connected with the truck had been consumed, heaved a big sigh of relief as he boarded a city-bound car, paid his fare smiling to the conductor, and exclaimed as he passed in his nickel: "This is the happiest day I've had in more than a year; that was my motor truck you saw smoldering back there where I got on, and it was insured, too."

The insurance money bought a complete horse-drawn delivery outfit, and business is good, says the expressman.

Not So Happy.

One of the most prominent brewers of New England, in speaking of the auto-truck in connection with his business, states that he would willingly consign his trucks to unmentionable regions if others would do the same. The excessive cost of maintenance over horse-drawn trucks is so great that a truck is maintained today solely for competitive purposes in sending a "keg" when it is apparently needed in a hurry, and horses have supplanted auto trucks in other instances.

Depreciation a Great Factor.

The Engineering and Mining Journal of October 18 has a very interesting article on the Availability of Motor Trucks for Mines.

The writer claims that a study of the results presented make it clear that the great question in motor-truck transportation is that of the tires. Second in importance is the question of repairs, and third is that of fuel consumption. Bound up with these three points are questions of road surface, road grade, altitude, climate, gear ratios, first cost, wages and various points of design.

Inasmuch as depreciation is one of the greatest items of expense in motor-truck cost and as interest and depreciation alike are not considered in many of the tabular presentations in this article, it would be interesting to know why they are omitted in the compilation of an otherwise most instructive discussion of the undetermined success of the motor truck, omitted, we mean, by those who furnished reports to the writer.

When a truck is sold, turned in, or goes to the scrap heap, whether the truck cost $1,000 or $5,000, a large amount in proportion to cost and previous usefulness must be charged up against operation.

That the demand for horses is increasing faster than the supply is a well-known fact. Depreciation in value is an almost unknown quantity in horse statistics, unless the horse is so old that age and service have placed him beyond the period of usefulness, and even then, age and service have so far offset original cost that depreciation is out of the question.

There are innumerable cases in this country where draft horses after five years of constant service, sold for one reason or another during the past three years, have brought as high or higher prices than were originally paid for them. Such being the case, the conclusion is obvious that it will continue so for many years, no matter how active the farmers or the breeders may become in raising horses, and the business is bound to be a lucrative one if properly conducted.

Good Roads.

The question of good roads is as important to the horse owner as it is to the automobilist, and the N. A. A. H. I. intends to take an active interest in solving the question of the durability and safety of waterproof roads and the extension of improvements into the more rural districts where branches of main highways are too often neglected. Apropos of good roads, an English association has started a movement well worth consideration.

The Road Improvement Association of London, England, has offered prizes in a horse-shoe competition, which should be of interest not only to the good roads advocates of this country, but to horseshoe manufacturers and jobbers as well.

The object of the competition is to stimulate invention and to award prizes for the most practical and useful type of horseshoes that will provide the horse with a satisfactory footing upon improved waterproof roads (thus alleviating its sufferings), and minimize the damage at present caused to such roads by certain types of shoes at present employed.

The merits of the competing devices will be judged mainly in the provision of a satisfactory and non-slipping foothold for horses upon waterproof road surfaces now adopted upon main roads and the chief streets in our large cities and towns; the reduction in the amount of damage caused to road surfaces; and general practicability, such as capability of general manufacture, reasonable life, moderate cost and similar conditions.

The competition is not only novel, but offers possibilities of usefulness. It will receive careful consideration by the directors of the N. A. A. H. I., and it is not at all improbable that something of a competitive nature along similar lines may be proposed in this country at an early date.

Co-operation Desired.

The more than 1,200 riding, driving and polo clubs of the United States are invited to correspond with the National Association Allied Horse Interests, for we hope to make our publications and the association alike of interest to the 125,000 members of these clubs.

There are approximately 4,500 owners of racing teams in this country who are also owners of fine country estates. The N. A. A. H. I. will be made to appeal to them from their point of view, and we do not hesitate to appeal to them for that co-operation which will make the association valuable in many ways. We do not want to use the word "co-operation" too much, but it means a lot at the beginning of a big publicity campaign such as has been inaugurated by the National Association Allied Horse Interests.

As to the commercial interests which the association will serve, the eighty-odd thousand blacksmiths, the seventy thousand veterinary surgeons, the more than a hundred and fifty thousand manufacturers of horse and accessory supplies, the fifty thousand stock raisers, the innumerable farmers and that great army of citizens which is composed of men dependent upon the horse for a livelihood, to them all we say, it is impossible for us to correspond with you directly, but we would like to hear from you, for the National Association Allied Horse Interests as an association, and through its official publications, means to benefit your individual business, and with your assistance we know that much can be accomplished.

That word "efficiency" is considerably overworked nowadays, and we are almost willing to admit that those who howl the loudest about efficiency are apt to be the ones most deficient in one way or another. Nevertheless the N. A. A. H. I.'s information bureau will endeavor to answer any reasonable question which may come to it pertaining to the horse or allied interests. You do not have to be a member of the association to ask questions nor to receive an answer; no, not even about motor trucks, if you are interested. You ask; we answer.

The headquarters of the association are in Providence, R. I., but in a short time branch offices will be established in the five districts into which the country has been divided for publicity work.

A Village Vehicle Painter.

From the Modern Painter.—Probably there is no man in the trade who executes his work under so many difficulties as does the vehicle painter in the smaller towns.

To begin with, he seldom has a shop that in any way meets his requirements; he hardly ever has suitable tools, unless he orders them from his city jobber; he often has to use materials that are not adapted to his work, and yet, regardless of all these handicaps, many of them turn out work that compares favorably with that executed under more favorable conditions. When looking at and admiring the splendid work of some of our village brethren, we have often found ourselves wondering what sort of results

these workmen would have produced if the work had been done under ideal conditions.

It is axiomatic among vehicle painters that if it is proposed to do a good job on a pleasure carriage, several things are necessary. The surface must be faultless; plenty of material of the proper kind must be applied; the work must be done in properly-ventilated rooms; the materials must be in harmony, the proper amount of time must be given between coats, and above all, scrupulous cleanliness must prevail all along the line.

Of course we know how desirable all these things are, and we believe that if the brothers in the smaller towns had all these conveniences they could execute better work and do it more comfortably, and we have often wished, after inspecting a job that had been done under adverse conditions, that the same workmen could turn out a job under ideal conditions.

One of the best qualifications a painter can possibly have is resourcefulness. He needs to be able to meet any sort of emergencies, and come up smiling, no matter how many body blows he may receive—and, best of all, most of them do that to the queen's taste.

The village vehicle painter is not, in most cases, a strictly one-trade man. On the contrary, he usually has to paint signs, do graining, hang paper, paint houses, or even stain and varnish coffins. For this reason it is hard for him to "keep his hand in" at any branch of the business, and we all know how desirable it is to be expert when it comes to painting a carriage, a wagon, or an automobile.

Here is to the village vehicle painter, the man who is able to bring order out of chaos, and apparently defy natural laws in the execution of his work. May he live long and prosper, and may his work continue to adorn our highways, but may the time speedily come when he shall have better conditions under which to labor, and receive better remuneration and more appreciation for his creditable efforts.

GOSSIP WITH SOME READERS.

The Rotary Oilstone—Pulleys—Triphammers —That Annealing Question.

BY JAMES F. HOBART, M. E.

In the October issue, brother E. N. See, Nebraska, describes a method of fitting pulleys to a shaft, which brings to mind a similar experience on the part of the writer. It was in a paper mill and a new gear must be put in place upon a horizontal shaft—Sunday work at that—when it was found that the gear, which was made in a distant machine shop, had been bored a little too small to slide upon the shaft.

Here was trouble—the mill MUST start up without fail at one o'clock sharp, Monday morning, and if I couldn't keep the mill a-going, then somebody else would be in my place mighty quick. The gear would slide upon the shaft about two feet, then it stuck fast, and no driving with sledges would force the gear further upon the shaft.

Timbers were procured and placed on either side of the gear, then other timbers were placed between the arms, through the gear so it could not turn around. Then a couple of hoists were rigged, one to pull the gear upon the shaft, the other tackle to pull it off. The rigging consisted of one rope hoist and one 2-ton differential chain hoist. This was used to pull the gear on to the shaft, toward its proper place, while the rope tackle was arranged to back the gear off of the shaft.

A small hose was attached to a convenient water pipe and suspended so as to keep a small stream of water at all times on the shaft, close to the gear. Then the power was started and the shaft set in motion inside the gear which was s lidly blocked from turning around, as describe above. A wheelbarrow of sand was procured and some of it sprinkled upon the wetted shaft, then the chain tackle was manned and the gear pulled upon the shaft, over the sand.

Instantly, a grinding noise from inside the gear, told that the sand was getting in its work, but close watch was kept on the job, also a stream of water, and when the first signs of the shaft getting stuck in the gear became apparent, the rope tackle was manned, the chain hoist slacked off, and the gear was yanked back before it could become fast on the shaft. Then, after more water and sand had been placed upon the shaft, the gear was forced on again, and the grinding continued.

The above was repeated several times until finally the gear was dragged into place and the key driven home. That gear ran without the least sign of becoming loose until literally worn out, and was replaced by a belt drive in line with more modern engineering. In doing such a job, just bear in mind that the sand quickly wears out, therefore it must be renewed very often; also that the mud into which the sand is reduced, must be removed from between the metal surfaces. The stream of water removed the worn-out sand, which was replaced by a fresh supply, and the water also enabled the sand to stay in place on the shaft until the gear came in contact therewith. Oil would answer as well or better than water, but then, it costs more than water.

That Good Triphammer.

Brother See also shows on page 480 of the October issue, a home-made power hammer which "listens pretty good." But in order to prevent some inexperienced smith from making a mistake, I wish to ask brother See how he drives the hammer. Both the engravings show a

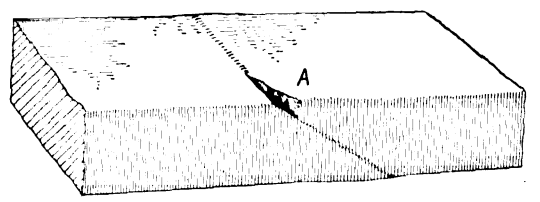


Fig. 1—Lap corner burned off.

horizontal belt leading from the hammer pulley, and fitted with an idler for tightening the belt when it is desired to operate the hammer.

Unless the horizontal belt be made very short indeed; that is, the pulleys upon which the belt runs, be placed very close together, it will not work very well as far as operating the hammer is concerned, neither will the belt last very long. The writer, when installing a belt-driven power hammer, always makes it a point to locate the shaft as nearly vertical with the hammer as is possible, either above, or in a case like brother See's, the line shaft or counter could be placed below the hammer pulley.

It may be that the engraver has slightly mixed things in reproducing the sketches of the home-made power-hammer, but bear in mind, always, that the more nearly vertical the pulleys of a hammer drive, the better the hammer will work, and the easier it is controlled, therefore put in the shafts accordingly.

That Annealing Question.

Mr. E. Bravender, Mississippi, asks on page 844 of the October number, how to anneal the lock casting on an iron bedstead side-rail. I do not know of any way of annealing this kind of metal, which is usually cast from hard white iron, instead of from soft gray iron as is the case with ordinary machine castings. However, he may try a scheme which sometimes works well on hard sleigh shoes, when it is desired to drill them. This method is as follows: Heat the part to be drilled to a low red, place it level and lay a bit of lump brimstone fair upon the place where the hole is desired. Don't use a big lump as it will spread all over. Use a very small bit of brimstone, and as it melts, it seems to sink right through the hard iron and soften it enough so that it may be drilled easily.

In using the foregoing method, great caution should be taken to keep the brimstone away from the metal which is not to be softened, for you can quickly burn off the entire casting by keeping it in contact with brimstone while red hot. To show yourself just how this substance acts when in contact with hot iron, just heat one end of a small iron or steel rod red hot and press it against a roll of brimstone. The iron will seemingly melt right down like an icicle, and run down on the floor!

What really takes place, however, is that the hot metal is oxidized by the sulphur and by the oxygen in the atmosphere. The stuff which runs down is really a kind of iron ore from which iron may be smelted again by proper treatment.

Another way to restore the broken part, is to knock off all of the casting, and take both rails to the foundry. Make a mold from the end of the other rail, which corresponds with the broken lock, then, when the mold is closed, place the broken end in the mold for a core and cast a new lock right around the rail, making the repairs as good as a new rail, and at very little expense.

Hardening a Hammer-Face.

The instructions given on page 834 for tempering a hammer, are good as far as they go, and if followed carefully, should give excellent results. But I have found in hardening some kinds of steel, possibly those a bit too low in carbon, that it was impossible to get the center of the hammer-face as hard as desired. In such cases, I have found it beneficial to quench the hot steel by forcing it against a stream of water under considerable head, from a hose or pipe. Seemingly, the steam generated by immersing in a body of water kept the steel from hardening as quickly as necessary to give the hardness desired. The stream of water removed the steam instanter, and cooled the steel very quickly indeed—possibly too quickly when the steel contains the proper amount of carbon. But a very small stream of water is useless for the purpose. The stream should be nearly if not quite as large as the hammer in order to do the business properly.

When a stream of water is not available, I have used ice instead. Press a big chunk of ice against the center of the hammer-face, and the hardness will come very quickly. Only don't try this with high carbon steel, except for very small tools and drills which are to be made as hard as fire and water can make them. Then the ice may be used for quenching, and the tool will be hard indeed—if it don't break in two under the severe internal hardening strains.

The Rotary Oil-Stone.

Wheelwrights have been pretty progressive in the matter of adopting emery wheels instead of grindstones for tool sharpening, but there is a last word to be said in that direction about the oilstone wheel, which is mounted and used very much the same as an emery wheel, but which runs in oil all the time, and which will put a keen edge upon any wood-working tool which can be brought to it.

The oilstone wheel puts that fine edge upon a tool which is impossible in the tool ground on an emery wheel, except by a very experienced workman. Set up a rotary oilstone in your shop and see how well it will be patronized. And, while you are about it, place on the other end of the mandrel, opposite to the oil-wheel, a wheel or disc made of leather, which can be used as a strop, after the grinding is finished, to give the tools such a razor-like edge that you are almost afraid to look at a tool for fear it will cut your fingers!

Patching a Weld.

There's a mighty good old saying that "you can't teach an old dog new tricks," but it is a fact, nevertheless that you can teach young smiths old tricks, and usually they can go the old smiths one better in the way of new tricks. The other day I saw a young smith, and a very good one he was, too, making a weld in some heavy bars about 1½'x2½". He had upset and scarfed them all right, but in making the weld, a little bit

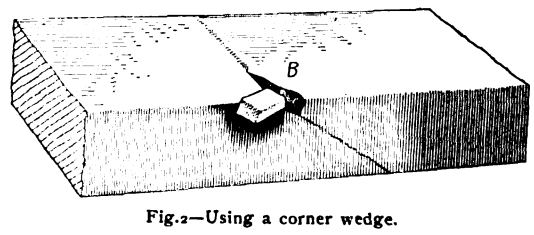


Fig. 2—Using a corner wedge.

of one corner had burned off—something which frequently happens, and the resulting weld came out like Fig. 1, sound as a dollar, except for the little corner at A.

The young smith tried upsetting the bar at A, and forging down to size again, but it would not fill the corner and he was about to cut the bar and weld it again when it was suggested to him to use the old locomotive-shop trick of welding a plug into the hole. This is a method often employed in railroad shops where side rods were once made by welding on "stub-ends." Corners were often burned off the laps, and the plugging method was much used as shown by Fig. 2, where the defective corner was opened a very little with a cold chisel and a wedge of same material as the weld, was driven into the lap as shown at B, Fig. 2.

The size of the wedge should be a little larger than will supply the amount of metal missing in Fig. 1, although of course, any excess of metal may be cut off after the wedge is welded down as shown by Fig. 3. Another heat is taken on

the bar and wedge, as shown by Fig. 2, and the wedge is heated a little hotter than the rod, which itself is brought to a low welding heat.

But the wedge, projecting as it does, receives a greater heat than the body of the rod, and consequently is readily welded in and flattened out as shown by Fig. 3, where at C, the defective corner has disappeared, and only a faint trace of the weld is to be seen on either side of the rod. This method of wedge-welding, may be varied indefinitely to suit requirements, but it is a mighty handy way of getting out of trouble in some cases.

When a tire has been cut a trifle too short, and you dare not draw it enough to fit the rim, a wedge may be welded in and drawn down, to give the small additional diameter required.

Balancing Pulleys.

Whenever the smith has occasion to set up shafting in his shop or elsewhere, let him watch the pulleys closely when the speed is first turned on and notice whether or not they run steadily or whether they rattle and jump and seem determined to pull the shafting from its hangers. When this trouble takes place it is evidence that the pulleys are out of balance—that is, the rim on one side is heavier than on the other side of the pulley.

The lack of balance is not noticed very much at speeds below 80 to 100 revolutions per minute, but becomes very pronounced as the speed increases. Shafts in modern shops are speeded to run from 300 to 500 R. P. M., quite a contrast to old style methods where 150 R. P. M. was counted very high speed indeed. Many shops run their line shafting 500 to 600 R. P. M., and save power by so doing, but it goes without saying that the pulleys are very accurately balanced.

All belt pulleys are supposed to be in good balance when they are sent out by their manufacturer, but like some other things pulleys sometimes get away without having been put in perfect condition and then they must be balanced in the shop or thrown away for they are worthless for high-speed running when out of balance.

When pulleys are balanced by their maker they are mounted separately upon a smooth piece

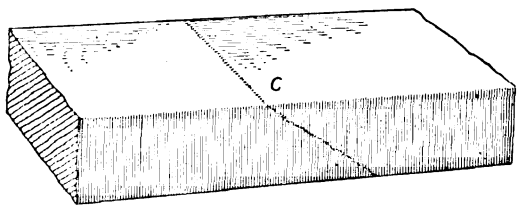


Fig. 3—The corner repaired.

of shafting, then the shaft is placed upon a couple of smooth, level metal surfaces. If the pulley is out of balance it will roll one way or the other until the heavy side is downward. To balance the pulley select a bit of metal which you judge to be of about the right weight and fasten the piece underneath or inside the pulley rim on the light side of the pulley. Use a bit of stick, ¼ inch or so in diameter, to brace the balance weight against the inside of the pulley rim.

Try for balance again, after placing the bit of metal, and if more or less weight is required add same or cut off some of the metal. When the pulley will remain in any position, drill a hole through the rim and rivet the balance weight to the inside thereof. A small rivet will answer as the weight bears against the rim at all times. Sometimes, with large, wide pulleys, two or more counterweights will be required, and for very high speeds a running balance must be obtained, the standing balance as above described not always proving sufficient to make fast revolving pulleys and cutter-heads run smoothly.

The standing balance, as above described, is easy to obtain, all that is necessary being a couple of finished level metal surfaces to rest the shaft upon. A couple of pieces of ¾ or ⅞ inch key-steel, cut two or three feet long, or even less, and laid upon level timbers or trestles will answer, but to obtain a running balance the smith must set up the pulley on a flexible shaft like a helical (spiral) spring and run the pulley at the speed it is to travel. Obtain the necessary balance at this speed by attaching weight or by drilling away the heavy sides or edges of the pulley gear or cutter-head.

The running balance takes into account a balance lengthwise of the face of a pulley as well as through its diameter, and while pulleys which are in running balance are always in standing balance those in standing balance may not be in running balance—not by a good deal, and this explains why some pulleys or cutters, even though very carefully put in standing balance, fail utterly to run smoothly. The running balance must be obtained in cases of this kind.

USEFUL TO THE CRAFT.

A Wide-Awake and Influential Kansas Organization.

The annual meeting of the Blacksmiths, Horseshoers and Wagonmakers' Association of Kansas was held at Salina, Kansas, November 12 and 13. It proved to be most successful and enjoyable to all present. This association is constantly increasing in influence and in advancing the material welfare of the craft in that state. Following are the officers for 1914:

T. F. Lannan, President, Topeka, Kansas.

W. C. Johnson, Vice President, Coffeyville, Kansas.

Austin English, Secretary and Treasurer, Hutchinson, Kansas.

The leading address of the convention was made by Mr. Perry R. Buckley and was as follows:

MR. PERRY R. BUCKLEY'S ADDRESS.

Brother Blacksmiths: I am glad to make a few remarks because I have the welfare of our Association upon my heart. I believe that if we all do have its welfare upon our hearts we can make it accomplish the things we desire accomplished and that it will do the good for us all that we need to have done for us. I say the things I have to say because I want to see the best things done for the Association and for the blacksmiths of Kansas in general.

We cannot accomplish the purpose for which we are organized unless we all are willing to do our parts; unless we have faith in the organization and are interested enough in it to work it; for it will not work itself. It is necessary for us all to be loyal to our Association and to its principles every day in the putting out of every piece of work.

We blacksmiths have been slow to realize that we must put our business upon a sound business footing if we are to succeed and keep pace with the progress of other businesses. Our business is an absolutely necessary one; one which cannot be gotten along without in any community. Every town, city and village must have its blacksmith shop. Therefore our trade is an honorable trade. As it is a necessary trade it is capable of the finest business development and deserves the best business talent, and merits the just consideration of the people and of the legislatures.

People have not been in the habit of thinking of the blacksmiths as business men. They have not thought very highly of our calling in this country, and the smiths have had the same kind of a feeling. "We have had the "each-man-take-care-of-himself" methods of business. By means of this organization we hope to better our condition, to raise the standard of our business and to introduce and maintain modern business methods in our trade. We believe that if we do these things, working together, we shall increase our profits and make for ourselves a real prosperity.

If these things are to be accomplished then we all must have faith in the Association. We must believe in it, must "talk" it and work for it, and be loyal to it and live up to its constitution and laws. This principle is true in every line of work. No man can do anything unless he has faith in his work and faith in himself.

We must believe that we can run our business in a business-like way, and that we can turn out work that the public will be willing to pay for, and that we can accomplish through various ways of working the things for which we work.

It seems to me that if we are to make a real success out of our Association, every blacksmith should be posted on the work it is trying to do, on what it has accomplished already and on what part he may have in bringing about the results.

Blacksmiths should have an understanding of business methods, of business principles, of up-to-date ways of keeping account of stock, credits, of values, etc.

We cannot do anything worth while in our business if we do not know anything about it, and yet there are men in the business who do not know anything about business, having the skill only to turn out the things that blacksmiths are supposed to make. Whenever we are together we talk about fellowship among us blacksmiths, and sometimes it is almost all talk. But I feel that I would like to say something else about it now. We cannot make this organization grow and do the work we intend for it to do unless we have real fellowship, unless we get along well together, respect each other, help each other and co-operate together in our business and in the work of the Association.

If a strong Blacksmiths' Association is to be maintained in this State the members must engage in and enjoy the fellowship which does not mean to belong to the Association and then go around and "knock" the Association or each other.

And a good of the fellowship is for each fellow in the organization to bear his rightful share of the finances and do it cheerfully. If a business is worth staying in, it is worth talking about. If a man cannot talk about his business he has not enough interest in it to make a success of it. If he cannot talk it up, perhaps he is ashamed of it? If he is ashamed of his business or his job he ought to get out of it.

The same is true of this Association. Let us talk it up, talk it to the other blacksmiths all the time. Get an interest in it. There are about 450 members in our Asociation and about 1200 in the State. Let us work our organization so enthusiastically and well that we can talk about it and let us talk it "in season and out" until these other men will want to come in with us. It is no use to talk up the Association unless the Association is accomplishing something worth while. There is no use to talk it up unless we are willing to work it up.

This reminds me that if we are to have an organization which shall be some good to us we must be willing to do big things for it. We ought to have a financial plan that would furnish money enough for our treasury to accomplish the securing of proper legislation, competent official work, etc. We can't run a big thing on little money. A man cannot run a big automobile on a wheelbarrow income. We have talked about some big things which we all want; if we want them badly enough we will have to finance the Association in a big enough way to get them done.

Some one has said: "I had rather be a cheerful idiot than a wise old grouch." This Association is no place for a grouch. Really, the world has no use for the chronic grouch. The habitual knocker knocks himself out of the friendship of all enterprising men. We hear men grouching around nearly every day. Some blacksmiths knock more on their competitors or on this Association than they do on their anvils. Brother blacksmiths, let us be cheerful, let us be proud of our work and happy in the doing of it.

We can put joy into this organization and into our fellowship. If we do we will have a much greater likelihood of making a success of it. I don't believe a man can do very much who is unhappy in what he does. Happiness and good cheer are contagious, and they get business. People like to trade with men who are pleasant and cheerful. They soon learn who keeps a shop where there is good cheer along with the right skill.

We are in a business of which we need not be ashamed; we can well be proud of it and we ought to love our work. If we love our work we will put into it our best ability and we will try to serve our customers in a way that will create a demand for our work. The governing principle which ought to go into this Association should be the love of blacksmithing. We will succeed legitimately only when we make our stuff so well that the farmers and other customers will be glad to pay a real price for it. Men would rather pay a good price for a well made article than a cheap price for a poorly made article.

As Association members we ought to see to it that every blacksmith in the Association puts out work that is right, not slip-shod or half right, but the best that can be done.

We can make the Association members' work so good that people will come to our shops, and that will cause the other fellows to line up. We can't do this and keep it up unless we have pride in our work and love to do it. It ought to give us joy to turn out good stuff. We ought to like to recommend it, to sell it and to watch it go by, or see it bring satisfaction to the purchaser.

I believe in this Association and want to do all I can to boost it.

I believe we can get what we want if we work together in the right way. I'm glad that I am a blacksmith and am glad that the blacksmiths are waking up to the fact that they can do as much in their line as other business men can in theirs. And as our President, Uncle George, has proved to us, we can get what we want if we go after it in the right way.

Then let us remember these things, and work together for the good of the Association and for the good standing of the blacksmith profession. If we all pull together we will put our trade upon a sound business footing and will increase our business and make for ourselves prosperity.

Carriage History.

The first suggestion of a vehicle was the trunk of a tree. Its faculty for rolling was noticed and the ease by which heavy weights could be moved by rollers. It is assumed by some experts that the ancient Egyptians built the Pyramids, which are composed of huge blocks of stone, each weighing many tons, by means of grades; moving the quarried blocks upon rollers. The lack of roads greatly deterred the birth of any form of carriage or vehicle, the palanquin or litter being used in Eastern countries, its replica being the sedan chair which existed as late as the eighteenth century. Hungary has credit for having invented and built the first carriage. Records in this respect show that a coach was given by the King of Hungary to the Queen of Bohemia, away back in the Middle Ages.

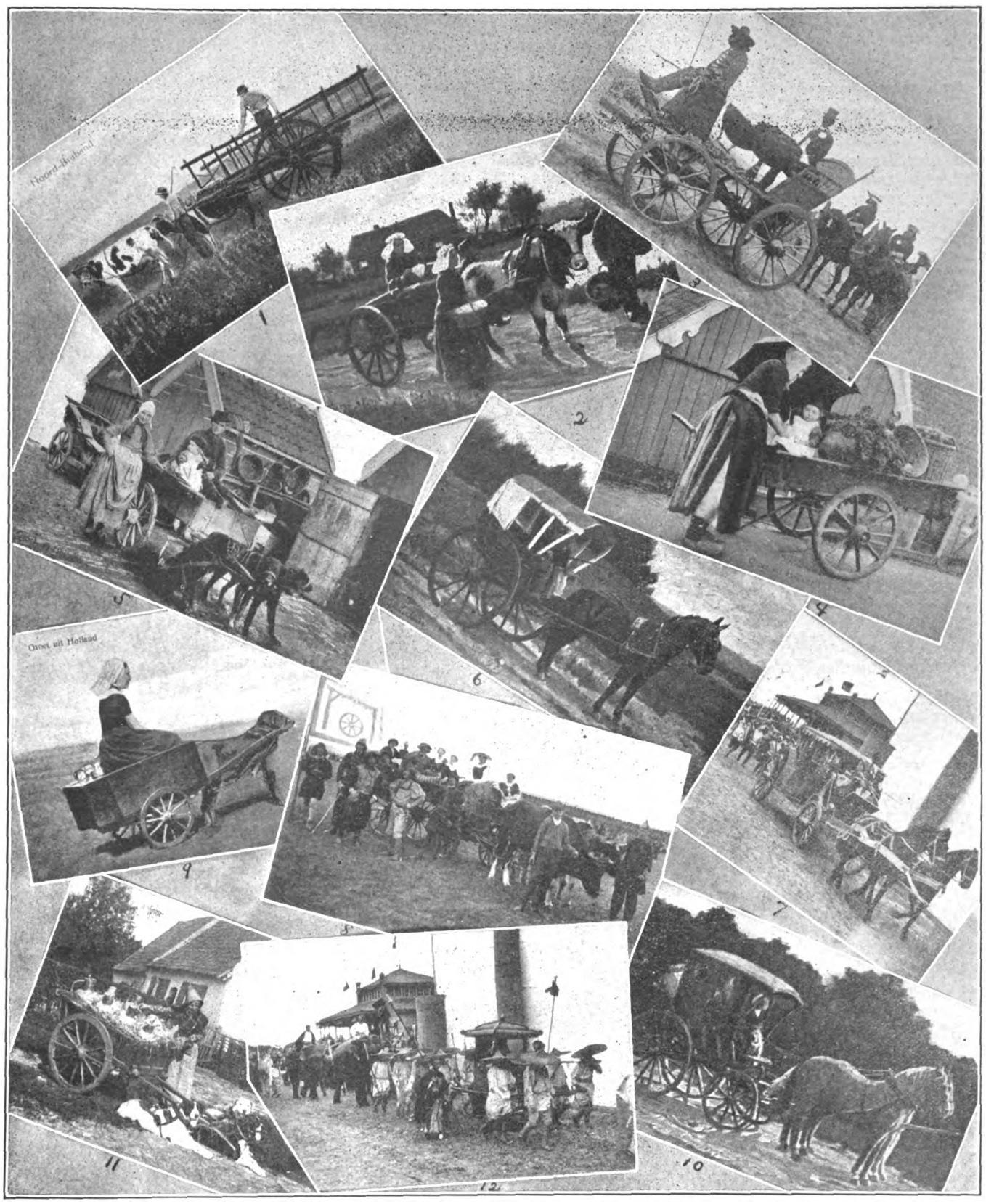
The first record of a coach being built in England was when Walter Rippon built one for the Earl of Rutland, later making one for the Queen at that time,who rejoiced in the name of "Bloody Mary." In the days of Queen Elizabeth, a Dutchman named Boonen presented her with an open carriage. It was only in 1610 that the coach habit became popular, and in that year we find one running between Leith and Edinburgh, in Scotland. It was, however, regarded as a risk of sudden and awful death to take the three mile trip between Edinburgh and Leith, and the intending passenger, with Scotch caution, usually made his will before embarking on the journey. The inventor eventually became so disgusted with his vehicle that he dubbed it a "hell cart." This carriage inventor was a poet by profession, therefore the expression is rather strong.

The court carriage then came into vogue in Italy, but the roads at that time were so exceedingly bad that going in a carriage was a risk to life and limb. It is interesting to note that an arrangement was affixed inside these primitive carriages onto which the travelers held while the vehicle negotiated the lumps and ruts. This was called the "pommel," which has departed from the coach and now is found on the saddle, its use being the same.

Wood block paving, tried and discarded in many cities of the United States thirty years ago, is now coming back into marked favor, due to improved methods of treating and handling the blocks.

Peculiar Vehicles.

The illustrations below show some of the peculiar vehicles and forms of vehicle propulsion that may be seen on the continent of Europe to-day, most of them being from Germany, Austria or Belgium. Fig. 1 is a farm "cow team." It would seem, by the way, as if cows had enough to do to bear calves and give milk, without being made beasts of burden. Fig. 2 shows a rather fine ox turn-out. Evidently the thrifty farmer and his wife and daughter are going to market. Fig. 3 shows something "classy" with a coachman and a "retinue." Fig. 4 is a market vehicle



with the "propulsion" and her baby. Fig. 5 shows the well-satisfied owners of a dog team. By the way, a dog always appears as if he felt humiliated when he is used as a beast of burden, and we believe he has reason for it. It is hoped that this idea will never become popular in this country. Let dogs be used for hunting and for watching the household and home. Figs. 6 and 10 are turnouts that look a bit like those seen in this country one hundred years ago. Figs. 7 and 12 are vehicles of "state" but not of the sort sort of "state" that shows the highest type of enlightenment. Fig. 8 has the appearance of being some sort of a Tyrolese gala affair; all evidently aware that their pictures are being taken. Fig. 9 is a quaint and distinct Dutch turnout. Fig. 11 shows another Dutch dog team. The poor dogs are evidently tired out with their heavy load. A good sturdy warm-hearted dog-loving American would rather drag the load himself than have such burden bearers. Possibly there is nothing cruel about it but it does not look that way.

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DECEMBER, 1913.

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NO FEAST, NO FAMINE.

Both business and industry or work are fast becoming intermittent—active or excessive to-day; dull or stagnant to-morrow. Many of our older readers can recollect when not only such a thing as Saturday "half holiday" but "summer vacations" were unknown as a settled or even a rare custom. Business and work went on summer and winter with about the same activity. The professional man as well as the mechanic—the minister, the lawyer, the carpenter, the bricklayer, the painter, and even the farmer—worked with a fair degree of regularity the year round.

Now all that is changed, and although the reason for this change is not far to seek, it need not be gone into here. But the fact is that in these days too often both business and work are either a feast or a famine. There may be double time or overtime work in the factory to-day, followed by short time or a shutdown to-morrow; taking on to-day all the new hands that can be secured and letting more hands go to-morrow than were taken on. To prevent a congestion of idle workers in some localities and a congestion of the need of workers in others, is a problem that sociologists and political economists have long tried to solve.

Fortunately, the blacksmith is not subject to such periods of activity and depression. Horses must be shod, no matter how dull the times. The need for repairs of vehicles and farm machinery does not depend upon the general state of business, and possibly such repairs are more likely to be called for when general business is dull than when it is good. Or rather, depression may reduce the purchase of new vehicles and farm machinery, and thus add to the necessity of more repairs.

Of course, the foregoing is not a new idea, by any means, but it is one that should not be lost sight of when some of us imagine that our own business is just a bit more difficult or less attractive than any other, as is usually the feeling no matter what it may be.

And this mean average or moderation of the blacksmith trade is in every way desirable and attractive. Nature abhors extremes; extremes of heat, extremes of cold; extremes of darkness, extremes of light; extremes of happiness, even, or extremes of sorrow; extremes of wealth, extremes of poverty.

The old philosopher was right when he prayed: "Give me neither poverty nor riches." Our incomes are something like our shoes: if too small they gall and pinch us, but if too large they make us stumble and trip. A business that gives us a constant and comfortable living is much better than one that gives us a feast to-day and a famine to-morrow.

PRICE FIXING AND MONOPOLY.

We have received from the "American Fair Trade League," quite likely a most worthy and useful association, a request to give as much publicity as possible to a recent article on "cut-throat price competition," by Louis Brandeis.

Mr. Brandeis maintains that such competition kills prosperity. He says, for instance, that the dealer who sells an Ingersoll watch for 67 cents necessarily loses money on that particular transaction, but that he does so in order to attract customers to his store who will purchase other articles upon which he can make a profit. Moreover, he claims that it "tends to make the public believe that either the manufacturer's or the dealer's profits are ordinarily exorbitant; or, in other words, that the watch is not worth a dollar. Such a cut necessarily impairs the reputation of the article and, by impairing reputation, lessens the demand. It may even destroy the manufacturer's market."

Mr. Brandeis claims likewise that the consumer's gain from price-cutting is "only sporadic and temporary. The few who buy a standard article for less than its value do benefit—unless they have, at the same time, been misled into buying some other article at more than its value. But the public generally is the loser; and the losses are often permanent. If the price-cutting is not stayed, and the manufacturer reduces the price to his regular customers in order to enable them to retain their market, he is tempted to deteriorate the article in order to preserve his own profits. If the manufacturer cannot or will not reduce his price to the dealer, and the regular retailers abandon the line, the consumer suffers at least the inconvenience of not being able to buy the article."

We believe that all of the foregoing will be freely admitted; that in the case of competitive articles or goods, price maintenance is desirable. For if price maintenance be followed by the fixing of exorbitant prices, the consumer will purchase something made by a competitor which answers the purpose better, price and quality being considered. If the consumer believes that a dollar is too much for, say, an Ingersoll watch, he will purchase some other watch.

But the condition is different in the case of a monopoly. There the power exists not only to maintain the price but to fix it far higher than the thing is worth, and the purchaser must pay that price or be deprived of the article. Away back in the time of Elizabeth and James I in England the experiment was tried of granting a monopoly to favored individuals of dealing in certain commodities, and it soon literally "raised Cain," so to speak. Among the commodities so monopolized were currants, salt, iron, powder, cloth, cards, saltpetre, lead, oil, vinegar, glass, paper, starch, tin, beer, leather, Spanish wool, Irish yarn, and scores of others.

As in the case of our present-day monopolists, having the power to fix price, the favored ones greedily raised prices beyond all bounds. To give an instance of how this operated in practice, salt was raised from one-quarter of a shilling a bushel to 15 shillings a bushel. And although some of the more conservative members of the British Parliament were very disinclined to interfere with the "royal prerogative," Parliament did interfere finally, and secured the passage of the "Statute of Monopolies," which is still in force to-day not only in England but in Australia. Of course it was comparatively easy to make a law to allow a return to competition where the monopoly barriers were artificial only, and not as they are to-day in this country, real and substantial, and we cite the instance only as showing that even at that early period the English government would not long tolerate such oppression.

But present-day monopolies are of altogether another character. To enforce competition where all the parties concerned in the monopoly are materially benefited by co-operation and materially injured by competition is a problem the solution of which is fraught by difficulties not at first realized.

STAND TOGETHER.

The contribution of Mr. Albeck of Iowa on another page deserves attentive reading. His views of prices and of the duty of the craft to stand together are in consonance with the more enlightened spirit of the times in all business and trade channels. It is illustrated in manufacturers' organizations, in the retail trade and in the labor unions.

Surely, if any kind of business needs such unity of effort rather than the "dog-eat-dog" competition policy, it is that of the blacksmith and the wheelwright. And as stated before in these columns, although that independence which impels a man to "run his business as he pleases" is inherent in most of us, if running it as we please means price-cutting and the effort to injure a competitor for the purpose of securing an unfair advantage over him, it is liable to result in the serious injury of both the person acting as well as the one acted upon.

In fact, the entire business and industrial world is fast moving on toward the idea that by working in the aggregate only can the interests of the individual be best subserved; that although the individual may be directly injured by both actions and laws for the benefit of the aggregate, yet in the long run the individual himself is benefited by whatever is of advantage to the aggregate.

There is a temptation, in the case of two blacksmith competitors in a single town, for each to try to get as much work as possible, and to shade prices to do so, although the practice is blighting. "But," we hear some one say, "suppose I can do work so much better than he can and do it so much more quickly that I can finally run him out of business altogether and thus get all the work myself; do you not think I have the right to do so?" Yes, you have the legal right, and as business practice goes, the moral right to do so. But even allowing this, the practice is not a good one. You may not succeed as easily as you imagine in running your competitor out of business. In such a case the competitor is likely to hang on like "grim death" so to speak. And even though you succeed, how long will it be before some other smith will be attracted to a good

field, and one at that who may be able to withstand the sharpest kind of competition?

The better plan—the better policy as well as the better principle—is to work in harmony.

FOOD FOR THOUGHT.

Read this, please, and make a note of it:

The present flood of talk in the technical press and by so-called "efficiency engineers" about a greater efficiency for labor and the "speeding up of labor," is solely due to present efficiency and to the present speeding up of labor.

Paradoxical as it may seem, the above is absolutely true. So, likewise, the present necessity for so much child labor is not due to the fact that there is so much labor to do, but that there is so little to do; not that the supply of workers is less than the demand but that it is greater than the demand. Children are never found among the toilers where their fathers are well paid but where they are ill paid; and fathers are never ill paid where there is plenty of work for them to do, but where there is little work for them to do.

Still another paradox: The tendency and the effort for greater efficiency in production is not owing to the fact that the supply of the thing produced is less than the demand, but rather because in order to increase the demand the price has been fixed so low that such production is unprofitable. Hence, the effort for greater efficiency and a lessened cost of production.

Or, let us put it in still another way: The yearning for labor and machine efficiency is not for the purpose of producing more but for producing at less cost.

Let us have no false notions about production and consumption, and about demand and supply. Let there be no sailing under false colors. Rather let us think out things in our own way, weighing up old ideas,considering the opinions of the economists, of conditions past and present, and after striking a balance, arrive at such conclusions as seem best to coincide with our own reason and judgment.

QUALITY AND PRICE.

Harper's Weekly suggests for the consolation of any manufacturers who may be driven out of their present business by tariff changes that there is an opening for them in making better lines of goods than the market now affords. The "journal of civilization" mentions plumbing, nails and tin as work or articles that might well be better.

But this sort of consolation will not work. The tendency when profits are small or the supply is greater than the demand is not toward a better product or superior construction but toward inferiority.

Price is invariably given more consideration than intrinsic value. Not but what the average purchaser wants both low price and high value, but when he can't get both he usually chooses the low price and whatever value accompanies it.

"'Tis true, 'tis pity; pity 'tis 'tis true," but a better consolation for manufacturers who may be driven out of business would be to make a cheaper "line of goods than the market now affords." It is the easiest thing in the world to get purchasers for goods at prices lower than formerly, but the hardest thing in the world to get purchasers of goods at higher prices than formerly.

The old adage, "the best is the cheapest," passes current in theory only. The practice in four cases out of five is "the cheapest will do well enough for me," meaning, however, usually, "the cheapest must do for me."

When a purchaser must make a struggle and a sacrifice to find cash to pay $1 for a given article, for illustration, he will scarcely be willing to pay $1.50 for a better quality of the same article, even though the $1.50 article be worth double the $1 article.

We can get out of life no more than we put into it. It may seem sometimes as if we were rather getting the best of the world, but this is invariably a mistake. No soul ever did or ever will get the best of it. It is true, that we may get a little more of our share of money or fame or popularity—the thing we most strive for—but enough less of something else which is just as valuable will thus be withheld from us.

San Francisco recently received its first cargo of lumber from the Tongass national forest, Alaska. The shipment consisted of 1,500,000 feet of Sitka spruce.

(Continued from Page 909)

And that he had ta'en up his latest inn,
In the kind office of a chamberlain,
Showed him the room where he must lodge that night,
Pulled off his boots and took away the light.
If any ask for him it shall be said,
Hobson has supt and's newly gone to bed.

Lord Byron was responsible for the mural inscription on John Adams, a wheelwright and carrier of Southwell, Nottinghamshire, and this may be read over his grave in that town:

John Adams lies here, of the parish of Southwell,
A Carrier who carried his can to his mouth well;
He carried so much, and he carried so fast,
He could carry no more—so was carried at last;
For the liquor he drank, being too much for one,
He could not carry off—so he's carri-on.

Yet another carrier and coachbuilder lies buried in the picturesque churchyard of Ludlow, where there is a headstone to his memory. By name John Abingdon, he for forty years drove the Ludlow stage to London, dying in 1817. His epitaph to "a trusty servant, a careful driver and an honest man," reads as follows:

His labour done, no more to town,
His onward course he bends;
His team's unshut, his whip's laid up,
And here his journey ends.
Death locked his wheels and gave him rest,
And never more to move,
Till Christ shall call him with the blest
To heavenly realms above.

The driver of the old-time coach which ran between Aylesbury and London possesses an epitaph over his tomb in the churchyard of Dunton, Bucks., which is a good specimen of the epitaph analogous. It reads:

Parker, farewell! thy journey now is ended,
Death has the whip-hand, and with dust is blended;
Thy way-bill is examined, and I trust,
Thy last account may prove exact and just.
When he who drives the chariot of the day,
Where life is light, whose Word's the living way,
Where travellers, like yourself, of every age,
And every clime have taken their last stage,
The God of Mercy and of Love,
Show you the road to Paradise above!

An epitaph with a solemn warning is that on John Webster, who died in 1809, through a cart wheel going over his head:

Ye little children that survey,
The emblemed wheel that crush'd me down,
Be cautious, as you careless play,
For shafts of death fly thick around.
Still rapid drives the car of time,
Whose wheels one day shall crush you all;
The cold low bed that now is mine,
Will soon be that of great and small.

An exceedingly clever epitaph to the memory of an engine-driver may still be read in Bromsgrove churchyard. It dates from 1840:

My engine now is cold and still,
No water does my boiler fill;
My coke affords its flame no more,
My days of usefulness are o'er;
My wheels deny their noted speed,
No more my guiding hand they need;
My whistle, too, has lost its tone,
Its shrill and thrilling sounds are gone;
My valves are now thrown open wide,
My flanges all refuse to guide,
My clacks also, though once so strong,
Refuse to aid the busy throng:
No more I feel each urging breath;
My steam is now condensed in death.
Life's railway o'er, each station's passed,
In death I'm stopped, and rest at last.
Farewell, dear friends, and cease to weep:
In Christ I'm safe; in Him I sleep.

Another engine-driver has simply been remembered by a quotation: "He was a Man—Shakespeare," which may be seen at Newport, Monmouthshire. At Hessle, Hull, there is an inscription to the memory of George Pussick, a plumber and glazier:

Adieu, my friend, my thread of life is spun,
The diamond will not cut, the solder will not run,
My body's turned to ashes, my grief and trouble past,
I've left no one to worldly care, and I shall rise at last.

A good example of an acrostic epitaph is afforded by that on Valentine Pyne, a gunsmith. This is in the Tower Church, London:

V ndaunted hero, whose aspiring mind,
A s being not willing here to be confined,
L ike birds in cage, in narrow trunk of clay,
E ntertain'd death & with it soar'd away;
N ow he is gone why should I not relate,
T o future ages his valour, fame and fate:
I ust, loyal, prudent, faithful, such was he,
N ature accomplished, world's epitome.

P roud he was not, & tho' by riches try'd,
Y et virtue was his safe, his surest guide;
N or can devouring time, his rapid jaws
E 'er eat away those actions he made laws.

There are several curious specimens of engineers' epitaphs extant, and one from the churchyard of Bridgeford-on-the-Hill, Nottinghamshire, is worth recording:

Sacred to the memory of John Walker, the only son of Benjamin and Ann Walker, Engineer and Pallisade maker, died September 22nd 1832, aged 36 years.

Farewell, my wife and father dear;
My glass is run, my work is done,
And now my head lies quiet here.
That many an engine I've set up,
And got great praise from men,
I made them work on British ground,
And on the roaring seas;
My engine's stopped, my valves are bad,
And lie so deep within;
No engineer could there be found
To put me new ones in.
But Jesus Christ converted me
And took me up above,
I hope once more to meet once more,
And sing redeeming love.

A carpenter next claims our attention, one John Spong, a jobbing woodcrafts man, who died in 1736 and was buried at Ockham, Surrey. His epitaph is interesting for its unique analogy:

Who many *a sturdy oak has laid along,*
Fell'd by death, surer hatchet, here lies Spong,
Posts oft he made, yet ne'er a place could get,
And liv'd by *railing,* tho' he was not wit;
Old saws he had, altho' no antiquarian,
And *styles corrected,* yet was no grammarian:
Long liv'd he Ockham's premier *architect*
And lasting as his fame a tomb't erect,
In vain we seek an artist such as he,
Whose *pale and gates* were for eternity.
So here he rests from all life's toil and follies,
O! spare kind Heav'n his fellow lab'rer Hollies.

It is interesting to remember that Spong lived at a time when the village carpenter could not, as now, buy his boards already sawn and seasoned, but had to go into the woods, select his trees, cut them down, and take them on a lorry to his yard. Here with the aid of an undersawyer, the trunks were laid over the sawpit, and with himself as topsawyer they were cut into posts, planks and boards, afterwards being set up for so many months for the purposes of weathering and drying. One more carpenters' epitaph will suffice to represent that trade in epitaph lore; this being taken from Longnor, Salop:

"In memory of Samuel Bagshaw, late of Harding-Booth, who departed this life June the 5th 1787 aged 71 years:

Beneath lie mouldering into Dust,
A Carpenter's remains.
A man laborious, honest, just,
His character sustains,
In Seventy-one revolving years
He sowed no seeds of strife;
With Ax and Saw, Line, Rule & Square,
Employed his careful life.
But death who view'd his peaceful lot
His tree of life assail'd.
His grave was made upon this spot,
And his last Bench he nailed.

At Colkirk, Norfolk, is this inscription to William Timperley, a gunsmith, who died in 1660—the year of the Restoration—as a result of a pistol bursting in his hand:

However young and strong, be not in breath
Too confident; since by untimely death,
(A pistol breaking in his hand) lies here
A Timperley: rather a tear
Distill, then judge, since he so worthy dies;
Rather let fall another from thine eyes,
And (serious) say (ask not a reason why)
Better die soon, than longer life and die.

A curious record of an accidental death occasioned by a downfall of ice, is to be found in an epitaph on the son of the then parish clerk of Bampton, in Devonshire. By trade an ironmonger, he was killed by an icicle falling upon and fracturing his skull:

Bless my i, i, i, i, i, i,
Here I lies,
In a sad pickle,
Killed by icicle.
In the year Anno Domini, 1776.

Another ironmonger rejoices in a somewhat profane mural verse, which is still on his stone at Datchett, near Windsor:

Here lies the body of John Bidwell,
Who, when in life, wished his neighbours no evil;
In hopes up to jump,
When he hears the last trump,
And triumph over Death and the Devil.

Although not strictly coming within the scope of this article, inasmuch as it is not an epitaph, we give by way of conclusion the following epigrammatic scrap of a past century on Coles, which it is hoped may not be altogether without interest:

I met my coal-merchant the other day—
"Good morrow," sir and how are coals I pray?"
"Ah, Sir," said he, "I pity the poor souls
This dreadful frosty time, for *coals are coals.*"
"That's good," cried I; "The news my heart elates,
For half of those you sent me last were *slates!*"

Correspondence

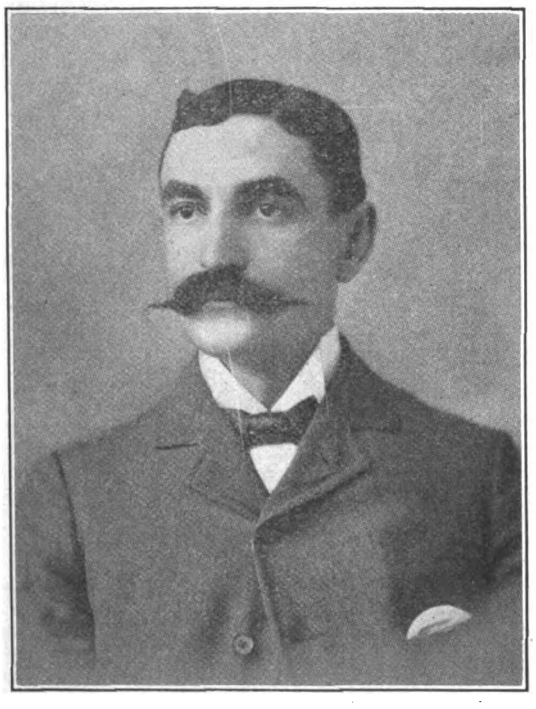
SUBSCRIBED FROM THE FIRST.

A Reader for Thirty-two Years and Still a Comparatively Young Man.

From Charles Barker, Massachusetts:

Horatio's servant, once with bow and cringe,
Swinging the parlor door upon its hinge,
Dreading a negative, and overawed
Lest he should trespass, begged to go abroad.
"Go fellow! Whither?" turning short about.
"Nay, stay at home, you're always going out."
"'Tis but a step, sir—just at the street's end."
"For what?" "And please you, sir, to see a friend."
"A friend?" Horatio cried—and seemed to start—
"Yea, marry shalt thou, with all my heart.
Go bring my cloak, though the night be raw
I'll see him, too—the first I ever saw."

When I met Mr. E. M. Bugbee of Springfield,



E. M. Bugbee.

Mass., I felt somewhat in the mood of Horatio, as expressed by the Poet Cowper.

During the past four years I have interviewed thousands of trade journal subscribers, but never the equal of Mr. Bugbee. It is a common occurrence to find a subscriber to The Blacksmith and Wheelwright of 10, 15 and 20 years, and I have in mind a subscriber in a small New Hampshire town, whose name I cannot recall, who surprised me by showing complete files for 28 years, and I had mentally awarded him the palm as the longest subscriber I ever saw.

But now the laurel wreath must fall upon the brow of Mr. E. M. Bugbee, who surely cannot be surpassed, and it is doubtful if he can be equaled, as a continuous subscriber to a trade paper.

In his comfortable and neatly appointed office, a shelf built for the purpose, contains every number of The Blacksmith and Wheelwright ever printed, beginning Vol. 1, No. 1, dated January 1, 1880, covering in all 34 years. Certainly a most remarkable incident, besides the highest possible compliment which could be paid to any trade journal.

When asked what particular feature interested him most, he replied: "I have always read it through thoroughly, and even now use my files for reference, because I have found so many useful ideas worthy of adoption, and the different departments contain such a lot of valuable information that it would be difficult to designate any special feature. It's good all the way through; why I even read the ads. and watch for any new device coming out in my line. I always had a habit of resting up, by reading, and have taken other papers in my time, but I probably have had a natural love for The Blacksmith and Wheelwright and maybe will until we part forever."

Mr. Bugbee's Shops.

Mr. Bugbee was born in Hartford, Vt., and is the third in line of generation to follow blacksmithing. At 14 years of age he entered his father's shop, and when he reached the age of 17 he decided he could never learn everything thoroughly in a small country town, so he left for Amesbury, Mass., where he immediately secured a position and worked for a few years. Later on he went to Concord, N. H., and was employed by the famous old firm of Abbott, Downing Co. When he felt he had mastered all detail of his work, his ambition led him to open a shop in Springfield, Mass., a little over 20 years ago, where he has remained ever since.

His oldest employee is Mr. Christopher Margeson, now aged 66 years, who has been with him ever since he started, of which fact he is very proud. Mr. Bugbee is a very young appearing man for his age, and personally does very little work at the forge, devoting most of his time in the painting department which is constantly increasing, particularly in automobiles. When seen he was busy installing a new engine in his workshop which will give him much needed extra power. All his departments are equipped with up-to-date machinery, which illustrates very nicely his progressiveness as a modern mechanic.

Welding an Automobile Axle.

From Chas. Smith, Pennsylvania.—There are a number of automobiles and auto trucks in this place and one was brought to me to have the broken axle welded. I will herewith describe the process as clearly as I can.

First measure the axle so as to get the center and mark each side of the center with a trammel. As a matter of caution mark on a board this measurement for fear the trammel should be lost or bent. Then heat the part of the axle to be repaired (being sure to heat it far enough back) and file all the paint off. The reason for doing this is that the white lead in the paint will not permit a weld being made. Heat to a bright red and let cool. A scale will be formed. Now cut four pieces of iron as wide as the axle and 6 or 7 inches long. Draw each piece to a taper, allowing ⅛ of an inch extra thickness to work on at the small end and plenty of thickness at the big end. Bevel the edges and fit all the pieces in the web of the axle. Allow for a taper and drive to place when hot. Drill ¼ inch hole in the axle 1 inch from the end and also in each piece of iron to be used as re-enforcement to the sides. Make two quarter nails long enough to take the axle and the two pieces for one-half of the axle. For the two nails just bend over the end of ¼ inch round iron, cut off the length required and point sharp. Heat each nail and flux with pure borax. Then heat the axle again and you will notice a heavy scale on it but you can remove this by filing it off and it will be free from any white lead influence. Then while the axle is red hot weld flux both sides with pure pulverized borax. This prevents any scale forming on the steel. Heat the pieces of iron prepared for the sides, flux them with borax and put them where they will be free from any dust. Cut two pieces of Delmas wire welding pad the width of the axle web and ½ longer than the pieces to be welded on. Punch a hole in the welding pad at the same distance as on the pieces, the ½ inch projecting beyond each end of the piece. Put the nail through the piece and welding pad and drive the nail through into the web of the axle, and one-half of the iron pieces are in place. Turn the axle over and put the other piece of wire welding pad over the nail, point down to the web and then place the other piece of iron over the nail and gently clinch the nail. Half of the axle is now ready.

Get the fire ready by burning the tar out of a good quantity of soft coal and well coke it. Remove the clinkers and make a good coke bottom to the fire. Then lay the prepared end of the axle on this bed of coke and wall up the sides with coal. Cut fine wood 9 inches long and sufficiently high to make a good oven. Then cover with fine coke and a light cover of soft coal. Blow up the fire until the iron gradually gets red hot. When the wood is partly burned away put a little more fine coal on the top and take a long rod and poke the coke under the iron. Replenish with coke from time to time, being careful not to let the top break down. When the iron is soft remove to the anvil and close down the nailed pieces of iron to the steel as close as possible to convey the heat uniformly. Re-

How it looked when welded.

turn to the well coked fire and take a heat, using a long spoon to put borax on the iron when required. Draw a soaking heat. Watch the steel. When the spoon sticks well the heat is ready to draw and weld. First weld the thin ends of the iron pieces using a flatter and hard holding blows and follow up to the end. Return to the fire and take a general heat with borax. Leave lots of iron on the end. Cut the scarf and draw to form a long scarf. Then cut a hook at the heel of the scarf and open it wide with a blunt cold chisel. Prepare the other half the same way and make the scarf to the trammel measure, one inch short, with plenty of stuff to draw from. Draw the welding heat in a covered fire with borax having the back of the scarf down. When the heat is ready turn the face of the scarf down for a few moments to get well softened. Then remove and hook the weld and stick with hard holding blows. Put dry borax under the points of the scarf while hot and close them to keep the dirt out. Then draw a heat

on the under side of the axle, weld that side first and close up the imperfections quickly with a hammer. Then draw a heat on the top side and do the same. Now wash, heat the scarfs one at a time and draw the weld to the trammel measure. Use the heat several times, if required, and allow 3/16 inch for shrinkage. Arch the axle, if required, and straighten with leveling rods through the holes. Have patience, making each weld carefully and you will succeed.

WORTH CAREFUL READING.

Welding Information, Prices, and Duty of the Craft to Stand Together.

From H. N. Albeck, Iowa.—I have seen several questions lately in regard to welding springs and flat irons, and although I have described my way of welding springs before, I will do so again, as I have had good success. In fact, I don't know of one broken in or near the weld that I have welded, and I have fixed a good many.

I draw both ends out to a spear point and sharpen the edges of the point. I then place a piece of Lafitte welding plate between the lap and clamp a pair of heavy tongs on one edge. Next I place the spring in the fire on the edge and blow slowly until it is good and red. Take it out and hammer lightly until it is stuck enough so I can take the tongs off and replace it in the fire without it coming apart. Heat again good and red. Take out and hammer again lightly all over until it is stuck good. I then replace in the fire and the third time I use a little borax, so it gets hot all through (but be careful not to get it more than a good red or just so the borax runs good). Take it out again and hammer down to size, striking quick and light, and keep hammering till it is black, and you will have a good job. But be sure the leaf is the same thickness in the weld when finished as it is each side of it. I find in welding flat iron of all kinds that by drawing the ends to a spear point it makes the strongest weld, and I find also that most poor welds are caused by being in too much of a hurry. So if you have trouble in welding wide tires, just take it easy and blow slowly, thus giving it time to heat through.

I have just installed an electric blower in my shop and I want to tell the brothers that if you have day service from your electric power plant you want to get one right away, as you will find it is much easier on a man and you can get the work out faster. I wouldn't be without mine for twice the cost price and twice the running expense.

We have recently raised the shoeing prices here from 40 cents for new shoes and 20 cents for resetting to 50 cents for new and 25 cents for resetting. The time is here now that the smith who knows his business and attends to it can demand good pay for his work.

I repair anything that comes along and make a specialty of doing hard jobs as I find anybody is willing to pay well for that kind of work and you may be sure I am not bashful about charging for it. At the same time a hard job well turned out is the best advertisement a smith can get.

I would like to see some discussion on acetylene welding, as I intend to put in an outfit in the near future, and would like to hear from the brothers that have tried it, and with what success.

Sometime when I have an extra hour you will hear from me again, as I think we all ought to take a little interest in the paper as through it we get closer together, and the closer we stick together the better for the craft.

Nearly 30 Years at the Business.

From Matt E. Burdett, California.—It has been several years since I have written to you. The older I get the less I think I know and hence the less I write. When I had been working at the trade three years I thought I could cure any defect a horse might have. Now when I get a difficult job I simply tell my customer that I will try. However, I have learned a few things since starting in at the trade in 1885. Most of the time I worked in Ohio, with seven years in the New England States. For six years I have been in California, and had I come here when I should I would not have had to work to-day. Some may wonder where the difference comes in. Well, this is the secret: In Ohio, if you figure on a job they try to see how low they can make it; here we do the opposite. I could go into detail and give you the items that make the difference, but the results would be just the same as you have them, so what's the use taking up your time? I will say that The Blacksmith and Wheelwright is a great medium for us fellows to exploit our ideas in, such as cold and hot tire setting, cold and hot shoe fitting, and interfering is in the same class. There is but one way that is right.

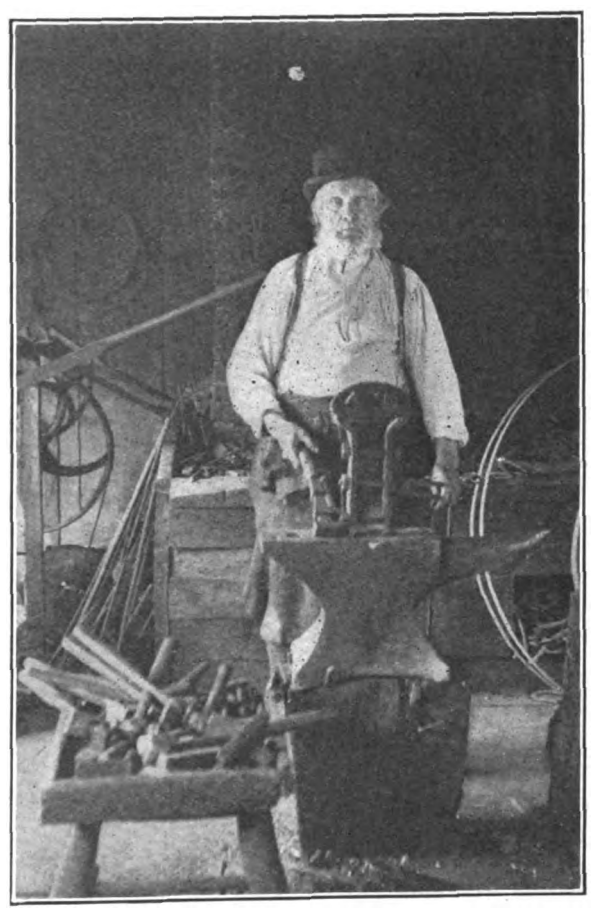
Now if I should give you my way to stop a horse from hitting his ankle, I would ask you to try style shoe No. 1, and then if that does not stop him try style No. 2, also No. 3. I wouldn't think of trying less, and even then he may hit. So you can change the shape and weight for every day in the first week and part of the second, and then get stuck. I am not joking with you, either. I fit hot and cold, as the case may be. I never trim a good frog, but do trim a bad one. There are not many who have not been in California that have ever seen a bad frog. I use clips on some feet; some don't need them. A bar shoe is the best ever on some feet; just the reverse on others. So young man, you don't know whether you are on foot or on horseback until you get there.

One word to the old men: I worked at the trade 20 years before I learned that it was wrong to back punch a shoe. A shoe punched from the swage side will hold much better. It will surprise you to see how small a hole it requires for your nails. No use of going into details as to the advantage. Any mechanic can see it at a glance.

If there is any young smith who would like to know what I have experienced in my line, or have the price of work or land in California to compare with those in his State, I will be only too glad to set him right. I will say that land sells readily in this locality for $1,000 per acre. This is the average. But there is lots of land in California not worth 25 cents per acre. Don't buy land unless you see it. I don't think I ever saw good mining stock for sale.

A Sturdy Veteran of 84.

From G. W. Bigelow, California.—As I was finishing and putting in the bolts of a stirrup for a muley sawmill on the 4th of October, the photographer came into the shop with his apparatus and called my attention to the fact that it was my birthday. He had got in the habit of coming on that date and could not stay away



On his 84th birthday.

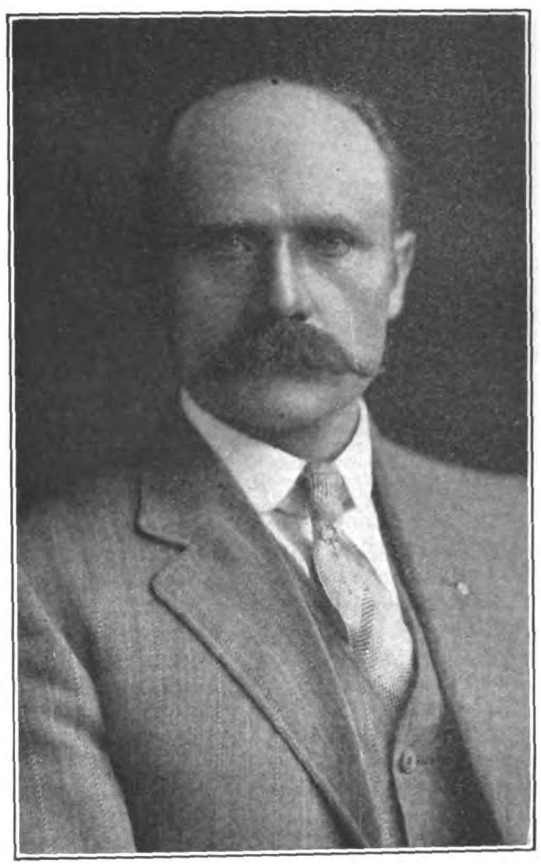
and lose the job, so he took a snapshot of me which I enclose herewith.

I think I am the oldest blacksmith in the State that follows the business. I have been compelled to abandon shoeing on account of a lame knee but find no trouble in doing fitting and other work. It is quite a nice job to make a stirrup of a piece of iron 3 inches wide and 5/8 inch thick that weighs 15 pounds, but years ago we had to make the mill crank out of 4 inch square iron and forge the wrist, and all in one piece.

Please receive my best wishes for The Blacksmith and Wheelwright.

An Interesting Sketch.

From Chas. W. Winter, California.—I was born July 14, 1863, in Pollnow, Germany. When 16 years of age I started to learn the trade under the old guild rules. I served 2½ years as



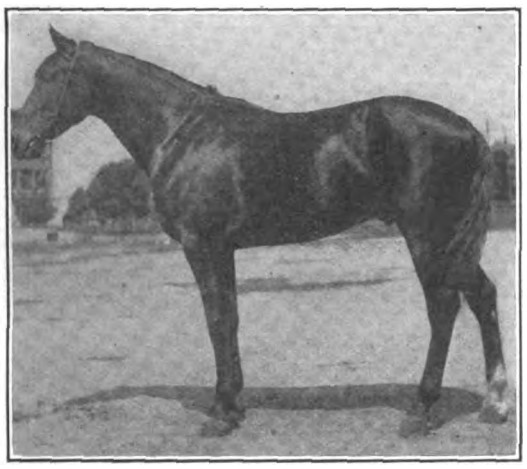
Charles W. Winter.

apprentice, passed an examination and worked as journeyman in the same place till I was 20. On September 1, 1883, I came to the United States and landed in Baltimore, taking the train the same day for Milwaukee, Wis., where I worked in several shops. I attended night school, also took private lessons in English. I came to Los Angeles, Cal., in February, 1886, and to Alhambra, a suburb of Los Angeles, the next month, October 1, 1887. I opened shop for myself and have been in business ever since; I like shoeing better than blacksmithing but do all kinds of work. I have a number of books on shoeing, but foremost is Roberg's "The Foot of the Horse," also Jordan's book, which I prize highly. I subscribed for The Blacksmith and wheelwright in August, 1887. I have raised some trotters for pastime, with more or less success. I raised Alarich, 2.11¼, trained and driven by W. G. Durfee of Los Angeles. He campaigned him on this coast this season. I have now a half brother to Alarich, Alhambra Prince, 3 years old, 2.27, by Redlac, 2.07½. He worked last summer in 2.13¾. I shall get him ready for the market next winter.

Blacksmithing here in Southern California is not what it should be. The prices are low in shoeing as well as blacksmithing. The cause is no organization in the country districts and very limited in Los Angeles. It used to be said years ago that horseshoers with means would come out here, work cheap and only cared to make money for tobacco and rent. Another excuse was they could not be idle. I manage to get $1.50 per set plain and $2 for rough shoes. Some shoe for $1 in Los Angeles. We organized a horseshoers' union some fifteen years ago but it did not stick.

Since I have received so much benefit from the pages of The Blacksmith and Wheelwright I shall try and explain how I true a box in a new wheel. It may not be new to some, but I have not seen anyone do it my way. I bore the hub so the butt end of the box will fit snug. Then I drive the box and put the wheel on the spindle. I take four long slender wedges and set them opposite one another in front. Then turn the wheel and tap the wedge where the wheel swings out near the ground. Keep on tapping until the wheel is true and the box tight. Fill the rest up with wedges. Cut off the end of the

wedges. Have a hollow calking tool which fits around the box and drive the wood and wedges back, enough to allow the rim of the nut to slip in place. Next wedge up the butt end. For an old loose box I use strands of unraveled rope about 4 inches longer than the box, enough to fill a space between the box and the hub. Insert the unraveled rope in the front end of the box about two inches. Turn the front up, so the strands will hang down and equalize them all around the box. Try and keep them in place, while you put the box in the hub. When driven



Alhambra Prince, 2.27. By Redlac, 2.07½.

in far enough, remove the strands or wedge, and the box will be true, if it had been true before, if not, as true as with the new wheel. Nice oat straw will do as well as rope. The rope will absorb any grease in the hub.

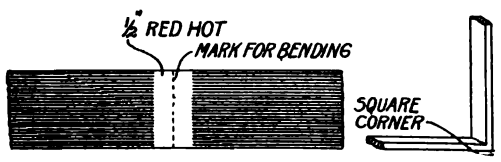
I have my blower run very easy by taking out the old grease, or oil, and filling with coal oil. Let it run for a half day, let it run out and fill with one part oil and one part coal oil. I have used one blower now nine years and it runs as nice as ever. I treat my blowers like this about four times a year. I use the Western Chief blower.

He Is Still Learning.

From J. B. Owen, Ohio.—About seven years ago I sent to you for a sample copy of your paper which you kindly sent by return mail. At that time there were two sawmills in the neighborhood of my shop, for I live in the country and all of my work is for farmers, but one of those sawyers came to me and said: "Can you make a cant hook?" He said he never saw a blacksmith that could make a good cant hook. I told him I would try it anyway.

I made the hook and sent it to him by his son, but I followed the directions of the brother from West Virginia, as he had given them in this sample copy of your paper. It was only a day or two until this millman was back and he said, "Who taught you to make a cant hook?" He says "I can stand on the mill and throw that hook out in the log yard and by it will catch a log. Make me four more hooks of different sizes." I tell this to show the value of your paper to me from this first copy.

Any brother that has a shop in the country and has to mend section rods will find this an easy way to get the sections off the rod: Lay the slack tub in such a way that the water will run away from where the bend is to be, then pour



Mending Section Rods.

water on and up to within a quarter inch of the rod across the end of the anvil with the points of the section down, then hit them on the back end with the hammer. A light blow will send them ringing across the shop.

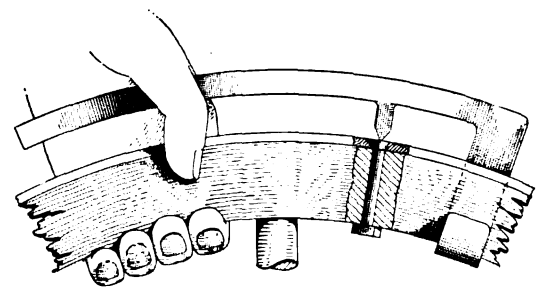
Here is my way of making a square bend in thin iron. After marking where the bend is to be made, heat to a yellow color and hold over the mark on each side. When there is only ½ inch that is red hot, bend, and a perfectly square corner is the result. In ironing coal cans, etc., this is a quick way to make the bends as there is less truing up.

I think a great deal of The Blacksmith and Wheelwright and enjoy reading Brother Hobart's letters as well as all the others, but it is difficult for me to put my ideas on paper as my education as a writer has been sadly neglected. If this misses the waste basket it will do more than I expect.

I am 62 years old and work both wood and iron and have all the work I can do, but I must say that the good old Blacksmith and Wheelwright has helped me out of a few tight places, and I am still learning something every day. No man will ever live long enough but what he will find some one that can give him a pointer or two. If the editor or some brother will tell me how to keep my papers or bind them it will be a great favor to me. I have all the numbers but two which I gave to a neighbor smith, for the last seven years.

A Fine Country Business.

From Ernest Finley, Pennsylvania.—I am engaged in a general line of blacksmith and wagon repair work and am located in a rural or farming district two and three-quarter miles to the nearest town and blacksmith. I have all the work one man wants. My line consists of almost everything that falls to the blacksmith's lot: shoeing, repairing buggies, wagons, farm machinery, soldering milk cans, cutting glass and patching slate roofs for pastime. I would say that most all of my customers are good pay or cash. Prices are fair, for shoeing plain, 30 cents per shoe; with toe and heel calks, 35 cents and 40 cents; Neverslip, $2.50 per set; 1 shoe, 65 cents; resetting tires up to 2 inches, 50 cents per tire; 75 cents for 3 inch; $1 for 4 inch; new tires, $5 per set up to 1 by ¼ inch, and above that according to size and weight. I am much interested in the articles contributed by the many smiths all over this country as well as other countries, many of which I have found helpful to me. I have been in business here for ten years and find I have yet many things to learn. When I have learned all I shall quit. I find many tools that have been made by many different smiths that are quite helpful. I also have some that might be a help to others. One is a tool to remove broken rivets



For removing broken bow sockets.

from buggy bow sockets which any one can easily make by bending a piece of steel as shown in the illustration.

Another one is a wrench for holding tire bolts, or any other bolt, where it can be used. This is a very simple affair but surely does its part. It consists of a handle bent a little with a hook on the end long enough to reach over the rim and stand about one inch above the tire. About 2½ inches from the hook is a steel pin with a chisel point to engage the head of the bolt and the handle is bent just enough to allow the hand to grasp the handle and rim. The handle is about 13 or 14 inches long. This latter tool, however, I hardly ever make use of any more, as I have for several years been using a Reynolds tire bolter.

My shop is 20 by 46 feet. I have a Royal H blower, a Little Giant foot vise and bolt holder. A Green River tire bender and Green River hot shrinker. No cold setter yet. I have a great many woodworking tools, but am not equipped with power yet but would like to be. I own my property, consisting of a house and lot, about two acres of ground along the main road from Pittsburgh to Uniontown (State route), a stock of material worth about $1,500 and have about $500 more invested in tools and free of debt. I have a wife and four children. I am a regular reader of The Blacksmith and Wheelwright and have all the numbers complete for twenty years and have received a good deal of help in my work from it and I expect to read it as long as I am in the business.

When a babbitted journal has strain enough on it or runs hot enough to seriously mar the face of the metal and call for scraping or smoothing up, it is generally better and cheaper in the end to repour the box with fresh babbitt.

ANSWERS TO CORRESPONDENTS

Under this head will be found each month replies to questions asked in previous issues. Our readers will appreciate the importance to inquirers of furnishing the desired information as promptly as possible.

Welding and Annealing.

From E. A. Weitz, Oklahoma.—My father has been a blacksmith for forty years and we boys are all blacksmiths. I have four brothers.

In answer to Brother L. W. Fox of Texas, I would say that we always just give the automobile springs a good weld and don't temper them at all. We have found by experience that it is a good way. Sometimes blacksmiths weld springs and the weld is smaller than the spring. The weld should be just as large as the main part of the spring, and not any smaller at the ends of the weld.

In answer to "an annealing question," from E. Bravender of Mississippi, I would say that if he will take the lock that is broken and heat it to a red heat and let it cool slowly, it will be easily drilled. The castings are usually quite hard but may be softened that way.

To Make a Rudder.

From Chas. Jenkins, Canada.—While looking over some of the back numbers of The Blacksmith and Wheelwright, I noticed that Emile Alexis of Louisiana would like to know how to make a rudder for a boat. I will try to explain how we make them here. But first it depends quite a bit on the size of the boat the rudder is for. For a big boat, say 75 or 80 feet long, the rudder should be 5 or 6 feet wide and from 6 to 8 feet long. The first thing to do is to get a piece of pipe, A, Fig. 1, 7 or 8 inches inside, and long enough to reach from the shoe, B, to the quadrant. Now get a piece of oak or any hard wood suitable, large enough to turn to the size of the pipe inside and full length. Turn the timber so it will lay in the pipe, A, pretty snug. Put the wood into the pipe. We use a press for this purpose to press the pipe onto the wood. The sketch I hope will be more readily understood than my description. Get pieces 4 inches by 8 or 10 wide, or enough to make the blade wide enough as shown at D, Fig. 1. The shoe, B, is made of 6 or 8 by 1½ inch iron, bent double at the end, E. This end should have a hole of 2½ inches in it for the pin in the rudder to drop into.

Fig. 2 shows the post with the pipe in the

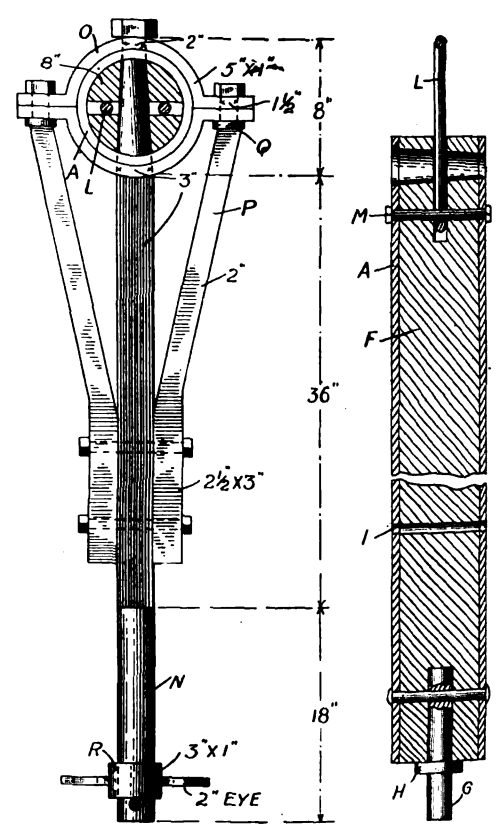


Fig. 2.

wood. Bore a hole and have it a driving fit for the pin, G. This has a collar, H, welded on it and against the end of the post, and this also acts as a bearing for the rudder. Now drill four holes for 1 inch bolts through the post about 8 or 10 inches apart. Drill ¾ inch holes, K, for

the rivets. Countersink on both sides so that the rivets will not stick out. Then cut a slot in the top end of the piece A, to let in a ring, L, or link. Drill a hole, N, through the post, A, for a 7/8 or 3/4 inch rivet, the rivet to go through the ring, L. This is to hook a block and tackle in order to ship and unship the rudder when necessary. A steel or iron post will do just as well. Of course, the steel or iron makes a heavy rudder. I can show two or three ways to make a quadrant, but the one illustrated will suit for this rudder. First the tiller bar, N, is 62 inches long and 3 inches square; stock is turned down as shown at the one end small enough to take a

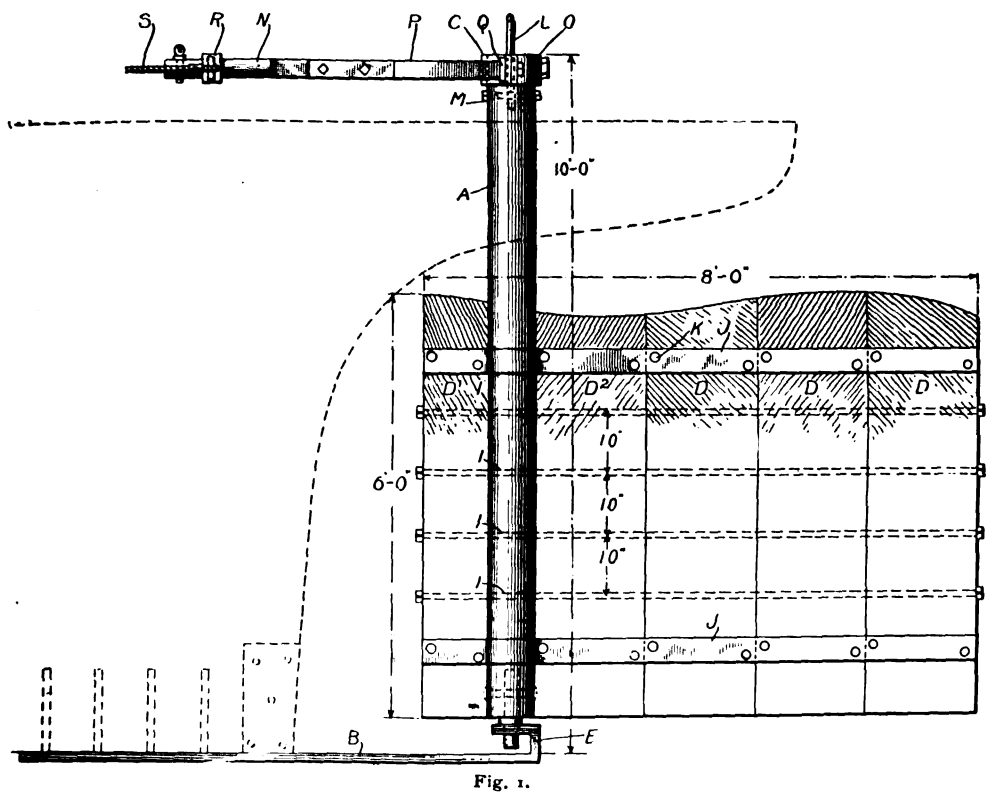


Fig. 1.

2 inch nut. This circular part should be 8 inches long. The clamp is made of 5 by 1 inch stuff with a 3 inch hole in the center of one half and a 2 inch hole in the center of the other half. The holes in the lugs for the braces are 1½ inches. The braces are shown at P. The braces are of sufficient length to suit and are flat on one end and are drilled for 2¾ inch bolts. The other end has a collar, too, and is drawn to 1½ round. The slide ring, R, is forged out of anything suitable. I make it 3 inches wide with a 3 inch hole, so it can be bored out to fit and will slide easily on the tiller end. The ring has two lugs, one on each side opposite the other, one big enough for a 1 inch cable eye, or a fastening for a chain, or you may weld a ring on each lug. This rudder can be made in proportion to the size of your boat.

Angle-Iron Rings.

From John J. Swope, Pennsylvania.—I saw while reading your paper that F. Swift from South Africa would like to know how to bend and weld angle iron rings. Now my way would be to take a piece of wood, or better yet, iron, and put a number of holes in it, that is according to the size of the ring to be made, and put bolts in with hooks on to catch over one side of the iron, according to the way the rings are to be bent in or out. Then heat the iron and clamp it down with the bolts, bend it around, and hammer it all around. Then scarf it and weld the same as ordinary rings.

To Soften Iron for Drilling.

From E. T. Boyd, Florida.—If Mr. E. Brevender, who wishes to know how to soften a hard casting, will burn a small piece of brimstone on the spot where he wishes to drill a hole, I think he will have no trouble in drilling it with an ordinary drill.

Quite a lot is written these days about gaining or getting the confidence of the men at work. The simplest, and often the most effective way is to show confidence in them.

HORSE DENTISTRY.

When It Is Needed and How to Do It Properly.

The necessity of having the teeth of horses attended to by a veterinary dentist is not always recognized, yet many of the apparent ailments of horses may be properly attributed to irregularities of the teeth, which may be readily remedied by the intelligent use of proper instruments. On the other hand, much harm is done by blacksmiths and others who introduce a hoof rasp into the mouth and tear away portions of the molar teeth which are necessary to proper mastication of the food, and at the same time fail to give the relief needed by removing abnormal projections, or loose, split molars, which may be occasioning the trouble.

It should be understood, says A. S. Alexander, M. D. C., in Canadian Farmer and Thresherman, that when a horse chews, the molar teeth grinding from side to side do not cross the entire surface of the teeth above or below. For this reason the outer edge of the upper molars and the inside edge of the lower molars remain unworn, and after six years of age become in many instances so long and sharp that mastication cannot be comfortably performed. It also happens that these sharp points frequently lacerate the checks or tongue, and so make it a painful act for the horse to chew grain or other food.

Where such conditions exist, the veterinary dentist skillfully rasps away the projections only, and is careful not to interfere with the rough corrugated surfaces of the molars, by means of which the grinding process is conducted. He has also a pair of close cutters with which he can snip off the longer points, and open cutters for the purpose of cutting off the large projections which are strong and difficult to cut.

Where a tooth has become diseased and dropped out or broken off level with the gums, the opposing tooth of the upper or lower jaw, having nothing against which to grind, grows long and often projects into the cavity. These have to be cut off level and for this the open cutters are required. Where such long teeth exist in the mouth of a horse, he can neither chew grain nor hay, and the latter food, after being formed into a "quid" or ball, is dropped out of the mouth. It is remarkable how quickly a horse is able to eat after the above operations have been performed and how soon the flesh which has been lost is regained.

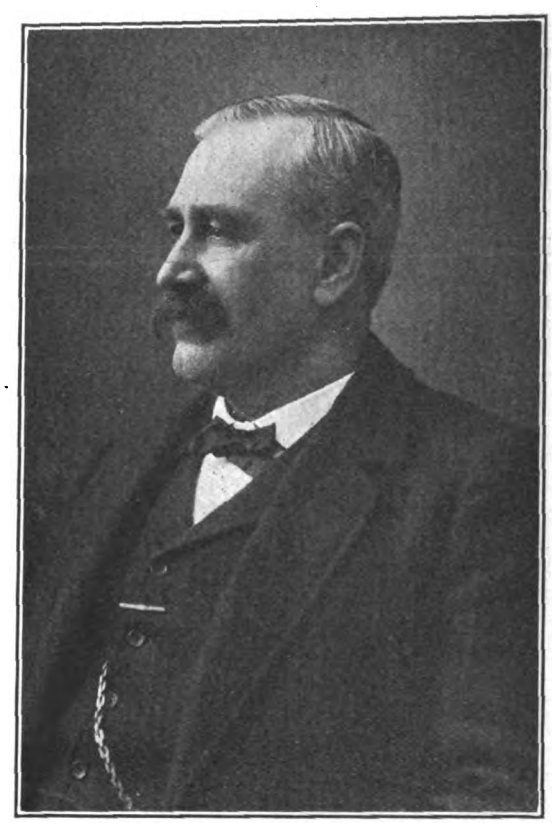
Where a molar tooth has been split by accidental chewing down upon a stone taken into the mouth with the food, one part usually becomes loosened and sticks toward either the cheek or tongue, and in either case interferes with mastication. This loose portion of the tooth has to be extracted, and for this work a special pair of forceps is required, and termed a "splinter forceps." Where a tooth has become diseased, the horse cannot masticate properly, and if it be in the upper jaw a discharge is seen from the nostril and a foul odor accompanies the discharge, which is especially noticeable when the mouth is opened, as in putting the bit into place. The bad odor is characteristic of both diseased and decomposed saliva and feed.

Many a good horse suffering from a discharge of this nature has been condemned and shot for glanders by ignorant or careless quacks, and numbers of horses are also doped with nostrums of all sorts for the cure of "catarrh" or "nasal gleet," when an examination of the mouth would disclose the diseased molar tooth as the true cause. It is a very difficult matter to extract a molar tooth from the upper jaw, and impossible in a young horse, as the roots are very long.

Trepanning is resorted to in such cases. An instrument cuts a circular, disc-like piece of bone from the skull at the cheek above the roots of the tooth to be extracted. The roots are thus exposed, and a punch is introduced through the orifice and struck several blows with a mallet, which forces the tooth down into the mouth. The hole is afterward plugged from above by a pledget of oakum, and the cavity syringed out daily with a mild antiseptic solution. It readily heals and the animal is as good as ever. It is easier to extract a tooth from the lower jaw, but care has to be taken, either in extracting a tooth or in trepanning the lower jaw, not to break the bone. Need of dentistry is to be suspected when a horse fails to get good out of generous feeding, when he passes oats whole, cuds or quids his hay, has a foul odor from his mouth or a hidebound condition and lack of thrift.

Obituary.

Many of our readers will learn with regret of the death of Lauren M. Fitch, proprietor of the Fitch Gear Company, Rome, N. Y., after a year's illness, at the age of 64. Mr. Fitch was a well-known and highly-esteemed business man and was for thirty-four years proprietor of the gear company which bears his name. He was born in Brookfield, Madison County, N. Y., on Sept. 3, 1849. In 1881 he began the business to which he devoted the remainder of his life, the Fitch Gear Works. All kinds of gears for carriages are the products of that plant and because of the excellence of the gears and through the successful business methods of Mr. Fitch those goods are now sold in all parts of the United States.



The late Lauren M. Fitch.

They are looked upon as among the best gears made for the purposes to which they are applied.

Mr. Fitch left a wife and one daughter. The business of the Fitch Gear Company is being continued by Mrs. Fitch, who has had eight years experience in its management and for the past year its exclusive management.

The Fitch Gear Company has been for many years represented in the business columns of The Blacksmith and Wheelwright, and both the high reputation of the firm and the exemplary character of Mr. Fitch himself have been tested again and again.

QUESTIONS FOR OUR READERS

You are invited to ask questions freely on all points pertaining to your work. Our subscribers who have solved successfully the problems which confront you will take pleasure in imparting the results of their experience for the benefit of their fellow-craftsmen.

Welding and Wheel Setting.

From J. S. P. M., New York.—I would like to know the best way to weld malleable iron. I did one job as an experiment, taking a piece of what acted like steel rod. I drilled in the end of a piece big enough to take the end of an automobile tire brace. I heated both ends as near to a welding heat as I dared and pushed the one into the other. I afterwards brazed the joint. I haven't heard from it since it was put to use. I find it can't be pounded at a heat. Is welding compound any use on it?

What is really the idea of using sand and borax on welds?

What is the best way to box a wheel, either new or old, in order to true them up accurately? I would like to know the old-fashioned way to box wheels after the hub is cut on each end.

What is meant by the "pole" horse on a race track?

I am working with an old-fashioned boss who does not care to do much jobbing, or anything else save horseshoeing. He has put in thirty years at it but is not much up to date.

A Soldering Acid.

From Henry H. Leland, Vermont.—A reader asks about acid for soldering brass. I take one pint of muriatic acid and put in an earthen, not glass bowl. Then add zinc in small pieces until it starts boiling and will take no more. When cold, add near one-half as much water as you have acid and one-half ounce of sal ammoniac. With this I can solder on brass, copper, zinc, galvanized iron, any soft iron or steel, or anything but cast iron.

Wearing Shoes on the Outside.

From E. A. Brown, California.—I have a few horses here that wear their shoes all on the outside. In shoeing, I weld a piece of ⅜x½ toe steel along the outside from toe to heel, and when they come for shoes again there is just a little of the shoe left on the inside.

Cure Wanted for a Forger.

From L. W. Hych, Canada.—I have a horse that is a forger, hitting his toes together. I have tried every way I know and I cannot stop him. He has good knee action and picks quick. He is a good driver, nice in appearance, carries his head up well, and is an all around nobby little horse, and four years old.

Welding Automobile Frames.

From C. A. Burke & Son, Texas.—We are in the oxy-acetylene welding business and have been up against it in welding automobile frames and also steel and iron. Will some one kindly advise us just how it must be done?

A Peculiar Case of Interfering.

From Theo. Anderson, Nebraska.—I would like to ask what to do for a stallion that interferes with his hind feet. The left foot he sets sometimes straight and sometimes the toe out, and then he strikes it with the other foot, both with shoes on and without.

Who Can Tell Him?

From W. H., British Columbia.—I would like to ask some brother smith how to temper a tire or we will call it a hoop, 30 inches in diameter, of ⅜ inch spring steel to give it a spring temper.

Engine Troubles.

The best way to overcome gasoline engine troubles is to prevent them by taking in advance of the trouble the care that has to be given afterwards.

When trouble comes it is best, unless one really knows the cause from its nature, to look for something simple first, the empty tank, the corroded or the open switch, the disconnected wire.

Do not be too ready to meddle with things that are working all right. Carry the oil can and the cleaning rags around a little more, and leave the hammer and the monkey wrench alone unless it is certain they are really needed.

In making adjustments, especially of the carburetor, expect a few back-fires and have the room well ventilated, and a pail or two of sawdust handy in case of fire.

Above all, when things go wrong do not get excited. Take things cool all the time, but take them to pieces only when it is required. Remember, that there are a few hundred thousand gasoline engines doing good work in the hands of all kinds of people, and that the burden of blame before the engine can be condemned is with the user.

POWER

In this department an expert will reply to any questions our readers may propound as the result of their experience, or inspired by a desire to become acquainted with the value of power in the shop. All inquiries should be addressed to the Editor of THE BLACKSMITH AND WHEELWRIGHT, P. O. Box 654, New York City.

The Gasoline Engine and the Blacksmith.

BY A. A. ANDREWS.

There are so many things the gasoline engine will do that it is a wonder every farmer in the country does not have one. Hundreds of boys are today finding it attractive to stay on the farm because they are not compelled to follow the eternal drudgery that met their fathers at every hand. Improved power machinery operated by gasoline engines has had much to do with this condition.

The blacksmith has, in many localities, played a very important part in the work of making these gasoline engines what they are on the farm. Many blacksmiths have learned that the purchase of a gasoline engine for their own use was but the starting point of a very profitable trade for them. In the first place, the shop equipped with a gasoline engine naturally also has machines operated by the engine. These power driven machines enable the blacksmith to do a great deal of work that he could not well do before, or that he can do so much more easily with power. As a result the volume of the work done, and therefore the amount of money taken in every day increased so that the purchase of the machinery was soon many times paid back.

Then, many of the people who came to the shop to have work done saw the blacksmith's engine and talked with him about it. This led many of the smiths to become agents or dealers and to sell the make of engine they were themselves using. They could show the engine in actual operation—quite an advantage. Perhaps no other dealer in the town had an engine to show, and if he did, it was not in shape to run or to run under load. As a result, blacksmiths' engines were in many places the only ones that actually did work, and good, hard work every day. And, as these engines were usually started and run at least twice every day, and sometimes oftener, they could and would start on every occasion, and therefore made good impressions on possible buyers.

Too many dealers whose engines are not doing actual work find that they are not able to start their engines when they do wish to make a demonstration, and this of course does not help them to make a sale.

The blacksmith's constant use of his engine makes him familiar with it. After one or two experiences of trying to start the engine with the battery switch out, he learns to avoid this trouble. When he has spent fifteen minutes to learn that the friction driven magneto has slipped and that the engine will not start because the magneto does not get up to speed, he knows another point to look out for. Perhaps he has lost half a day's work on some important job because he has tightened up a spark plug too much and caused a fracture in the porcelain, which short circuits the current only when the engine begins to get heated up so that the fracture opens. Perhaps one day when he was called out to some farm to do some work, his helper started to overhaul the engine and in doing so took apart the governor and failed to get it back correctly. Locating this and making the correction has shown the smith just what the governor is supposed to do for the engine and how it does it.

Now these and many other things that happen to him, make the smith naturally and by training the most experienced gas engine man in the country. So, when a dealer has trouble with an engine, or when a farmer is in difficulty, the smith is naturally sent for to help. Trouble work of this character should pay well and usually does so unless the smith fails to make a charge in accordance with the real value of the service rendered. If a smith loses half a day going out to some farm to show the farmer how to start the engine, then the smith should be paid. If the farmer has purchased an engine and is having trouble with it, he cannot expect the smith to help him out for nothing unless he purchased the engine of him. Head work pays greater returns than hand work and that is the reason the smith earns more money per day than his helper. So, when you go out ten miles and find an engine with the water jacket cracked from having been left with water over night in freezing weather, you have the right to expect brain-work pay in making the repair. And, even if you should find that the only trouble with the engine is that the batteries are run down, or that the igniter plate packing or insulation has become broken, you are entitled to brain-work pay for your services.

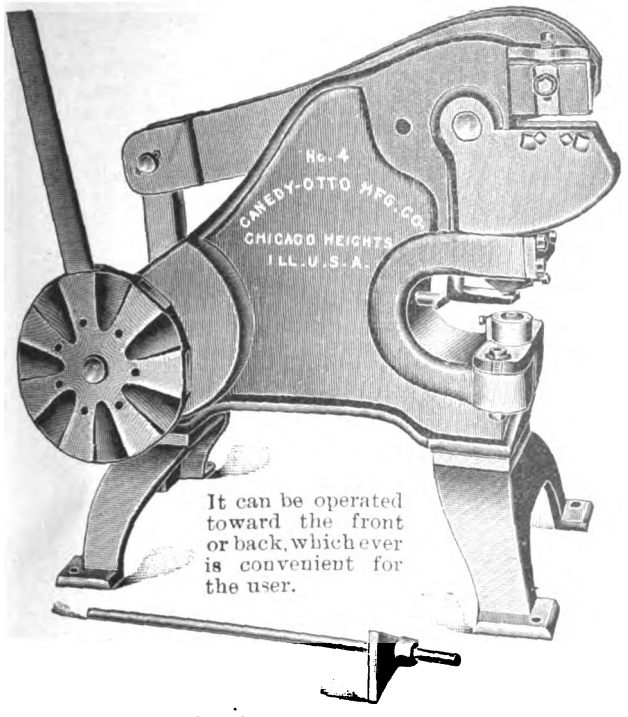
The blacksmith's training requires the development of ability to take things as they come and to solve each mechanical trouble as best he can under the circumstances. This is well illustrated by a case which occurred in the central west some time ago.

A blacksmith in a certain community had acquired quite a reputation as a gas engine expert, and there was hardly an engine in a range of 15 miles that had not at one time or another received some of his attention. If a new make of engine was purchased by anyone, this blacksmith usually took advantage of the first opportunity to look it over and see wherein it was different from the makes around there that he had previously seen. As a result, he was quite familiar with nearly every make in the territory and had done repair work on many of them. When he was called out to this particular farm, he had handled so many obstreperous makes, he had never done any repair work. However, as he had handled so many obstreperous makes, he had come to believe that he could fix almost anything that could be done outside of the engine factory.

He was told that this engine had run all right for several months but that it had not been used for a couple of weeks and on trying to start it to saw some wood the engine could not be made to go. Now this blacksmith had long since found out that if you once get an engine to running and then let it alone for two weeks, there are but very few things that can happen to it to prevent it from starting at the end of the period of time. So, when he had tested the batteries, the spark, and everything else that he thought could get out of order by itself, and was unable to locate the trouble he felt assured that some one had tinkered with the engine. Usually in such cases the farmer either does not know that he has actually caused trouble by getting the parts out of adjustment, or else he does not know that some one has done the tinkering. This particular farmer did not realize that loosening up a screw and letting a little lever slide out of the side shaft half an inch or so would stall the engine. It happened that this incident, however, caused the igniter to operate about half a revolution after it should. As a result, most of the mixture had passed out of the cylinder before the spark occurred and therefore the engine would not start. It would not even ignite the first or priming charge. Now, this blacksmith knew that the ignition ought to occur just before the piston reaches the inner dead center, and when the piston got to this point he began to look for the igniter to operate. When it did not do so, he looked to see why it did not, and when he found why it did not, it was a simple matter to make the correct adjustment and soon have the engine running.

Here was a case of good brain work. An ordinary worker might have spent days on the engine and either shipped it back to the factory, or had a man come from the factory. But this intelligent head work soon told the blacksmith where the trouble was. That it required him but ten minutes to find it, surely did not mean that he be paid only for ten minutes. Like the doctor, or the lawyer, who spends years and money to learn how to look for trouble and how to remedy it, this blacksmith's ability to locate the trouble was the result of much money and time and headwork, and he was entitled to and received a very good rate of pay.

No. 4 Combination Punch and Shear



Will shear ½x4-in. flat bars.
Will shear 1-in. round bars.
Will punch ¼-in hole in ¼-in plate.
Depth of throat 6 inches.
This machine is furnished with ¼-in., ⅜-in. and ½-in. punches and dies, also a lever bar.

When choosing your blacksmith shop equipment why not get the best—

CANEDY-OTTO

It costs no more.

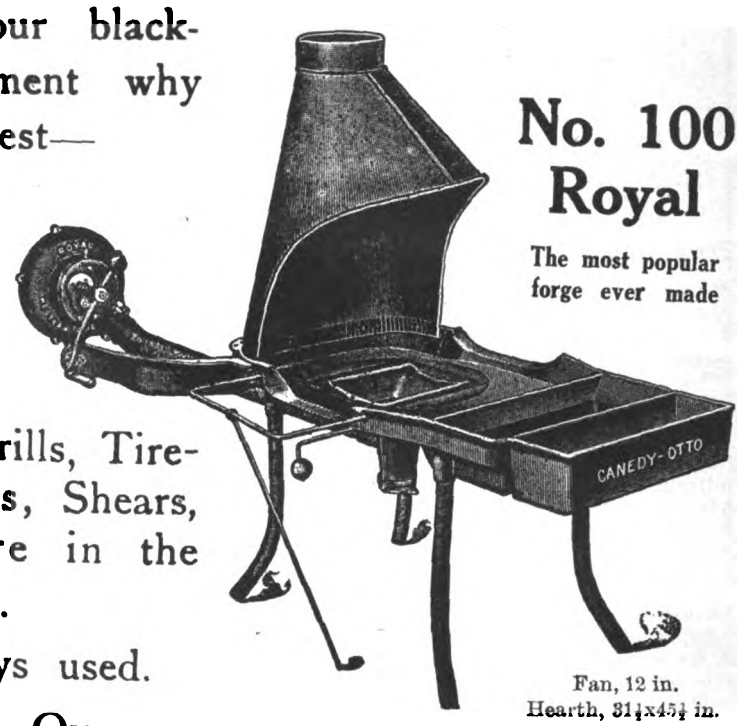
Manufacturers of the finest line of Forges, Blowers, Drills, Tire-Shrinkers, Punches, Shears, produced anywhere in the WORLD.

Once tried, always used.

There's a reason — QUALITY.

No. 100 Royal

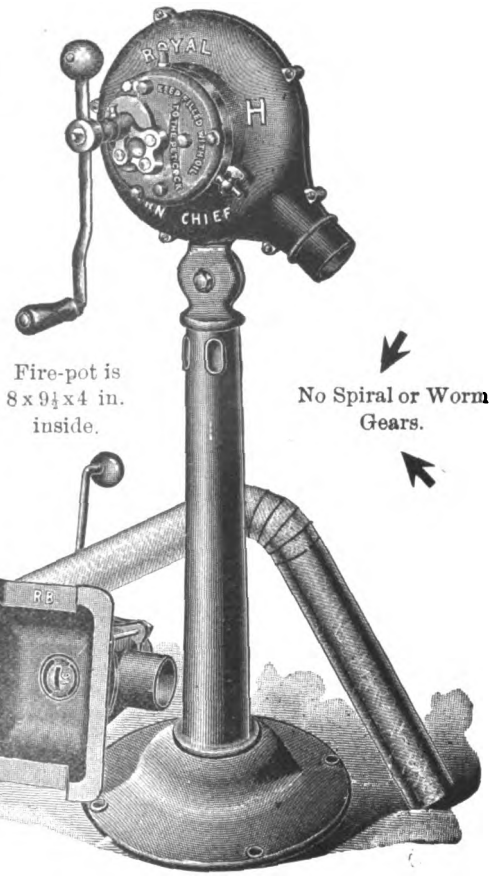
The most popular forge ever made



Fan, 12 in.
Hearth, 31¼x45½ in.

Royal Blower

(Ask the man who owns one)



Crank turns forward or backward.

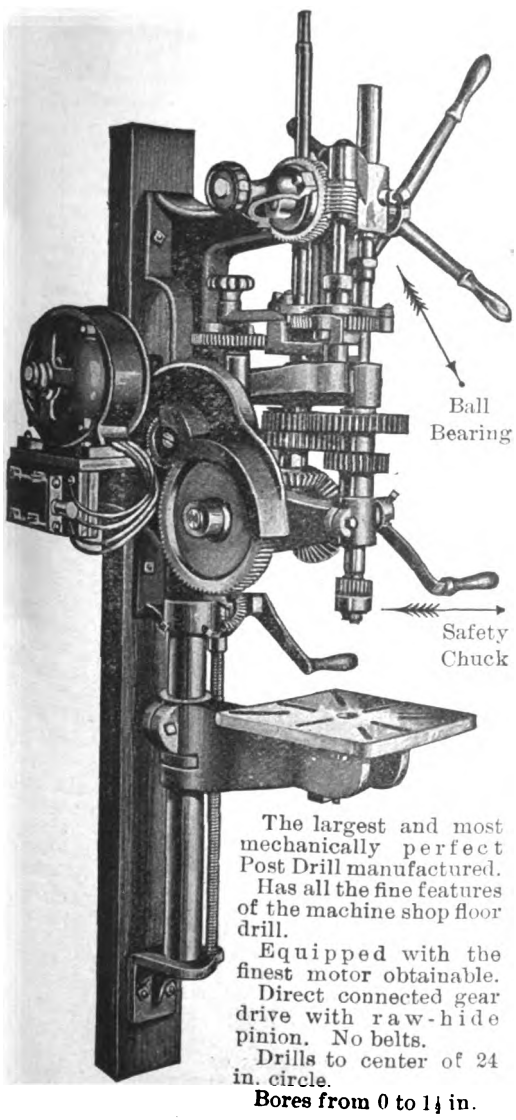
Fire-pot is 8 x 9½ x 4 in. inside.

No Spiral or Worm Gears.

FORGES BLOWERS

PUNCHES SHEARS

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 raw-hide pinion. No belts.
Drills to center of 24 in. circle.
Bores from 0 to 1¼ in.

DRILLS
TIRE-SHRINKERS

Over 200 different styles of TOOLS. We can suit every need.

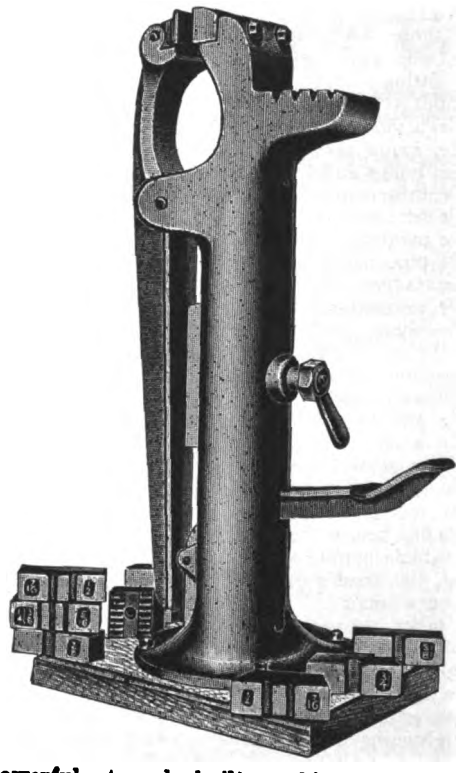
Send for Catalogue

Give name of supply dealer or jobber.

CANEDY-OTTO MFG. CO.

CHICAGO HEIGHTS, ILL.

Canedy-Otto Foot Vise and Bolt Header



A powerful, strongly built machine for making bolt heads, forming calks, shaping tools, and everything where a first-class quickly operated vise is needed.
Furnished with or without dies of the following sizes: ¼, 5/16, ⅜, 7/16, ½, ⅝, ¾.
The best of material and workmanship used throughout.

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1912 AND 1913

THE BLACKSMITH AND WHEELWRIGHT

The asterisk (*) denotes that the article is illustrated.

WANT ADVERTISEMENTS

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

will be inserted under this head at 2 cents a word, including the address for each insertion, payable in advance; but no advertisement will be accepted for less than 50 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 FOR INVENTIONS.

H. W. T. Jenner, patent attorney and mechanical expert, 608 F St., 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.

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.

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.

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C. L. PARKER, attorney-at-law, and solicitor of patents. American and foreign patents secured promptly. Handbook for inventors sent free upon request. 926 G street, Washington, D. C.

CASH FOR YOUR BUSINESS OR REAL ESTATE.

I bring buyer and seller together. No matter where located, if you want to buy or sell, address FRANK P. CLEVELAND, 975 Adams Express Building, Chicago, Ill.

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Send for a circular describing "Mechanics' Companions," a tri-square, a centering square, a calliper, rule and protractor. Address J. O. HESS, Oran, Mo.

BLACKSMITH.

Here is your opportunity to be an expert blacksmith without help. As life is short, get Toy's Modern Methods of doing hard jobs easy, forging and welding all kinds of steel solid. Also tempering all tools to a standard by colored charts. This is real plain information, not theory, all for $1.00. Send for free samples first. W. M. TOY, Sidney, Ohio.

FOR SALE AT A BARGAIN.

One Barnes Power Drill, one 16 horse power gasoline engine same as new. Address for particulars H. M. LOWERY, Summit, Ga.

DON'T PURCHASE A TRIP HAMMER

Until you have asked for a price from the COLEMAN IRON WORKS, Elmira, N. Y., U. S. A.

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Accidentally have discovered a root that will cure both tobacco habit and indigestion. Gladly send particulars. No drugs. G. S. STOKES, Mohawk, Fla.

FOR SALE.

General blacksmith and wagon repair shop; new dwelling house and about an acre of land, located in a thriving German Catholic settlement in a good farming community of Central Wisconsin. Fine chance for the right man. For particulars address A. J. Martin LBR. CO., Bloomer, Wisconsin.

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Guaranteed Brooks Cold Tire Setter; a bargain; cash or part cash and short time on balance. Write for particulars. P. O. Box 325, Wichita, Kansas.

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Prompt attention. Legal protection our specialty. Our clients receive personal service. Booklet free. HARRY PATTON CO., Suite 352, McGill Building, Washington, D. C.

FOR SALE.

1 to 100 H.P. gasoline engine values. All kinds of auto motors. Chassis parts for autos and trucks. State your requirements and save money. BADGER MOTOR CO., Milwaukee, Wis.

FOR SALE.

Brooks Tire Setter, practically new. Set of blacksmith's tools. Will also sell or rent my shop and dwelling. Address for particulars H. S. Bynes, Gibson, Ga.

BUSINESS WANTED.

I am looking for a good location. Will pay cash. Send full description in first letter. Address, BLACKSMITH, Box 975, Cherry Valley, Illinois.

FOR SALE.

First class power shop. Six-room dwelling in good shape. Plenty of work. Going West on account of health. Price right. Address for full particulars R. E. Keene, Wilsey, Kansas.

A BLACKSMITH WANTED.

One who can do general repairing and horseshoeing. Would rather have a married man. Steady work. Will rent or sell to right man. Address for particulars, J. H. Kruse, Sabula, Iowa.

FOR SALE.

Blacksmith shop, tools and materials. New five-room house. Good territory. Only shop in town. For particulars address M. Larsen, Voorhies, Iowa.

FOR SALE.

Horse shoes. Several thousand pounds, assorted sizes "Good Enough" shoes, at 2c. per lb., while they last. A great opportunity. Act quickly. GEO. H. HOLZBOG & BRO., Jeffersonville, Ind.

FOR SALE.

Blacksmith's shop. One of the best locations in Northwestern Ohio. For further information write to J. A. REES, Risingsun, Ohio.

AUTOMOBILE REPAIRS.

Blacksmiths who own automobiles or repair automobiles in their shops should subscribe for the "Automobile Dealer and Repairer," a handsomely illustrated monthly magazine of 100 pages devoted exclusively to automobile repairs. The only magazine of the kind in the world. The "Trouble Department" with five pages of numbered questions each month from car owners and repair men, which are answered by experts on gasoline engine repairs, is worth many times the subscription price, which is $1 per year, or 15 cents per copy. Postal cards will not be answered. CHARLES D. SHERMAN, 52 Windsor Avenue, Hartford, Conn.

FOR SALE.

Power Blacksmith and Wagon Shop, with all stock, tools, Gasoline Engine and Machinery. Paint shop upstairs; best farming section in the State; only shop in town; a bargain if taken at once. Terms if wanted. Address OXFORD WAGON WORKS, Oxford, Fla.

FOR SALE.

Blacksmith shop, equipped with power gristmill; good tools and small hardware stock. Good trade, no competition. Ill health cause of selling. WM. KIRCHNER, Bayle City, Ill.

FOR SALE.

Blacksmith shop, stock, tools, house. This shop is located in the Ozarks, healthiest country in the world. Will sell cheap. Address J. G. JURKINS, Birch Tree, Mo.

FOR SALE.

Rim bender. One largest Defiance rim bender; will bend 12 inches wide and 5 inches thick; all complete; also 24 inch Planer and Hub Roughing Machine; bargain price. In good condition, at half price of new machine. Address BALTIMORE HUB, WHEEL & MFG. CO., Baltimore, Md.

FOR SALE.

Two-story blacksmith shop, 32x80, with power, stock and tools. Blacksmithing, wood work and horse-shoeing. A new six-room house. Plenty of work for two men and most of the time for three men the year round. A good trade worked up in the last 15 years. Only shop in town. Only reason for selling, my health has given out. For full particulars address C. E. ERICKSON, Monterey, Minn.

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Good paying blacksmith shop, 22x50 ft., fully equipped with modern tools. Located in splendid section of country. Only reason for selling is ill health. R. B. LINK, Lock Box 155, Marvell, Ark.

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Two-story brick blacksmith shop, 23x75, bottom floor; slate roof, with good light; electric light and power. On main street of city. Address for full particulars, F. H. SEELOW, 2652 Elston Ave., Chicago, Ill.

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Power blacksmith, wagon and machine shop, implement store, seven-room house, one acre of land, in town of 700 on Illinois river; work for two men; will sell or trade for other business. WM. TRITSCH, Browning, Ill.

FOR SALE.

Stock and tools of blacksmith shop; shop is 20x52 feet, in good location and in good community. House has five good rooms. Shop and house rent for $10 per month, $5 for each. For full particulars address R. F. BEVINS, Petersville, Iowa.

FOR SALE.

One Scientific Cold Tire Setter, up to 4 inches; one Skow Disc Roller; both machines good as new. Must be sold at once. Address WHITING GARAGE, Whiting, Iowa.

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Specials: 50 sets ⅞ axle stubs, $1 per set; Jackson buggy gear, $15; ¾ and 1 lb. machinists' hammers, 35c., 3 for $1; 30 in. band saw, $47.50; 36 in. band saw, $70; saw table, $10 up; broomstick lathe, $55; gasoline engines, 5 h. p., $50, 6 h. p. $75, 8 h. p. $100; new marine engines, 2 h. p. $35, 5 h. p. $75; new jointers, $66 up; combination machines, $85 up. BICKNELL, Janesville, Wis.

FOR SALE.

Blacksmith and wagon shop, will sell stock and tools. Good country and fine people; country building up fast; population of our town, 500. Will sell cheap. J. O. SPRINGER, Van Vleck, Tex.

FOR SALE.

Blacksmith shop, stock, tools, machinery; shop 30x40; work for three men. Poor health is reason for selling. Inquire or write NAPOLEON TROMBLEY, Stewart, Minn.

FOR SALE OR RENT.

General repair, wagon, blacksmith and carriage shop. Will sell outright or sell stock and tools and rent shop. Best location in city of 25,000 population; good business; employ four men; wish to retire. Address for particulars, J. M. GUTEKUNST, 309-311 Division St., Burlington, Iowa.

$3,500.00

invested in an established carriage and wagon works, in one of the best towns in Oklahoma, gives purchaser controlling interest in a business now earning about 12 per cent dividends and management at a salary of $1,500 per year. Equipment new and modern, and our work is superior to similar lines in this section. Will bear rigid investigation. "G.," care Blacksmith and Wheelwright, P. O. Box 654, New York City.

THE SAN FRANCISCO EXPOSITION.

I am a blacksmith and am going to the exposition in San Francisco in 1915. I could look after an exhibition of rubber pads, files, horseshoes, horse nails or bolts, and my familiarity with the trade will help me to represent some manufacturer and to sell his goods. Address A. F. LIBBEY, South Londonderry, Vt.

WANTED.

First-class wood worker. Steady job for sober, middle-aged man. Address T. M. McINERNEY, 360-364 State St., Elmira, N. Y.

WANTED.

Blacksmith and woodworker for repair work only, for shop in nice suburban town, 10 miles from Chicago. Good steady place and good wages for good man; or, if wanted, will sell all or part, as owner has other business. Address W. G. NEWBURY CO., 306 West Lake St., Chicago, Ill.

WANTED AT ONCE.

A young man to learn horseshoeing and general blacksmithing, or a young man with some experience in horseshoeing. Address O. T., care of The Blacksmith and Wheelwright, P. O. Box 654, New York City.

TWO SHOPS FOR SALE.

One in Hilger, Mont.; one in Winifred, Mont. Both in new towns and prosperous places. Good opportunity. These two towns are 26 miles apart. Shop and lot, with or without tools. Good reason for selling; have other business. Address for further particulars, H. W. VAGTS, Winifred, Mont.

BLACKSMITHS,

don't fall down on your welding. Send and get my secret of welding everything, springs, axles and all kinds of steel. T. J. AMOS, 2402 Johnson St., Greenville, Tex.

Neverslip Calks.—In this issue, we would call attention to the effective advertisement of The Neverslip Manufacturing Co., New Brunswick, N. J., giving several sound and pertinent reasons why their product, the Neverslip RED TIP Calk is a prime favorite with the horseowner. There is no concern advertising the Allied Horse Interests that uses more publicity than this company, in their effort to drive to the horseshoer the business of their horse-owning public. Through the medium of daily and farm papers, billboards, signs, cut-outs, displays, moving picture slides, etc., the RED TIP Calk is held up before the public to view as the quick and practical method of winter traveling. Horseshoers who have not already done so would do well to write the Neverslip Company for their new advertising signs and their booklet V.

Sisco Anvil.—This anvil, which has been favorably known on the market for some time, is made, we are informed, of one solid piece of warranted tool steel. It has new weight-saving features, which recommend it to the blacksmith. It is sold by jobbers everywhere, but our readers who are interested are requested to write for descriptive folder, prices, etc., direct to the Swedish Iron & Steel Corporation, 12 Platt Street, New York City. You are also referred to the attractive announcement of this company which appears on our second cover page.

In all your correspondence, kindly mention this magazine.

The Wiley & Russell Mfg. Company, which has been located for many years at 90 Center Street, has removed its New York office to 28 Warren Street, where it has on display a complete line of taps, dies and screw plates. Our readers who are favorably located are invited to call and inspect these tools.

United States Tires.—Solid rubber tires for horse-drawn vehicles are coming more and more into use every year all over the country. The United States Tire Company, Broadway and 58th St., New York City, with many branches, as shown in their advertisement in this issue, makes a solid rubber tire which presents many points of interest. These tires, they say, stand all the bumps and knocks of hard travel because wear resisting factors enter into their construction. You can get their prices, etc., by writing direct to the company as above or to any of the branches mentioned in their advertisement.

Blacksmiths' Tools.—If you have not already sent to Cray Brothers, 1117 West 11th Street, Cleveland, Ohio, for a copy of their 480 page book, "The Repairer's Guide and Price Maker," it would be well to do so promptly, because it contains information of value to every blacksmith. In writing to them kindly mention this paper.

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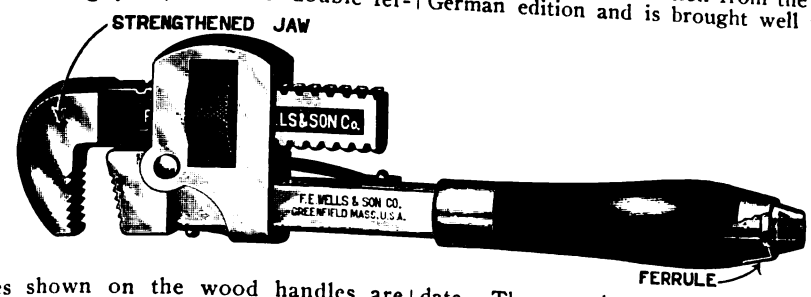
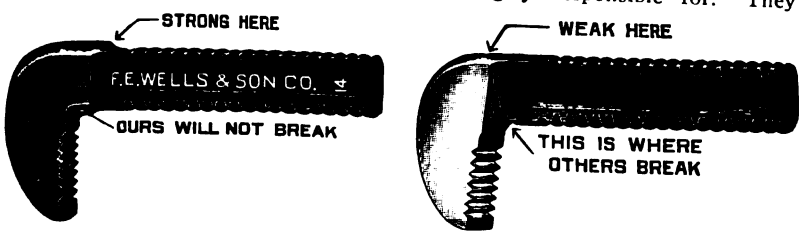
Wrenches for Hard Use.

The accompanying illustrations show better than any words of description the undoubted merits of the new Wells pipe wrenches. Not only do they reveal their strong jaws, but the double fer-



rules shown on the wood handles are a guarantee that they will never twist off or split. Every wrench is tested to the limit before it leaves the factory, and this well-known firm is actuated by the idea of making them just as good



as possible, it being a fact that the best is the cheapest. For full particulars and prices address F. E. Wells Sons & Co., Greenfield, Mass.

Save Money on Your Coal.—The Penna. Coal and Coke Corp., White Hall Building, New York City, wish to send a little booklet they recently brought out entitled "Smithing Coal" to every reader of this paper, and will do so if you will cut out the coupon at the bottom of their advertisement and send it to them, first filling in your name and address distinctly written. Or if you do not want to mutilate your paper send a postal card to the company as above and a copy of this booklet will be sent to you if you mention this paper. This booklet may contain some points concerning coal that you do not know about and may show you how to save considerable money every year.

Brazing Forges.—These are made by the National Cement and Rubber Company, Department "B", Toledo, Ohio, see their announcement on the back cover. These are made in four sizes and a catalogue fully describing them will be sent promptly to any reader sufficiently interested to write for it.

Diamond Horseshoes.—Of course every reader of The Blacksmith and Wheelwright has by this time noticed the full page advertisement of the Diamond Calk Horse Shoe Company of Duluth, Minn., which has been running in this paper. The Diamond calks give splendid satisfaction in all makes of shoes, but the manufacturers say that they give better service and satisfaction in the Diamond horseshoes. These shoes are easy to fit well punched in nail holes and calk holes and have a good strong clip without weakening the toe. The company would like to send its new catalogue giving a list of the sizes, patterns and prices to any one interested enough to write for it. When writing for their catalogue ask for one of their advertising art posters.

Broken Castings Mended.—By communicating with the A. & J. Mfg. Company, 561 West Lake Street, Chicago, Ill., any blacksmith will learn how in his own forge, by using "Braziron," he can mend broken castings successfully. There is not a blacksmith in the land that does not have an opportunity to mend broken castings. All he has to do is to notify his customers that he can do this. A complete outfit only costs $1.00 with complete instructions. But write to the company as above for further particulars and mention this paper.

Anchor Welding Compound.—N. D. Doxey, of Elmira, N. Y., wants to send a sample of his Anchor Welding Compound to every reader of The Blacksmith and Wheelwright who may be interested enough to write for it and mention this paper. This compound welds the hardest steel, he says, and no hammer is needed.

A TEXT BOOK OF HORSESHOEING. By John W. Adams, A.B., V.M.D. J. B. Lippincott Company, publishers, Philadelphia. Price, $2.

This book is a translation from the tenth German edition and is brought well up to date. There ought to be more books on horseshoeing; or, rather, horseshoers should be better informed as to the science of horseshoeing. But whatever in this respect may be lacking, horse owners themselves are largely responsible for. They have taken their horses to shoers who nail on shoes at the least possible cost, and those who do the work at the lowest price are usually such as know little about scientific shoeing and its importance. Almost anyone can nail a shoe to the bottom of a horse's foot, but to shoe a horse properly requires knowledge, experience, care and judgment. "A Text Book of Horseshoeing" will give the requisite knowledge for not only shoeing healthy hoofs but unhealthy ones—forgers, interferers, defective hoofs and lame horses. The anatomy of the horse and of the foot are treated simply so that anyone can understand it. Students of veterinary medicine will also find the book of value. It contains 178 pages and 160 illustrations.

Crescent Universal Wood Worker.—This is a machine that can be used to advantage in every blacksmith shop in the land that has power. For further particulars concerning this machine consult the advertisement of the company on another page and write to the Crescent Machine Company, 203 Main Street, Leetonia, Ohio. This company would like to send their catalogue to every reader interested and it contains descriptions of many other wood-working machines besides the Universal. In writing to the company kindly mention The Blacksmith and Wheelwright.

Sliding Calipers.—E. G. Smith of Columbus, Pa., is issuing a little booklet giving full particulars about his sliding calipers, and he would be pleased to send it to anyone interested. These calipers are said to be as much superior to the old-fashioned sort as a micrometer is superior to the "rule o' thumb."

Bent Knees and Bob Sleighs.—Those of our readers who may be interested in bent knees or bob sleighs should consult the advertisement of the Sherwood Hall Company, Ltd., Grand Rapids, Mich., in this issue and write to them for further particulars and prices. They have sleighs for pleasure, delivery, express, grocery, or in fact any work where a light, strong sleigh is needed. They also manufacture the "Success Oscillating" Sleigh Knees for farm, road and lumbering bobs. In writing to this company please mention The Blacksmith and Wheelwright.

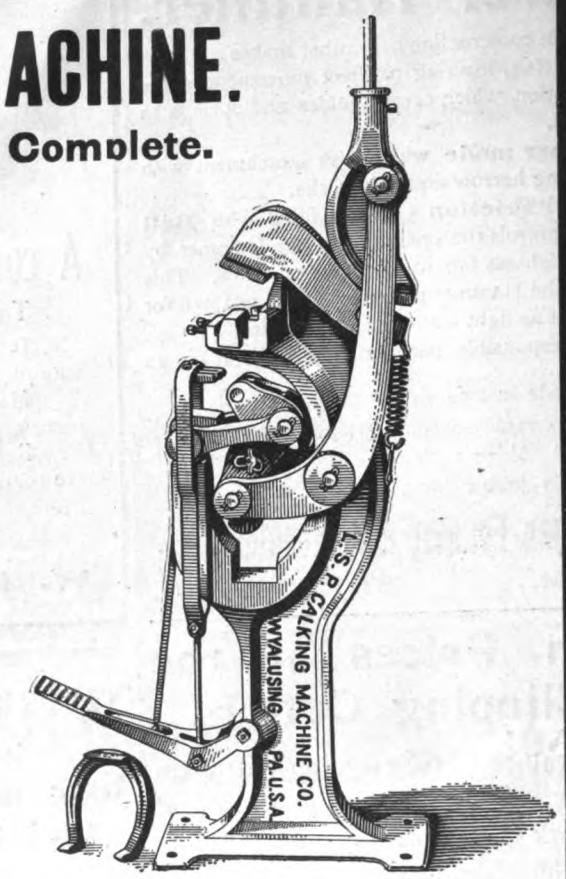
Little Iowa Power Hammer.—In this issue is a new announcement of the Modern Sales Company, manufacturers of the Little Iowa Power Hammer. The weight of this hammer is 850 pounds, and the weight of the head is 35 pounds. It is made especially for the small blacksmith shop, because it takes up little space. It does all kinds of blacksmith shop work and can be run with a very small amount of power. The manufacturers announce in their advertisement that it will be sent on ten days' free trial. Write to them for further particulars.

Firestone Hoof Pads.—These are made in seven styles for every horse at every work in every weather. They insure also, the manufacturers say, quick and easy work for the horseshoer. These pads are made by the Firestone Tire and Rubber Company of Akron, Ohio, and can be obtained from dealers in blacksmiths' supplies everywhere. If you cannot get a price list and sample set from your regular dealer write direct to the company above and mention The Blacksmith and Wheelwright.

Subscribe for THE BLACKSMITH AND WHEELWRIGHT. $1.00 a Year.

THE L. S. P. CALKING MACHINE.

The Machine That Calks A Shoe Complete.



Don't calk your shoes by hand. It is a big waste of time and money calking shoes by hand. The work of the L. S. P. Calking Machine is much more satisfactory to yourself and customers.

The machine is used every day in the year, on either sharp or blunt work. Used on every shoe you calk. And you are wasting money every day until you have one, whether you are alone or have five men working for you.

The machine that is in use by the U. S. Government.

The machine that is in use in the best shops.

The machine that pleases Bosses, Journeyman and Customers.

The machine that the users claim more for, than the manufacturers.

The machine you will eventually use.

The machine that was on exhibition at the Master Horseshoers' National Convention at Denver.

WHAT THE MACHINE WILL DO.

With one pull of the lever it will completely make either a sharp or blunt heel calk of any desired length, on any size shoe, with the stock where it is needed, and no galls or cold shuts, producing a perfect calk. One pull of the lever welds either a sharp or blunt toe calk, and forms clip or not, as you may desire. No weld like the pressure weld, no losing of toe calks.

It has a shear to cut off the end of shoe for shoeing flat or with pads. It works finely on old shoes and resharpening. It makes the Single or Double Block Heel, or the "Phila. Kink," without the use of hammer or change of dies. And in Changing Dies you have no bolts or screws to bother with; all dies pick right out with the fingers.

The machine is made of the very best material and by the best mechanics, and is fully warranted and guaranteed. Write today for testimonials and prices.

"THE EXTREME OF HAND LABOR IS THE EXTREME OF EXTRAVAGANCE."

THE L. S. P. CALKING MACHINE CO.
Wyalusing, Pa., U. S. A.

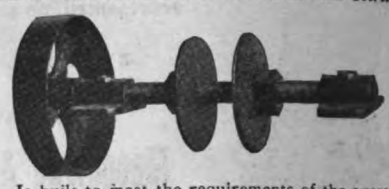
NATIONAL MACHINE COMPANY
Brighton, Ont. Canada.

The Wood Worker's Friend.

If you are doing wood work, why not do it quick and easy? We make 5 different styles of Jointer Heads, and some of them will suit you. Don't buy till you get our new circular and prices. Order through your Jobber or direct.

Manufactured by
JOHN WHISLER, - Gibson, Iowa.

THE SAMPSON POWER GRINDSTONE SHAFT



Is built to meet the requirements of the average blacksmith and wood worker. It has 1¼-inch steel shaft 18 inches long, 6 inch flanges, 8½ inch pulley with 2-inch face, boxings 3 inches wide. Ask your Jobber about them.

Price only $3.50 each, F. O. B. Gibson, Iowa.
Manufactured by
JOHN WHISLER, - Gibson, Iowa.

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OUR NEW GENERAL CATALOGUE

which will be distributed soon, write on your letter-head or advise us what business you are in.

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Always Sharp Calks
NONE BETTER

400,000 for sale @ $8.00 per 1,000; or $1.00 per 100 for any size except ⅝, f. o. b. Harrisburg.

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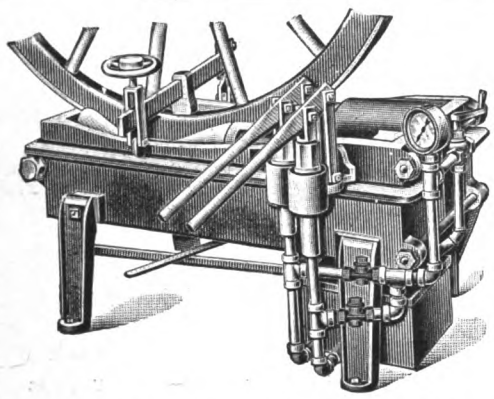
The
LITTLE GIANT



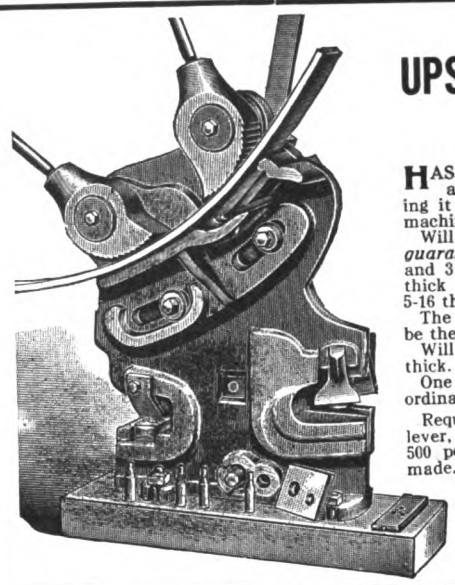
Simple—Reliable—Durable.

The machine that makes tire setting a pleasure.

You will need one soon.

Write today for Literature.

Keokuk Hydraulic Tire Setter Co.
29 Johnson St., - Keokuk, Iowa.



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UPSET, PUNCH AND SHEARS
COMBINED.

HAS compound lever action and in connection with an eccentric, working on hardened bearings, making it one of the most powerful and easy working machines offered the trade.

Will upset wagon tire, including 4 inches wide. *We guarantee* them to cut ¾ square and 1-inch round iron and 3½x½-inch flat bars. Will punch iron ⅝-inch thick and will punch ¾-inch holes in boiler plate 5-16 thick.

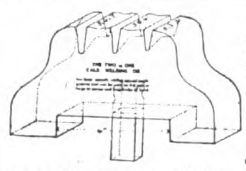
The Upset is admitted by all who have used it to be the SUREST AND EASIEST WORKED.

Will Upset Axles or iron from ¼-inch to 1-inch thick.

One man can handle and correctly set, and do all ordinary work alone.

Requires no change; put in the work and pull the lever, and the job is done. Is the strongest (weighs 500 pounds), handiest and most durable machine made.

LUTHER MFG. CO.
OLEAN, N. Y., U. S. A.



The ONLY DIE that DOES NOT DULL or UPSET THE CALK
The TWO in ONE CALK WELDING DIE
has **deep, smooth, chilled, special angled** grooves which grip the calk near shoe, causing a complete weld. The slanted grooves prevent sticking, deep and wide at the bottom makes it impossible to wedge tight or **dull the calk. It saves time of resharpening.** The grooves crowning at center produce a **self-cleaning die.** The indentations made from the die on the calk near the shoe make it easy to resharpen on the anvil when setting. **The TWO in ONE** is 3¾ inches wide, will fit any calk, can be used on 4x4 scantling at forge, leaving the anvil clear for other work. **Why have two, when one will do? PRICE EACH, $1.50.**

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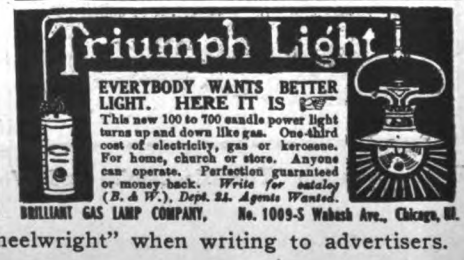
Triumph Light



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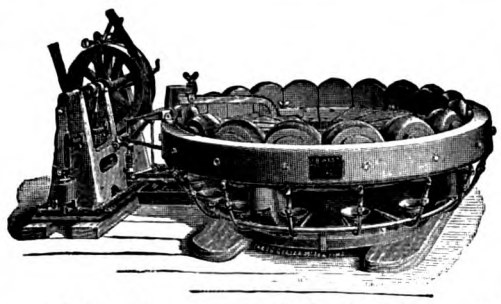
COLD HAMMERED HORSE SHOES

Ready to drive, at $6.75 per Keg,
And save $5.25 on the deal. Country or City Patterns.

MONEY SAVED IS MONEY MADE.

Order your sharp shoes now and save delay.

J. D. HALL - Orrville, Ohio



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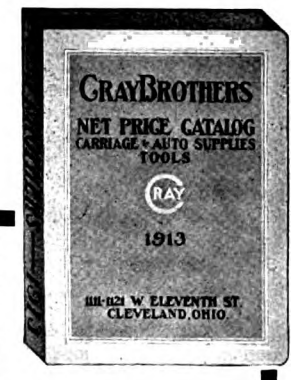

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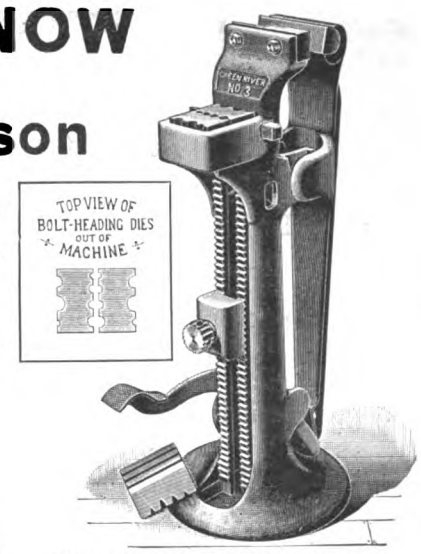
This vise forms straight and sharp calks without changing the die.

Also has a bolt heading attachment.



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VERY STRONG AND SOLID.

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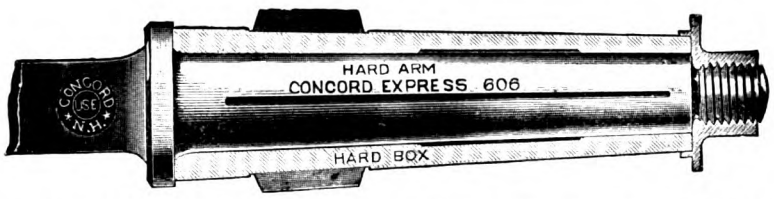
A STRAIGHT LINE

Is the shortest distance between any two given points.

IT GETS THERE FIRST.



Our No. 606 Axle, with STRAIGHT, SMOOTH ARMS, GETS THERE first because its form is the nearest approach to mechanical perfection; and because its hardened surface, of arm and box, insures the longest service.

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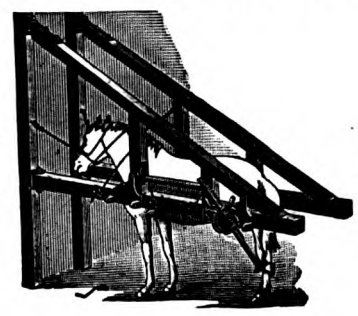
The most easily operated; the simplest and most perfect in every detail. Safe for both horse and man.



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Write at once for circular which describes the advantages of our stock in detail.

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