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FOR ALL WORKMEN, PROFESSIONAL AND AMATEUR.

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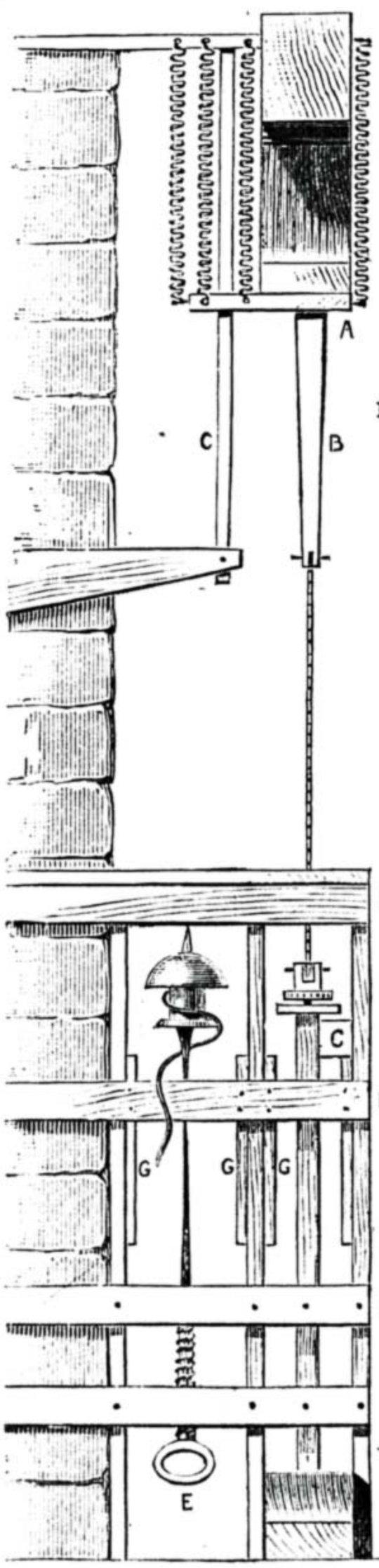


Fig. 1.—Perspective Sketch of Machine—A, Spring-plate; B, B, Saw-holders; C, Guides; D, Beam; E, Connecting Rod; F, Weight Box.

Fig. 6.—End View of Machine—A, Spring-plate; B, Saw-holders; C, Guides; D, D, D, Fixed Rails; E, Screw; F, Sliding Bar; G, G, G, Guides.

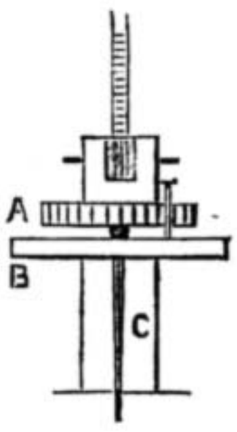


Fig. 3.—Adjuster—A, Toothed Wheel; B, Lower Wheel with Pin; C, Tang of Knuckle to Runner through centre of Holder.

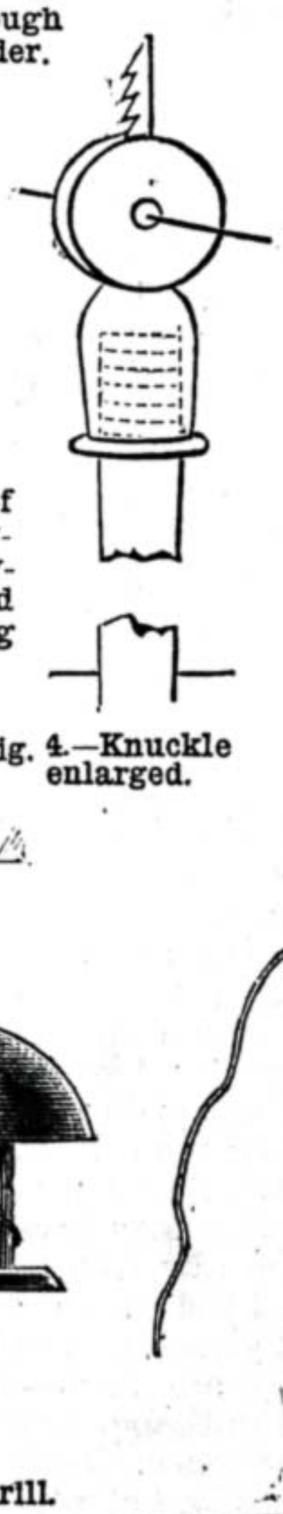


Fig. 5.—End of Upper Saw-holder, showing method of inserting Saw.

Fig. 4.—Knuckle enlarged.

Fig. 2.—Diagram illustrating Principle of Saw.

Fig. 7.—Drill.

A POWERFUL MACHINE SAW AND DRILL.

A POWERFUL MACHINE SAW AND DRILL.

BY F. HALLIDAY ROPER.

WHO would not like to be the possessor of the above—easy to work, and most inexpensive? Well, such a machine is now before the readers of WORK. It is not intended to take the place of the highly finished and costly machines which are to be purchased by those fortunate individuals who have plenty of means—they can readily be supplied by the various tool-makers, many of whose productions are so excellently described and illustrated in WORK; but for those who have little money to spare and none to waste, and will take the trouble to construct it—and the construction is easy—it is the very thing. The cost is almost nominal. I really had only to purchase the bow-saw, which cost about a shilling, the drill, for which I paid 4½d., and the steel wire for springs; the rest is all made out of oddments, but then, I never throw anything away. I rescued two rails from imminent danger of destruction one fifth of November, and out of gratitude—let us give them credit for it—they work the saw that saws the wood that lights the fire that cooks the food of all in the house that we live in! Surely the old proverb, "Keep a thing for seven years and it will come in useful," applies with great force to the inventive workman or amateur.

This saw has a 9-in. stroke, and will cut wood, hard or soft, up to 4½ in. I have not tested it beyond this, but it is certainly not the limit of its powers; and as for anything under an inch, it is like cutting paper—you just tickle it with your foot, and away it goes. It also cuts curves beautifully, up to the 4½ in. to which I have tested it. I may also say that I have never had a saw broken.

And now a few words as to the main principles of the machine, before I give details of construction. If you take a rail A (Fig. 2), and hinge it to a roof-beam at B, and connect it by a string to a similar rail C, hinged to the floor, you will find that although the rails move in sections of circles, the resultant motion of the string will be, for all practical purposes, up and down in a vertical line. The string represents the action of the saw, and you require a spring D to pull the saw up to position, after the downward stroke obtained by pressing the treadle B with the foot. This by itself, however, entails unnecessary labour, as there is not only the exertion required to saw the wood, but also to overcome the resistance of the springs D. We now take advantage of one of the principal forces of Nature—that of gravity; and, by loading and adjusting the saw, obtain great power at a very little expenditure of labour, on the same principle that a rocking-stone weighing many tons is easily moved with a very little push, or a heavy, but well-balanced, scale is turned by a small weight.

Construction of Saw.—Procure two rails—say 6 ft. long by 3 in. by 2½ in. I will here remark that the sizes given need not be exactly followed; they may be varied according to convenience. My workshop is a very small one, and I had to build the saw to suit. For instance, I have only a space of 11 in. from centre of roof-beam to wall; this, unfortunately, cramps it very much, and gives me very little space on the left hand. It really should be in the centre of a workshop, with plenty of space all round, so as to have room to manipulate a large piece of wood. The saw-bench, also, is only 3 ft. 6 in. from floor; this may possibly be too low for some. It should be arranged at a convenient height to suit the workman. Having procured the rails, then, cut the slots to receive the saw-holders and bore holes for the pins. Screw the spring-plate A (Fig. 1), made of inch wood, and about 8 in. by 6 in., to the end of the upper rail. Hinge the rails as shown, one to the roof-beam and the other to the floor, connecting them by the string as before mentioned. The springs next claim our attention. Procure steel piano wire, pretty strong—it is sold in suitable lengths—and, to make the springs, proceed as follows. Put a spindle in your brace—I used a piece of old stair-rod, about 10 in. long; these lengths of stair-rod, by the way, made all the larger pins—and having passed one end of the wire through two pieces of wood tightened up in the bench vice, or in any other way having got sufficient tension, wind the wire closely and regularly round the spindle, and capital springs are made. You will require many of these to balance the heavy weights with which the saw has to be loaded. I have, in addition, a clock movement, not shown in sketch, fixed between the beam and the wall, from which I get additional power; but where this cannot be used, additional springs will be required, as you can hardly have too many or have them too strong. Get as much power as you can, as any excess can easily be compensated. This is an important part of the saw, and took me a deal of trouble to get right. Do not use indiarubber; I tried it, but as it constantly breaks, it is useless. Having got the springs fixed, and the upper rail so that it will pull up sharp and strong, construct the bench of inch wood, firmly fixed to floor; mine is 6 ft. long by 13 in. wide. It must be placed so as to allow the string to pass through a small hole, 7 in. from end. Now plane up two pieces of inch deal for saw-holder, length to suit the height of room, and tapering somewhat, as shown at B. The upper end of the saw is inserted in a brass plug, drilled for pin, and let into the wood, as shown at C. The lower end is treated in the same manner, with the addition of an adjuster to keep the saw true. This is made of two wheels connected by a screw knuckle in centre; the holder is cut 2 in. from upper end, and the parts connected by the adjuster. The tang is drilled and pinned to holder, the bottom wheel of adjuster being screwed to upper end, the upper, or toothed wheel, being fastened to the small piece of holder cut off, the knuckle connecting the screw, the play of the screw in knuckle being sufficient to allow of adjustment, which is effected by a pin in the lower disc, holding the upper or toothed wheel in position. Old clock works do very well for these wheels. Having pinned the saw up, you will find the adjuster most useful for correcting any error which may have crept in, and by it you get the saw true to the front. You must now fix the guides C to keep the saw steady. A glance at the drawing will show how they are fixed—the upper one through a slot in the spring-plate, and the lower one to the bench. They allow the rails to work vertically, but prevent any lateral movement. The loading of the saw is the next step. For this purpose you procure a beam D—say, 4½ ft. long by 4 in. by 3 in. Cut a slot for the saw-holder to work freely in, and having drilled a hole at each end with a twist drill, pin it through the holder about the middle, the other end being pinned through the two vertical rods which swing from the saw-bench, and are likewise pinned at the bottom to the lateral rods, which in turn are pinned to the holder. The effect of this arrangement is that the whole apparatus under the bench works freely with the treadle, and resists without friction all the strain caused by the pressure of the wood against the saw. You now complete the affair, as far as the saw is concerned, by loading the weight box F with lead or iron to complete the balance. The saw should now work easily and beautifully, cutting with the greatest ease.

The drill is fixed to front of bench, and is very useful for drilling with great ease and rapidity small holes through metal. It goes through ⅜ in. iron very quickly, and there is no labour attending the process; you have only to pull a string, and the drill does its work. It is formed of a wood bobbin, a steel pinion being fixed at the top, pivoting in a piece of brass let into the topmost fixed bar D (Fig. 6). Two other fixed bars are also used, through which the long screw E passes, giving the necessary pressure to the sliding bar F, which is held in position by the guides G. To use the drill, lower the sliding bar a little by means of the long screw, insert the metal to be operated on, screw up again, and pass a cord round the bobbin, the other end of cord being attached to a piece of indiarubber about 18 in. long, under the bench. On pulling the string the drill revolves rapidly, and you get all the necessary pressure by the screw E.

Intending constructors may modify this machine in order to suit their requirements and the materials at hand. The springs may be bought, if desired, ready made and the drill made more powerful by using a fly-wheel on the bobbin. The heavy weights and the beam give sufficient tension to the saw, and in order to get it to work easily and cut true, the guides should be carefully adjusted; but the whole construction is so simple that it is quite within the power of anyone of average ability to produce, and as it has stood practical tests there is no fear of any part refusing to do its work properly. The principal point to be attended to is accuracy of construction, as, if not hung true, it will not cut straight. Before fixing the guides, test this by means of a plummet and line, and see that the saw moves up and down in a true vertical line. See also that all the holes are bored straight, and that the weights are properly adjusted to strength of springs, which should be kept well oiled; and if the guides, where wood works against wood, are blackleaded, the saw will work without perceptible friction. The bow-saw I use is 18 in. long. The weight box should have a cover, screwed down, and the weights packed in sawdust to prevent rattling. If, however, there are any difficulties, I will be most happy to give every assistance in "Shop."

TEMPORARY DECORATIONS FOR THE INTERIORS OF BUILDINGS.

BY ARTHUR YORKE.

DECORATION OF A TEMPORARY CONCERT-ROOM—ARRANGEMENT OF THE PLATFORM—TREATMENT OF AN OPEN ROOF—OF A FLAT CEILING—FERN BASKETS—ROUGH BRACKETS—WINDOW DECORATIONS—PAPER FLOWERS—A TEMPORARY BALLROOM—SETTING UP PILASTERS AND DADO—SLAPDASH PAINTING FOR THE WALLS—TEMPORARY GILDING—AN EXTEMPORE FOUNTAIN—CONCLUSION.

OCCASIONALLY, and more especially in the festive Christmas season, large rooms which in their ordinary state are by no means ornamental, such as schoolrooms,

warehouses, etc., are required for balls or concerts, and have to be made as ornamental as possible. It is in such rooms that the decorator has most scope for his ability. In the church he has to keep his work subordinate to that of the architect, but here he has everything to do, and may claim the whole credit of the result.

We have, we will say, such a room on our hands to decorate for a *concert*. Probably it is a schoolroom. We wish to make the decorations as effective as possible; but whilst doing so, we shall doubtless need to be economical—for amateur performances of this kind are generally expected to make a profit for some charitable purpose. First we have to arrange a platform. The chances are that at one end of the room there will be a door leading to some class or committee-room, which will serve as a retiring-room for the performers. If so, we shall choose that end, but instead of carrying our platform quite to the wall, we shall do well to leave a passage behind it, so that the performers can mount the platform at *both* its back corners—which is a decided advantage. If there are loose forms belonging to the school, we can set them lengthwise and lay the boards which floor our platform across them, nailing or screwing a strip of lath along the under side of the boards at each end to prevent them from slipping, and to make them clip the forms firmly together. If there are no available forms, we must borrow or hire trestles from a builder; or failing even these, we can make a very good shift with empty barrels (small) from a neighbouring public-house; the floor boards we get from the nearest timber-yard, paying a trifle for "deterioration."

By-and-by we shall carpet our platform, and for a back to it shall borrow from some of our friends a couple of Japanese folding screens, which will in themselves add to our embellishments; but at present we leave the platform as it is. It will be useful as a table on a large scale on which to lay out, arrange, and finish our mottoes and other devices. When, in due time, the carpet has been tacked down and the piano set in its place, we shall find that the front, where footlights come in a theatre, needs something to ornament it, and in a degree to hide the feet of the performers. For this we can have no better makeshift than a row of flowering plants in pots, which we can readily borrow. We shall range them the lower ones in the centre, and the higher ones rising gradually towards the sides; last of the row against the wall at each end a large and effective plant will be required. These pots, it must be remembered, should not have saucers, which would chatter with the vibration of the music. A stool or hassock at each end of the passage left at back of the stage will serve as a step by which the performers can mount.

The roof of our room will most likely be one of plain timbers, and open either to the straining-beams or to the ridge-piece. Of the ugliness of this roof we can entirely rid ourselves by some such arrangement of festoons as that shown in Fig. 12 of the former article (p. 512). Possibly we may not, as in the church, have anything of the nature of a corbel to which to bring our festoons at the walls, but we can fix up rough temporary brackets in their places. How to make these brackets will be shown later.

When we find such an arrangement of timbers as that shown in Fig. 12, we shall doubtless have a gas-burner, or if not, a hanging lamp or a chandelier, suspended from the middle of the lower beam. This will have its decoration of evergreens, and will thus harmonise with and add to the effect of the roof festoons.

Or if, instead of a timbered roof, we find a high flat ceiling, we have at our disposal the means of converting it into a series of bowery Gothic arches, in a manner which will astonish as well as delight those familiar with the room in its plain state. This we do by "springing" deal boards—that is, by bending them and fixing them in a bent position, as in Figs. 14 and 16—our temporary arches being, of course, covered with greenery. These would be placed about as far distant from each other as the timbers usually are in a timbered roof.

Into a flat-ceiled roof nails cannot be driven, and this has to be borne in mind in making our arrangements. In Fig. 14, the two sprung boards A, A have, therefore, their tops fastened together by hinges at *a*, as is shown enlarged in Fig. 15. At *b*, *b*, Fig. 14, these boards are sawn half through, so as to permit them to be bent to an obtuse angle, below which they are nailed to the wall, their ends resting on the rough brackets *c*, *c*. Purlin strips *d* *d* pass from arch to arch throughout the length of the room, and the boards are screwed to them; the whole is thus held firmly together. All parts of this woodwork are dressed and hidden with evergreens.

In Fig. 16 is shown a second arrangement of sprung boards, forming one of a series of depressed arches, and suited either to a ceiled or timbered roof. In this, B, B are two straight planks meeting in the middle where they are hinged, if against a ceiling, and nailed if against a beam. C, C are two short sprung boards. D, D are struts from the strips to the corners, which are needed to resist the upward thrust of the bent boards.

We must, however, take care that we do not bring our roof decorations too low, or they will interfere with the acoustic qualities of the room. I speak under the supposition that we are preparing for a concert; if the room is to be used for a ball or a bazaar, less care in this respect will be needed.

Another detail of roof decoration, if it can so be called, may be found in fern baskets, which can be hung from the timbers near the walls on either side. The construction of such a basket is seen in Fig. 17. The bottom is a square piece of rough board, with holes bored at the four corners; the sides are made of rough natural sticks, overlapping at the corners and bored through near the ends. Four strings pass through the holes in the board and the holes in the sticks, serving alike to hold the basket together and to hang it up. Or these rustic baskets may be made rather more quickly if the sides are upright instead of sloping outwards. In each a root of fern is placed, which is kept fresh by filling the basket with damp moss.

At the platform end of the room the lower part of the wall will be hidden by the Japanese screens—which will, we hope by-the-bye, have plenty of gold lacquer about them—and above might come a large motto, appropriate to the occasion; this will be bordered with ivy-ribbon. Reference to Figs. 6, 7, and 8 in the former article (p. 509) will suggest ways of so placing the scroll about as to be most ornamental and best to fill the space. Higher still will probably be a triangular piece of wall, the centre of which may be filled by some monogram or device in ivy-ribbon, or three rough brackets may be ranged there: the central one, rather higher than the others, may carry a bust, the two others vases. As the occasion is a concert, the bust of some noted composer will most appropriately occupy this post of honour.

The rough brackets, mentioned more than once, are made of unplaned inch board nailed together, as in Figs. 18 and 19. A number of them, large and small as required, are quickly knocked together by a carpenter, and there are many places in which we shall find them useful. Each bracket is fixed to the wall by two or more strong nails, and it is dressed with evergreens *in situ*.

Supposing that we have blank spaces on the side walls, we may, in the middle of these spaces, half-way between the beams and their decorations, fix up some of these brackets 6 ft. or 7 ft. from the floor, and place on each a statuette or a vase; but these situations will generally be occupied by windows. If the windows are of good shape, we may simply put a border of broad ivy-ribbon round them; but if they have square ugly tops, we may relieve them by hanging a festoon over them, looped up by a nail in the centre. And here it may be said that whenever a festoon is thus looped over a nail, or otherwise makes a sharp angle, it will be sure to look thin and poor at that place, and will need a few more sprigs tucked in. The wall can further be relieved by carrying a horizontal band of ivy-ribbon from window to window, on a level with their bottoms, and (if there be no roof decoration to interfere, and if the height of the walls seems to demand it) a second on a level with their tops. Panels will thus be formed in which may come brackets, or, perhaps, arrangements for lighting.

Speaking of lighting, it is presumed that at the present day no one will (in default of gas) think of doing so with

> "Candles that shed their soft lustre
> And tallow on head-dress and shawl,"

but will use the more cleanly paraffin lamps. Country ironmongers generally keep suitable ones to let out on hire for such occasions.

To return to the windows. We spoke of diapering church windows, and there is a somewhat similar way of making windows decorative for such purposes as the present. It is by cutting out fleurs-de-lis in gilt paper, and pasting one in the middle of each pane—the gold side of course inwards. By artificial light this produces a pretty glittering effect. Even coloured paper only looks well.

Some mention has been made in a former place of paper flowers to be used as bosses on ivy-ribbon. For occasions like the present, when the decorations are to be seen by artificial light only, they are exceedingly useful, and they are easily made. The paper should be as stout as the middle qualities of writing-paper, for if too thin, the petals do not form themselves into good circles. In many places ribbon-like strips of suitable white and coloured papers are to be got from the waste of workshops, and time and money may be saved by using them. We take a strip of paper, say from ¾ in. to 1 in. wide and 4 in. to 5 in. long, and fold it lengthwise and crosswise, as at the dotted lines *a a* and *b b* (Fig. 20). We then cut away with the scissors the part left unshaded in Fig. 21, the folded lines being those at *a b* and *b b*. We open the paper at its transverse fold, which gives us a still doubled paper of the form seen in Fig. 22, and which, if opened, would be of the form shown in Fig. 23. Of these papers we take, say, a dozen, and laying them side by side, tie them tightly

together by their middles with cotton. We now have a fan-like appearance at each end of our bunch, but as yet nothing like a flower. To get this, we have to open the petals, and run the thumb-nail down the middle of each, when we shall find them spread out into a circle, as in Fig. 24.

If the paper is of proper thickness and the work is properly done, there will be no gaps where the two semicircles of petals join; but if owing to any shortcoming some little gap should happen to show, it is easily hidden in fixing up by using an additional needle point. If desired, a centre may be given to each flower by going through the same processes with shorter pieces of paper of a different colour, and fixing the circle thus made in the middle of the original flower; and this may be repeated with circles decreasing gradually in size till a boss of the double dahlia type has been formed. But this would be unnecessary labour; these flowers are not meant to be examined closely, and for their purpose in decoration the single ones are all that is needed; indeed, no attempts to imitate a natural flower will approach them in effectiveness. As these paper flowers will always be placed on dark evergreens, light tints will tell best.

A room to be prepared for a temporary *ballroom* will, as a rule, be larger than that used only for concerts—possibly it may be the rifle drill-hall or the corn exchange of a small town. In such a room the decorator will have no small amount of plainness to get rid of. The suggestions already given will furnish him with many resources for doing this, and to these some others can be added. As regards the roof, some modification of the methods above mentioned will amply suffice, but for breaking up the (presumably) long, straight, plain side-walls into manageable portions a new expedient may be needed. This may be done by a range of pilasters at regular intervals up each side.

We can make these at a very moderate outlay of money and trouble. They will be formed of deal planks (probably 9 in. by 2½ in.) hired from a timber-yard. These should be long enough to reach to about the top of the wall; at the bottom they will be fastened to the floor, and at top to the wall by a couple of iron hooks. The upper part of one of these pilasters is shown in Figs. 25 and 26. The "caps" are of rough board roughly nailed on, and they need corresponding bases, which may be equally rough—boxes from the grocer's, when enough of a suitable size can be got, do very well, an opening being sawn in them to admit the plank. Single pilasters, as in Fig. 25, are the least trouble, but a better effect may be got by ranging them in *pairs*, the two shafts (planks) being kept 2 in. or 3 in. apart. Having fixed our pilasters and nailed on capitals and bases, we cover them with marbled wall-paper; for the shafts we use a yellow sienna, for the bases a dark colour, and for the caps a very light one—in fact, for these a plain white paper might do, as they will be covered with evergreens tacked on. In the angles at the sides of the pilasters light pendants of ivy should be made to fall; and from cap to cap, curving downwards considerably in the middle, should hang festoons.

In the recesses between the pilasters, seats will be eventually set, and behind where these will come, and high enough to be above the heads of the sitters, we may carry a dado. This we shall make with a top strip of lath nailed to the wall, and a bottom one nailed to the floor, canvas being stretched over the two. We cover our dado with a formal wall-paper: one divided into large quarries will look best; it should be tolerably dark in colour, but still somewhat lighter than the bases of the pilasters. As a surbase to the dado we shall nail along its top a broader strip of lath covered with a somewhat darker paper; and along this and overhanging it will be laid a festoon.

Instead of affecting an imitation of stone in our pilasters and dado, we may, if we choose, give a much more realistic imitation of ornamental woods. This we do by veneering them with American leather-cloth, which is, of course, somewhat more expensive. For the pilaster shafts we take a light grained maple, mahogany for the bases, and walnut for the dado; and with strips of the cheap German gilt moulding we arrange mouldings and cut up our work into panels, so as to hide all joinings of the cloth. This material imitates polished wood remarkably well. I may mention that at the Paris Exhibition, where I was fitting a show-case for a firm of English manufacturers, I found myself at the last moment, so to speak, unable to get a grainer to finish my woodwork. Time pressed; and I had recourse to the above dodge. The result was so good that no one guessed the veneers to be other than genuine wood till the pulling down of the case at the close of the Exhibition revealed their real nature.

As centres to the panels formed between the pilasters, the dado, and the hanging festoons, we can place brackets, devices in ivy-ribbon, or decorated lights; unless these spaces happen to be occupied by windows: and it often happens that rooms of this description have skylights only. The dado will frequently require to be carried along the ends of the room also, where there will be no pilasters.

As an alternative to filling one or both of the higher spaces at the ends of the room by methods already suggested, temporary paintings may be executed for them. The way of doing this may be briefly described—not that it is supposed that any person unaccustomed to drawing and the use of the brush can be thereby enabled at once to dash in a distemper picture. That would be absurd. But in every party of volunteer decorators there will be tolerably sure to be one or two with some skill in ordinary oil or water colour painting, and such persons need find no difficulty in doing the required work.

It will be in what is known as "distemper," and there are two ways of setting about it. In one the picture is painted on calico, and in the other on the wall itself. This last is to be preferred, as then nothing of the nature of stretcher or easel will be wanted. If, however, the painter elects to use a calico ground, he will first have to prime it with a coating of glue and whiting.

If he paints on the actual wall, no preparation is really necessary, though to ensure uniformity of tone it may be well, if the wall is in any way dirty, to give it a coat of ordinary whitewash. The picture is sketched in with charcoal. The colours are the common powdered ones used by whitewashers, and are ground up with stale beer. The keepers of oil and colour shops will generally grind up the colours if requested. They are to be laid on broadly and boldly, not with artists' brushes, but with house-painters' "tools." Sable, camel-hair, and badger brushes would be immediately ruined by this rough work, but an artists' "hog-hair" may be useful for the finer touches. The chief difficulty that will be experienced (remember that it has been premised that the painter is accustomed to the practice of painting in other methods) will be in the colours drying very much lighter than when laid on. It will be well, therefore, to try them on paper before beginning, and to dry them at the fire. The difference will then be seen, and due allowance can be made.

It should be noted that these "slap-dash" colours, being thin and rapidly laid on, are sure to be so splashed about as to make a mess; therefore, if the work is done on the actual wall, it will be well to finish the painting before the parts near it are decorated. Neat and careful painting is neither attempted nor expected in this work, for at the distances and beneath the light at which and by which it will be seen and judged, rough and bold handling tells best. Of course such paintings are not expected to be permanent.

There are reasons why in choosing a subject a *winter scene* should be preferred. The sparkling effect of snow and hoar-frost, which will add not a little to the attractiveness of the picture, is to be got very cheaply. All that has to be done is, before painting, to brush over the space with whitewash in which a quantity of alum has been dissolved. This must be put on hot. The alum in cooling will crystallise, and assume a sparkling appearance similar to that of hoar-frost or of frozen snow. In painting, we have then simply to work up the other parts, leaving the untouched ground to represent those parts where frost or snow is to appear. The picture, whether on calico or on the wall, will need a frame of ivy-ribbon.

If gilding is desired about the picture (or indeed elsewhere, as it well may be in our temporary decorations), it will be done in the cheap and rapid manner used at the theatres, with Dutch metal and "madong." The madong, which serves as gold-size, is put on *hot;* one person brushes it over the parts to be gilded, and another follows to dab on the leaf metal *at once*. Here are two receipts for making madong:—Pitch, resin, beeswax, of each 4 oz.; Venice turpentine 1 oz.; Russian tallow 2 oz.; and gold-size, to be put in after the other ingredients are melted together, 2 oz. Or, pitch, resin, beeswax, of each 4 oz.; and boiled oil, gold-size, and turps, of each 1 gill. This for our purposes will look as well as careful and real gilding, and that it will not last does not matter to us.

When we have space for such a luxury, and when there are water-works to furnish the necessary supply, an *extemporary fountain* may be made a pleasing feature. This will, perhaps, be most practicable when we have at our command a second room of good size—it may be as an entrance-hall, a refreshment-room, or what not. The construction of such a fountain is shown in section in Fig. 27. To make it, we first need a shallow vessel of zinc or galvanised iron as a basin (A A). That shown in the figure is pierced for the passage of the supply-pipe (B) and the waste-pipe (C); but should the vessel be merely a borrowed one, it cannot well be pierced. We can then carry the two pipes over its edge, but in that case we must take care that the supply and exhaust are equal, or we may have difficulties with our waste siphon.

The square pedestal which supports the jet-pipe (D) may be of terra-cotta or zinc; but it will suffice to make it of wood, to paint it, and whilst wet to dust sand over it,

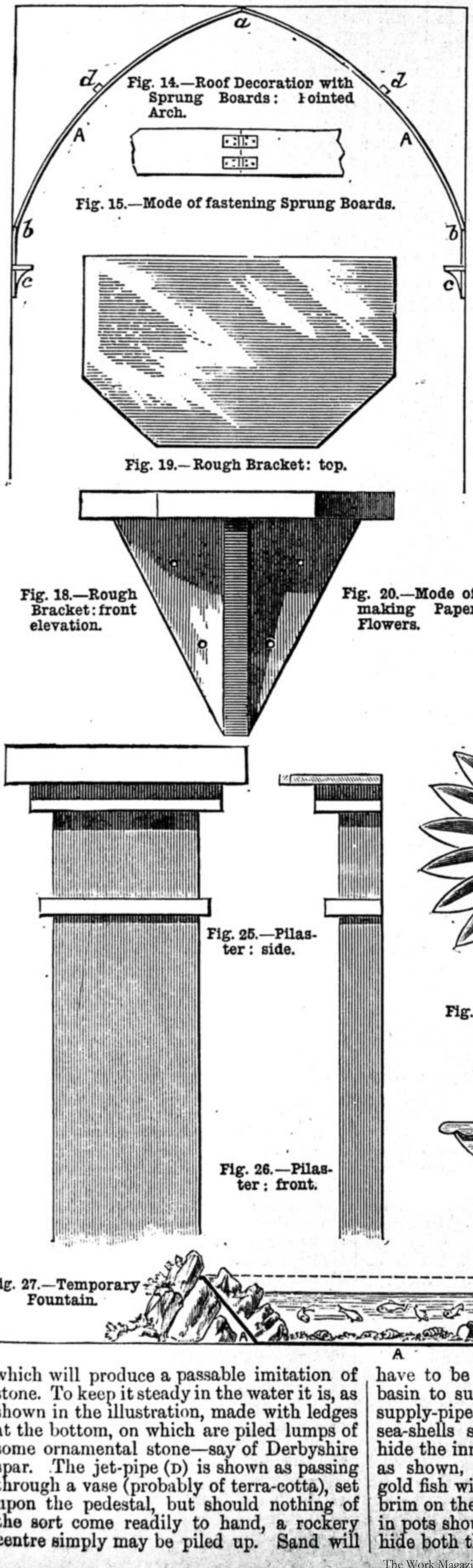


Fig. 14.—Roof Decoration with Sprung Boards: Pointed Arch.

Fig. 15.—Mode of fastening Sprung Boards.

Fig. 19.—Rough Bracket: top.

Fig. 18.—Rough Bracket: front elevation.

Fig. 20.—Mode of making Paper Flowers.

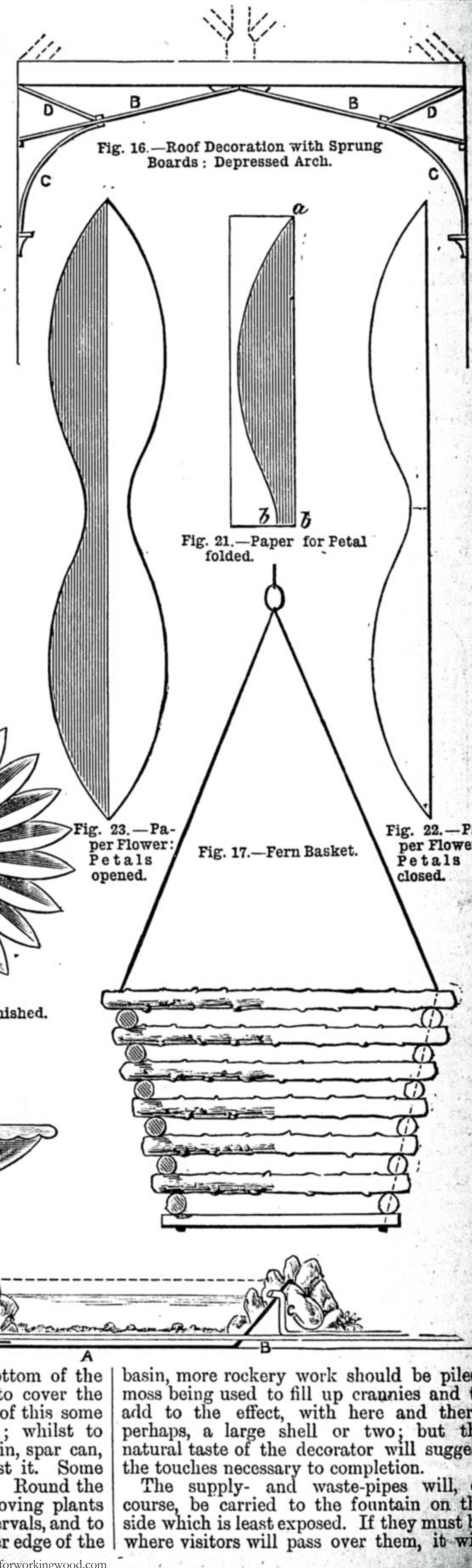


Fig. 16.—Roof Decoration with Sprung Boards: Depressed Arch.

Fig. 21.—Paper for Petal folded.

Fig. 24.—Paper Flower finished.

Fig. 23.—Paper Flower: Petals opened.

Fig. 17.—Fern Basket.

Fig. 22.—Paper Flower: Petals closed.

Fig. 25.—Pilaster: side.

Fig. 26.—Pilaster: front.

Fig. 27.—Temporary Fountain.

which will produce a passable imitation of stone. To keep it steady in the water it is, as shown in the illustration, made with ledges at the bottom, on which are piled lumps of some ornamental stone—say of Derbyshire spar. The jet-pipe (D) is shown as passing through a vase (probably of terra-cotta), set upon the pedestal, but should nothing of the sort come readily to hand, a rockery centre simply may be piled up. Sand will have to be spread over the bottom of the basin to such a thickness as to cover the supply-pipe, and about the top of this some sea-shells should be scattered; whilst to hide the inner slope of the basin, spar can, as shown, be piled up against it. Some gold fish will be an acquisition. Round the brim on the outer side water-loving plants in pots should be placed at intervals, and to hide both the pots and the outer edge of the basin, more rockery work should be piled, moss being used to fill up crannies and to add to the effect, with here and there, perhaps, a large shell or two; but the natural taste of the decorator will suggest the touches necessary to completion.

The supply- and waste-pipes will, of course, be carried to the fountain on the side which is least exposed. If they must be where visitors will pass over them, it will

be well to brad a strip of lath along on each side of them for their protection, to cover them with sawdust, and to tack floor-cloth over. In a hot ballroom a fountain will always be attractive, and such an one as has been described is readily made; where there is not room for one on the larger scale, a smaller one on the same lines for the refreshment counter might be put up.

This will be the last of my suggestions for temporary decorations. Some readers may perhaps think that hints for the decoration of the home might have occupied some part of the allotted space; but I would remind them that the greater includes the less, and that in the suggestions given above will be found abundant resources for the comparatively simple task of decorating an ordinary house.

HOW TO MAKE A WOODEN REST FOR A LATHE.

BY E. A. PENROSE.

PERHAPS there may be many readers of WORK who will like to hear how I overcame a difficulty in regard to obtaining a suitable rest for a lathe.

My lathe is a 6 in. centre one, which I made according to "Self-Helper's" second article on "Lathes for Everybody," and the rest which I had at first was similar to that which he described in his article on the dead-centre lathe.

I found, after using the rest for some time, that it had many defects, one of which was its fixed height, which was very inconvenient; besides, it was apt to give if any strain was brought to bear on either end of it.

Being unable to obtain a proper iron one anywhere in the vicinity, and not wishing to go to the expense of sending away for one, I set about making a wooden one; it has been in use for some time now, and gives great satisfaction. Of course, if a proper iron rest is at hand, it would be folly to discard it for such as I am about to describe, yet I hope the description may be of use to anyone who may be in a similar fix as I was.

The wood of which mine was made was well-seasoned mahogany and beech; the mahogany was a piece of an old tea-chest: it was very dark in colour, even and hard in grain.

First of all I took a piece 15 in. in length by 2½ in. broad by ½ in. thick; this I planed up true. I next bored a hole A with a ⅜ in. bit two inches from the end and exactly in the centre; then with a gauge set to an inch I drew two lines, one from each side from the hole to within three inches of the other end; this left a space B in the middle of the board 10 in. long by ½ in. broad, then with a key-hole saw I cut out the marked space. A glance at Fig. 1 will show more clearly than I can describe what I mean. B is the space cut out, and is intended for the holding-down bolt to go through.

I next took a block of beech 4½ in. by 2½ in. by 2 in.; this I shaped like Fig. 2, of which A is front elevation and B side view or section; on it I cut the two tenons C and D, and morticed it into the end C in Fig. 1. A slot was cut in E, Fig. 2, for the rising and lowering bolt. When morticed together it has the appearance of Fig. 3, of which A is the sole plate, B the upright with the bolt; C is the slot for holding-down bolt.

My next move was to make the T. For this purpose I took a piece 8 in. by 4 in., and shaped it like Fig. 4, bevelling the top and cutting mortice A for the rising and lowering bolt. To prevent side play I screwed on the two slats B and C, leaving the distance between them exactly the breadth of B, Fig. 3. A side view or section of T through B or C is shown at A.

The rest was now complete, as all I had to do was to bolt the T-piece to upright, putting the T inside and leaving the nut outside the upright, then with a spanner the T can be clamped at any height pleased.

Fig. 5 is the rest complete. If anyone has any difficulty in making it, I will be only too glad to help him through "Shop."

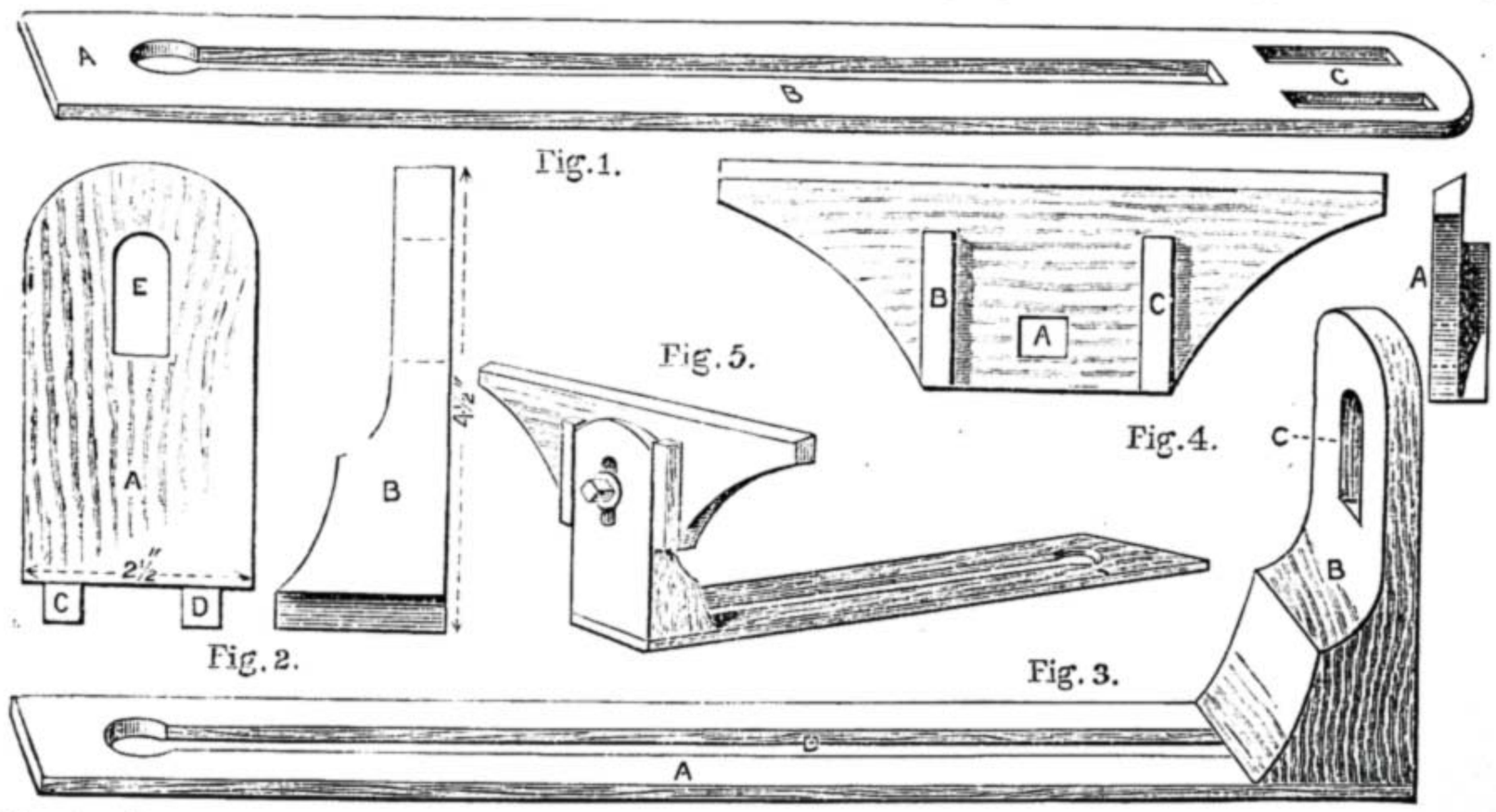


Fig. 1.

Fig. 2.

Fig. 5.

Fig. 4.

Fig. 3.

Fig. 1.—Base or Sole Plate of Lathe. Fig. 2.—Block at End of Sole Plate in Elevation (A) and Side View (B). Fig. 3.—Sole Plate with Block attached. Fig. 4.—T-Piece—A, Side View or Section. Fig. 5.—Perspective View of Rest when completed.

A TURN-TABLE FOR MICROSCOPIC SLIDES.

BY H. J. L. J. MASSÉ.

A FRIEND of mine came to me begging me to contrive a turn-table for him to use in mounting his microscopic slides. At first I thought of utilising a pair of small bevelled cog-wheels that I had by me, using a weight and a string for the motive power. But I soon resolved to keep the cog-wheels for some other time, and to use a small clock movement that I had been presented with as "quite a useless thing." I may mention that I always keep clock and watch wheels by me in a separate box, and have quite enough loose parts to repair a friend's Waterbury, or Ansonia or Busy-bee clock.

First, I found a small, square, wooden box, which, when stained and varnished, formed the case for the instrument. Inside this case I fixed the movement with the portion that carries the hour-hand projecting through the case. Next, I turned up two discs of ¼ in. mahogany (about 4½ in. in diameter) and screwed them together, with some liquid glue between, taking care to put the two pieces so that their grain lines crossed at right angles, to prevent future warping. Exactly in the centre of this disc—for, of course, it was now one—I drilled a hole, and by this hole it was attached to the projecting portion of the clock movement.

The clockwork was to be set in motion by my friend's finger, when required, simply by passing his finger through a hole in the side of the box, and working round one of the smaller wheels one way or another, according to the direction the disc was to be made to revolve. Two small brass springs were fixed on the disc to hold the slides in their place while the disc was revolving; but indiarubber rings would do equally well.

This turn-table answers extremely well; but when I make another, as I hope to do some day for myself, I shall use a clock movement with a perfect mainspring and in fair going order. To work the turn-table, I should remove all the escapement, and fit a brake or some kind of detent to one of the smaller wheels. The turn-table would then be ready at a moment's notice if the clock were wound up, and both my hands would be quite free to manipulate the building up of asphalt rings, etc.

I may add that the disc was lightly marked with concentric circles while revolving in the lathe, as a guide in putting slides in their place on the turn-table.

THE TRIUNIAL OPTICAL LANTERN: HOW TO MAKE IT.

BY CHARLES A. PARKER.

THE METAL LINING OF THE LANTERN BODY—MATERIALS EMPLOYED AND NATURE OF THE WORK—MARKING AND CUTTING THE VARIOUS APERTURES—HOW TO WIRE THE EDGES OF THE LINING—PUTTING THE LINING TOGETHER WITH FOLDED SEAM—PREPARATION OF THE JET SHELVES—FIXING METAL LINING IN OUTER WOODEN BODY—PREPARATION OF THE LANTERN HOOD—LINING THE DOORS.

THE sets of tools possessed by amateurs are generally of such a varied description that it would be scarcely reasonable to suppose that the average worker will be able to construct the triple lantern entirely himself. It will, therefore, be found advisable with any difficult portion—for instance, the metal lining about to be described—to get the requisite amount of work supplied by some competent professional, should the operations involved prove to be beyond the capabilities of the amateur workman. Working in sheet metal requires a considerable amount of care, as anyone who has had practical experience is well aware, and although the average amateur turns out this class of work in a slipshod style, this may rather be attributed to a lack of suitable appliances or a want of knowledge than to anything specially difficult in the work.

The best sheet iron — usually called Russian iron, which, by the way, generally comes from Birmingham or Sheffield—should be employed in the construction of the inner metal body of the lantern. Assuming that the reader intends occasionally to employ the upper lantern as a separate instrument, it will be necessary to make the metal lining accordingly in two portions, each lining being cut from a single sheet of tolerably stout Russian iron, which must be provided with openings for the condensers, doors and jets of the same size and shape as the corresponding apertures in the wooden carcase described in the previous paper. These linings, when ready, are put together with what is known as a folded seam, and the top and bottom of each are wired in order to stiffen the edges, and render the body rigid when finished. The supporting shelves for the jet tray are secured to either side of the lining by means of small copper rivets on a level with each of the jet apertures, and the upper or third lining has a bent hood riveted to the upper edges.

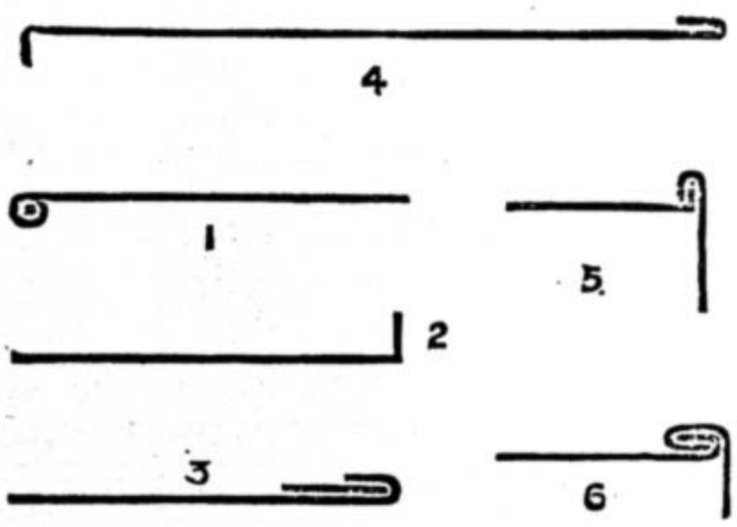
Having gained an idea of the work to be done from the foregoing brief description, it will be advisable to turn to the constructive details involved in making these two metal bodies or linings of the lantern. Select a perfectly flat sheet of iron of a suitable size, and then proceed to mark out the form of the four sides of the lining, as shown in Fig. 12, cutting the metal, in the first instance, to the full height required for the triple instrument, as in the case of the wooden body. First mark the outside dimensions of the lining by means of a sharp steel point, *on the surface of the metal*, the exact measurement being 28½ in. by 24¾ in.; then run a line along each side at ⅜ in. distance from the edge for the folded seam and wired edge, after which draw three lines equidistant from each other, to indicate the position of the four sides, as shown by A, B, and C in Fig. 12, each of these sides being 6 in. wide. At 10 in. from the top draw a line at right angles across the metal from side to side, as shown by D E, and then draw another line on either side of and parallel to this, in order to indicate the metal that is to be turned over when the edges are wired. Having got the lining planned out in the above manner, the next proceeding will be to mark the position of the various apertures, as shown by the black portions of Fig. 12. Taking the four sides in rotation from the left-hand side of the cut, we shall first require these apertures 5 in. square for the doors. In marking out these, the lower aperture should commence at 2⅜ in. from the bottom of the lining, with a space of 4 in. between the top of this and the next one, and 4¾ in. between the second and third. The cause of this space between the second and third apertures being ¾ in. more than the first and second apertures will be understood when it is remembered that ⅜ in. on either side of the line D E will have to be turned over a piece of wire. These apertures should be cut to measure 4½ in. square in the first instance, in order that half an inch on all sides may be turned over and hammered down flat on the inside, so as to bring the openings to the requisite size of 5 in. square.

The jet apertures, which occupy the next side of the lining, are 6 in. high and 4 in. wide at the lower portion, tapering to 2 in. wide at the top. The lower aperture should be situated at 1 in. from the bottom, with a space 3 in. between the top of this and the lower portion of the second one, the space between the second and third apertures being increased to 3¾ in., for the reason above mentioned. This being finished, so far, the next side is left quite plain, and the three circular openings for the condensers are then marked and cut in the fourth or remaining side. Make a centre punch-mark at 4½ in. from the bottom, and then by means of a pair of compasses strike out a circle this diameter, and as soon as this has been done make a second centre punch-mark at 9 in. above this, and strike out another circle the same diameter for the condensers of the second lantern, after which the punch-mark is again made at 9¾ in. above this to indicate the axis of the third circle, which is marked out on the metal in a similar manner—all these apertures being afterwards cut with the greatest possible care in order to avoid buckling the metal, as this would be a source of endless trouble.

If the reader is unequal to the task of cutting these apertures, it will be found advisable to take the sheet of metal, when marked, to a tinsmith, or a simple way of cutting them is to lay the metal flat on a sheet of lead or zinc, and then cut the openings to the form of the outlines by means of a cold chisel. The cutting of the circular apertures may be facilitated to a considerable extent by making a series of small punch-marks all round the outline, just about the sixteenth of an inch apart; it will then be found an easy matter to cut through the intervening spaces by means of a small cold chisel, care being taken to afterwards smooth the edges well with a half-round file.

When furnished with the apertures above described, the lining, which should now present the appearance of Fig. 12, will be ready to be cut in half, as indicated at D E, by means of a pair of shears, after which the top and bottom edges of each portion must be wired by folding the metal over a piece of iron wire. This is done by carefully turning up ⅜ in. of the edge to right angles where marked, by means of a series of well-directed blows with a hammer or mallet, the sheet of metal being meanwhile supported on a hatchet stake or suitable substitute. The edge is then turned down over a sufficient length of No. 10 B.W.G. iron, which must be slipped underneath the fold before the metal is quite closed. A nicely rolled appearance may be given to the edge by hammering it down by means of a punch having a semicircular concavity at its end, the wired edge presenting the appearance shown in No. 1 when viewed in section.

When the two linings have each been wired at the top and bottom, they will



be ready for putting together. If they were to be joined together by means of ordinary soldered seams, there would be some danger of the great heat to which the lining is subjected melting the solder, and thus rendering it useless; it will, therefore, be found safer to put the metal together with a folded seam. This form of seam, which is now very much used for all kinds of tin and metal utensils, is very simple to make when once its construction is understood. In the first instance, the ⅜ in. of metal on either side of the lining, previously marked off for this fold, will require to be turned up to right angles as in No. 2, by hammering it over a suitable iron edge, after which a flat piece of metal 1/16 in. thick, and provided with a perfectly straight edge, is then placed in the angle against the upturned edge of one of the sides, for the latter to be hammered down flat, as in No. 3, the two edges being turned up in alternate directions, as in No. 4, in order that they may be sprung together as in No. 5, and afterwards turned over and hammered down flat in a similar manner to the folded seam of a Colman's mustard-tin, the lining presenting the appearance of No. 6 when viewed in section.

In putting the lining together, it will be necessary to see that the four sides are each bent in the right places, in order that it may be quite square and true when put together.

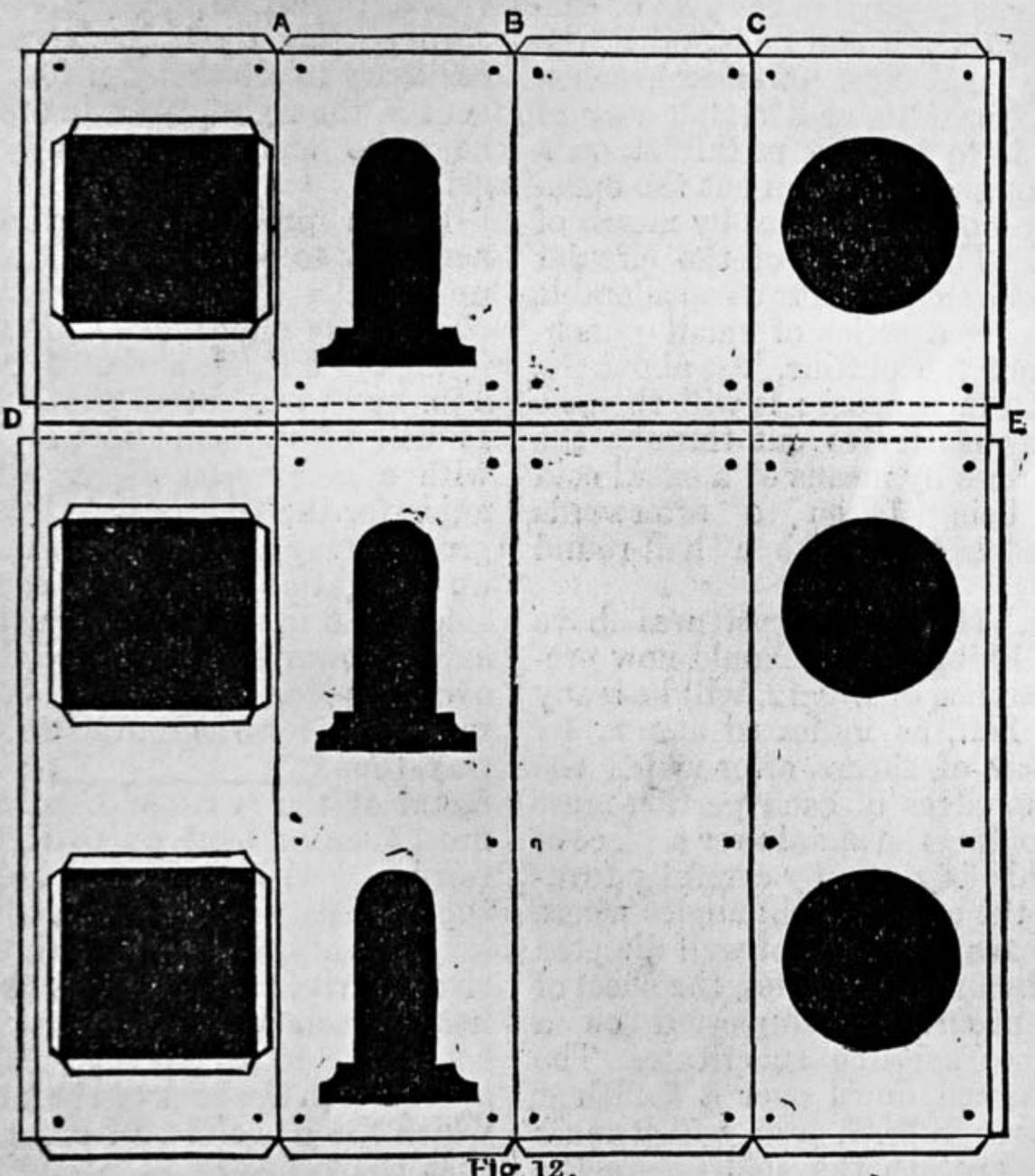
Before proceeding further it will be necessary to prepare the jet shelves, on the upper sides of which the supporting trays of the jets slide. Each of these must be formed of a single sheet of iron, measuring 8 in. by 4½ in., cut in the form of Fig. 13. It will be requisite to provide each shelf with a groove, on either side, to act as a guide for the jet trays to slide along. These grooves may be readily formed by turning up to right angles ⅜ in. of each of the long sides for 6 in. of the full length of the shelf, and afterwards hammering them down flat over a piece of metal about ⅛ in. thick, in order to form a groove on either side of the tray, thus ⌐ ¬ : one inch of the metal at the front and back of each shelf must then be bent up to right angles, and furnished with three rivet holes, after which the shelf may be affixed in the inside of the lantern lining by means of three small copper rivets, driven through corresponding rivet-holes punched in the lining. They must, of course, be fixed on the same level as the apertures in the back of the lanterns through which the jets slide, in order to be certain that the bends at each end of the shelves are made in the right place; it will be found advisable to accurately measure across the interior of the lantern before bending the metal. The appearance of one of the shelves when ready for fixing is shown in Fig. 14. For the rivets which secure the shelves in the lining a few ordinary copper tacks will be found to answer very well. Cut off the head and a small portion of the stem of each, and insert the latter in the holes previously punched in the metal, and then hammer the stem until a second head is formed.

It will now be time to secure the metal lining to the interior of the wooden body. For this purpose twenty-four holes should be punched in the lining in the position indicated by the black dots in Fig. 12. In actual work, however, these holes should be made previous to the lining being folded together. Anyone used to metal work will employ a bolster on which to support the metal while the holes are being punched. This tool consists of a piece of steel about 2 in. square with a hole in the centre, and is similar in appearance to an ordinary screwed nut, the latter, by the way, forming a capital substitute for a bolster. Having provided the lining with sufficient holes, it should be inserted in the wooden carcase, and secured to the

woodwork by means of ¾ in. screws, which are driven through the holes prepared for their reception with a ½ in. length of brass tube of about ¼ in. bore screwed up between the metal and the wood. All the screws must be driven from the inside of the body by means of a long spindled turnscrew, which should be inserted through the various apertures in the body. The lantern body being completed, the next proceeding will be to make the hood, which is shown complete in Fig. 15. As will be understood by reference to Figs. 16 to 19, this hood is made in three portions, which are so planned that by means of sundry bends they may be fitted and riveted together to form a hood with a projecting rim, which fits into the top of the lining. Fig. 16 is a plan of the top cover of the hood, which is cut from a sheet of iron, measuring 16 in. by 8¼ in., the dotted lines representing the position of the folds. The space between the end of the metal and the first dotted line will be 1 in., with 1½ in. between the other two dotted lines. The central portion, which forms the bent hood, should be wired on either side by turning down ⅜ in. of the metal over a couple of strips of iron wire. Fig. 17 indicates clearly the curved form to which the cover should be bent when ready; the circular curve at the front may be secured by bending this part round a piece of 1 in. gas-tubing, or similar suitable substitute, the metal being closed as much as possible, and then bent outwards again; the straight bends which are made in alternate directions along the dotted lines in order to make the double fold, which forms the projecting ledge, will be an easy matter. It will, of course, require some care to form good curves, and make straight and even bends along the dotted lines, but it is absolutely necessary that this should be done if the hood is to present a good appearance. When the cover has been prepared, the two sides, each of which will measure 8½ in. by 7 in., must be cut from a sheet of metal of sufficient size to the form of Fig. 18. The measurements between the three dotted lines will be the same as before, that is to say—from the lower end of the metal to the first line at A A 1 in., and from this to the second line, and from the second to the third line, 1½ in. each, the remaining space being 3 in. wide. When ready, each of these sides must be bent as shown in Fig. 19, in the same manner as the ends of the cover, previously described. The three portions may now be fitted together in the position they are intended to occupy when finished, and if found to be correctly adjusted, three small rivet holes should be punched through each corner in the position indicated in Figs. 15 and 16, the metal being secured together by means of small copper rivets, which are pushed through the four thicknesses of iron and riveted on the other side. The four corners of the under rim which lap over in either direction must also be provided with two rivet holes apiece to enable them to be firmly secured together with small copper rivets. It will thus be seen that the hood is put together entirely with rivets, no solder being used for any part of it. The hood must not be allowed to curl over too much at the front of the lantern, otherwise it will interfere with the subsequent working of the rolling curtain.

When the hood has been finished, it should be placed in the hands of a japanner to be japanned. The japan used should be black, and it will be found an improvement to have a neat gold line run round the edges, but this, of course, is simply a matter of taste. Unless the reader is conversant with the process of japanning, it will be found the most economical plan to put the job out to be done by a professional, as it is a very awkward task for a beginner. It would occupy too much space to enter fully into the details involved, but should our readers prefer to make an attempt, the following course should be adopted:—Grind up sufficient ivory-black with turpentine, and then mix it with some ordinary shellac varnish, and apply smoothly to the surface of the metal by means of a soft brush. About three or four coats should be sufficient, the metal being slightly warmed previous to the application of the first coat, after which each subsequent coat is heated to about 300° Fah. before another coat is put on. In laying on the varnish it is advisable to avoid going over the same spot a second time while the varnish is moist. An ordinary household oven will be found to answer sufficiently well for the purpose of stoving the work. In order to produce the best finish, or when a bright gloss is desired, it will be necessary to polish the surface after having applied sufficient varnish to bear the subsequent treatment. For this purpose some tripoli and oil may be applied by means of a soft rag, or a piece of cloth, and as soon as the work appears glossy it should be rubbed with the oil alone, in order to free it from the powder, and impart a still brighter lustre.

The next proceeding will be to prepare and affix a lining to each of the three doors. A piece of metal 6 in. by 4¾ in. will be required for this purpose. Having cut a piece to the size, make a centre punch mark in the middle, and then strike out a circle 1 in. in diameter, afterwards carefully cutting the metal to this size, in order that it may connect with the circular sight-hole, previously cut in the woodwork of the door. Two lines should next be drawn, parallel with the 4¾ in. sides, as indicated in Fig. 20, the first at ¼ of an in. from the edge of the metal, and the other at ½ an inch distance from the first. Four small holes should also be punched on either side within the ½ in. space, in order to serve as a means of securing the lining to the door. Thus prepared, a couple of sharp bends are made at right angles on either side along the scribed lines, by hammering the metal over a hatchet stake, after which it is secured to the woodwork by means of eight screws driven through the holes previously punched in the metal. The method of hingeing the doors has already been described in the previous paper, but as no form of fastening was mentioned, it may be stated that a small brass or china turn-button, or an ordinary flush ring catch, will form the most suitable fastening. If a spring catch is used, it must be let into a slight recess prepared for its reception in the left-hand side of each of the doors, the small plate belonging to each catch being let into the opposite door stile, flush with the surface of the wood. These catches, which should be the smallest size made, must not exceed 1 in. in length, otherwise they will present a clumsy appearance when attached to the doors. Any ironmonger will supply these at about 8d. each. If a button is employed instead of a catch, it should be rather less than 1 in. in length, and it must be attached to the door stile by means of a small brass screw with a lacquered head.



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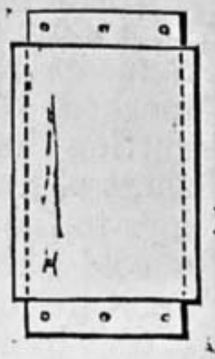
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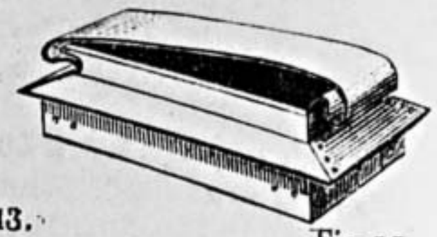
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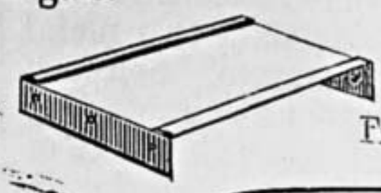
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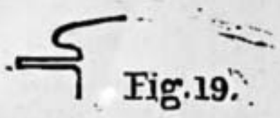


Fig. 19.

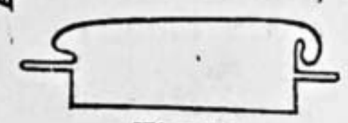


Fig. 17.

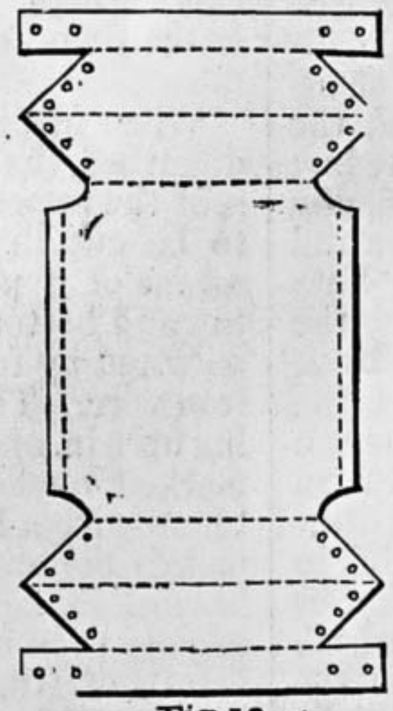


Fig. 16.

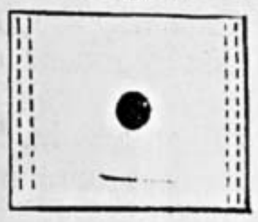


Fig. 20.

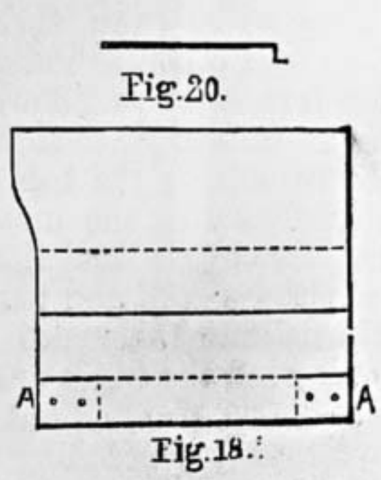


Fig. 18.

Fig. 12.—Plan of Metal Lining. Fig. 13.—Plan of Jet Shelf. Fig. 14.—Jet Shelf ready for fixing. Fig. 15.—Lantern Hood. Fig. 16.—Plan of Cover of Hood. Fig. 17.—Section of Cover. Fig. 18.—Plan of Side Wing of Hood. Fig. 19.—Section of Side Wing. Fig. 20.—Plan and Section of Door Lining.

A LAMP-STAND IN WOOD.

BY C. MAYNARD WALKER.

THE revival in recent years of the use of wrought-iron work in domestic utensils of various kinds has naturally familiarised the eye to application of scroll-work of every shape and form to articles which hitherto had been associated with pedestal or vase-shape forms, such as lamps for the table or floor—which, judging from the displays in the shop windows of art metal workers, must be very fashionable and popular. Now scroll-work in metal is not within the range of the average worker, but in wood almost anyone who can use the simplest tools can make, with proper instructions, a very creditable show. The object of the present article is to submit a design for a table lamp-stand in woodwork cut out with a scroll or fret saw. Fig. 5 is from a photo of one made by the writer of ½ in. pine throughout, and finished in dead black, having all the appearance of ironwork, and sufficiently strong for the purpose; the stand measured over all 10 in. high by 9½ in. at the base, being triangular. Fig. 1 is a full-size pattern of the uprights, of which three will be required; the method of construction will not need a lengthened description. I will merely state briefly the manner in which I went to work: viz., having cut out three of Fig. 1, I made a triangle for the base by cutting out (for economy of material) three of Fig. 3, with a corresponding centre, as shown in Fig. 2, into which each arm was fitted, as also another triangle of the same shape, but about ½ an inch wider all round. This shape is easily obtained, without the necessity of another illustration, by running a thick pencil round the piece cut out from Fig. 3, with the addition of three segments of circles on the outside centre between the arms; these two triangles were built up, one on the other. A further triangular piece, Fig. 4, was cut and fluted with a round file, and slotted at the ends to the thickness and depth of the uprights, or standards, which were glued in and pinned as shown; the uprights were also pinned and glued to the triangular base—a small hole drilled and common pins used—the whole being very rigid without the addition of the top ring, which was then also pinned and glued. This ring should be made of two pieces of wood glued together, so as to cross the grain and prevent cleavage, and externally, to be 5¾ in. in diameter; a turned knob in the centre of base may be used or not as a finial to that part. The work was smoothed up in the ordinary way with sand-paper, and one coat given of a flat black paint, and was so far complete. In this form it may now be used as a lamp

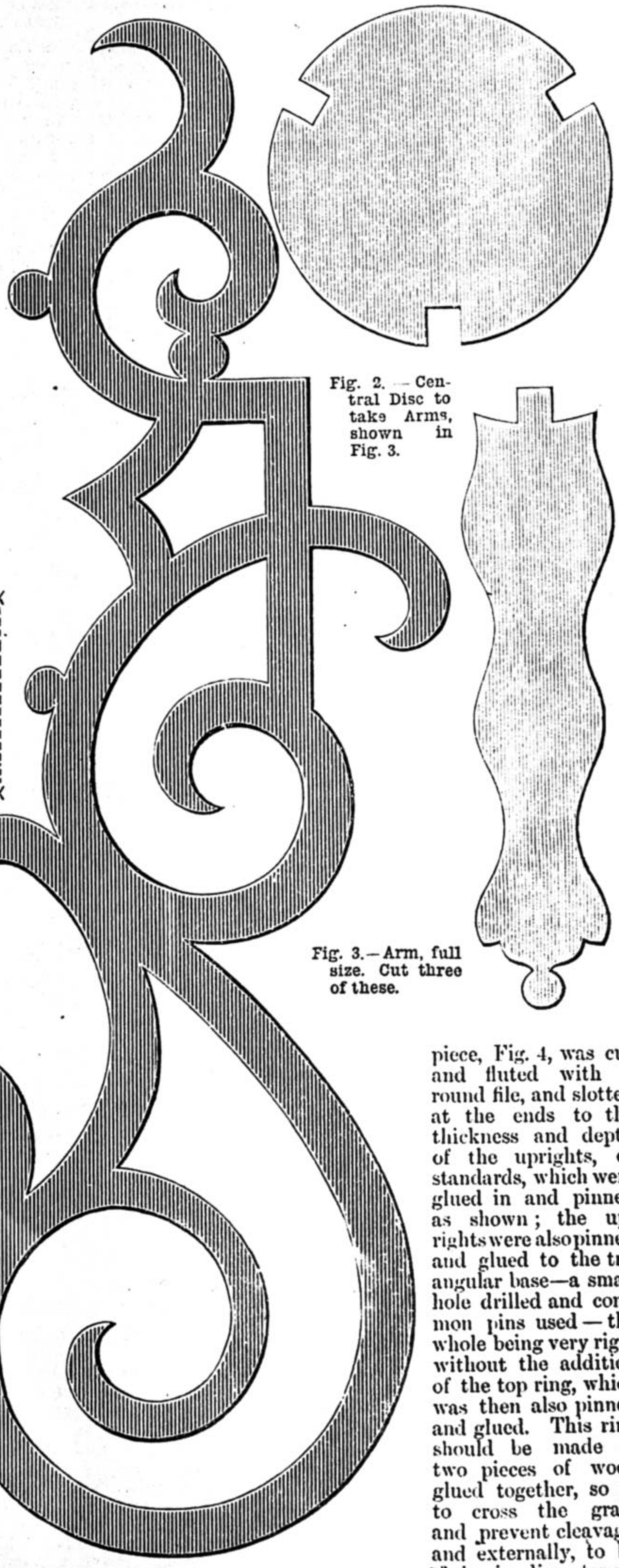


Fig. 2.—Central Disc to take Arms, shown in Fig. 3.

Fig. 3.—Arm, full size. Cut three of these.

Fig. 4.—Slotted Triangle, full size. Cut one of this Pattern.

Reverse this piece, and add at X X on opposite side to complete Triangle.

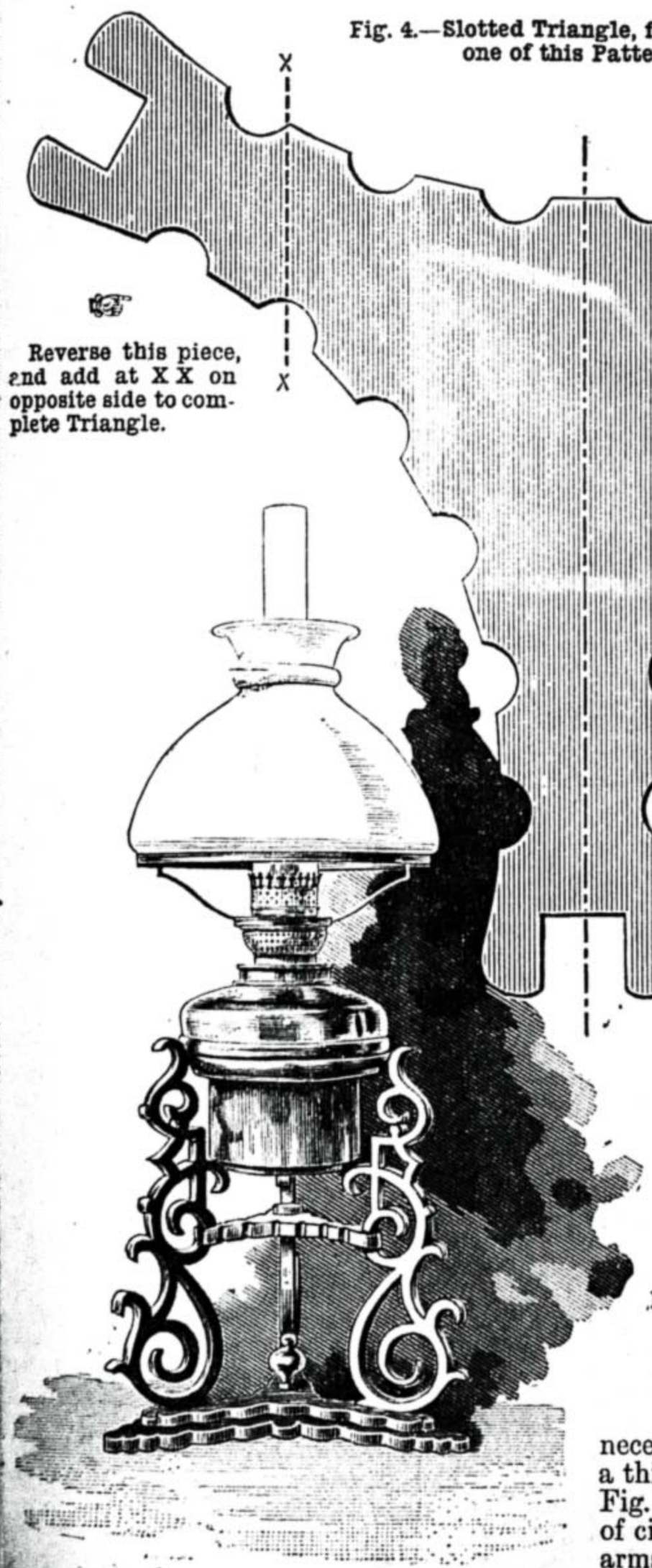


Fig. 5.—Lamp and Stand complete.

Fig. 1.—Standard, full size. Cut three of these.

stand, as shown in Fig. 5. It will depend, of course, upon what kind of lamp container is adopted as to the internal diameter of the ring for holding same. In the case under description the one used was a lamp known in the trade as a "10 line kosmos," with a glass "well-hole container" of a peacock-blue tint, with opal shade complete; and the container, moreover, was of a bold shape, measuring 5 in. wide at the bulge by 4½ in. deep, the shoulder of which rested upon the ring with an inside diameter of 4¾ in. This kind of lamp is very cheap, efficient, and serviceable, costing about 2s., and may be ordered through any lamp dealer in town or country. If this kind be adopted, the complete lamp and stand will be about 23 in. high, and present a bold and attractive appearance at a very low cost—plus labour. It will be seen that the stand would answer equally well as a flower or plant stand for table decoration by the simple addition, in place of the lamp, of a water-tight zinc vessel fitted into the circular space; but for whichever purpose it is employed, I am sure the worker will feel amply repaid for his labour in the possession of a novel piece of furniture.

OUR GUIDE TO GOOD THINGS.

*** *Patentees, manufacturers, and dealers generally are requested to send prospectuses, bills, etc., of their specialities in tools, machinery, and workshop appliances to the Editor of* WORK *for notice in "Our Guide to Good Things." It is desirable that specimens should be sent for examination and testing in all cases when this can be done without inconvenience. Specimens thus received will be returned at the earliest opportunity. It must be understood that everything which is noticed, is noticed on its merits only, and that, as it is in the power of any one who has a useful article for sale to obtain mention of it in this department of* WORK *without charge, the notices given partake in no way of the nature of advertisements.*

90.—Philip's Portable Adjustable Sundial.

I have much pleasure in directing attention to a pretty and handy new and instructive model known as Philip's Portable Sundial, adjustable for all latitudes, and fitted with compass, designed for use in schools and all educational establishments, as well as in private families. The sole manufacturers are Messrs. George Philip and Son, 32, Fleet Street, London, E.C. Its price is 3s. net. Its form and use may be gathered from Fig. 1, which shows the model placed on the case or box in which it is kept when not in use, and which serves as a suitable pedestal for it when being worked. In order to use it, the base of the sundial is fitted into the top of the case as shown, and the case itself, which is a perfect cube, must be placed on a flat surface, so that the small leaden plummet shown at the back hangs directly over a metal pin below it, projecting upwards from the stand. The lower end of the brass meridian must then be fitted into the wooden support so that the needle or central wire joining the two sides of the meridian is placed exactly against the graduated scale on the side of the support representing the latitude for which the sundial is to be adjusted, namely, for London, 51°; for New York, 41°, etc. By means of the compass the position of the whole must then be so fixed that the needle points due north. In order to arrive at the exact time, the difference between solar and civil time must be taken into consideration; and, to aid the operator in doing this, a table is supplied on the side of the stand. Moreover, the cubic stand is a complete exponent of the decimal system of reckoning measurement and weight, for it measures one cubic décimètre, which contains one litre, which, if filled with water, weighs one kilogramme, one-thousandth part of which weighs one gram and measures one cubic centimètre.

91.—Booth Brothers' Blowing and Ventilating Fan.

Messrs. Booth Brothers wish me to submit to the readers of Work an illustration of their Blowing and Ventilating Fan, to which reference was made some little time ago by a correspondent in "Shop." Its principle and mode of action will be readily understood from Fig. 2. I should have liked to be in a position to give the size and further particulars, but as these have not been supplied to me, and I have not seen the machine, I can only leave readers who desire to have them to obtain particulars from Messrs. Booth Brothers, Upper Stephen Street, Dublin. Its price is 12s. 6d. It is worked by hand, and it is said that the blast can be conducted to any reasonable distance by means of glazed earthenware pipes.

Fig. 1.

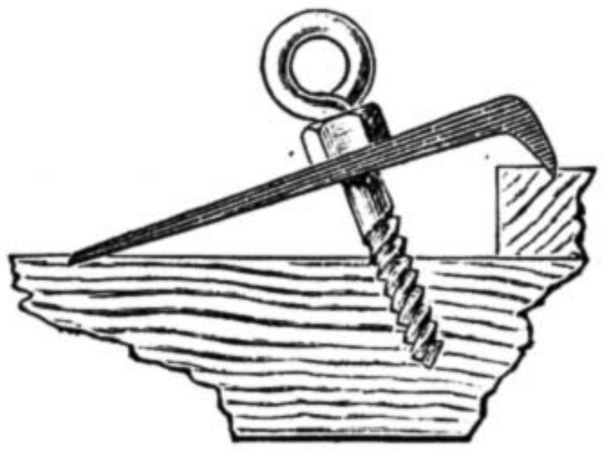


Fig. 3.

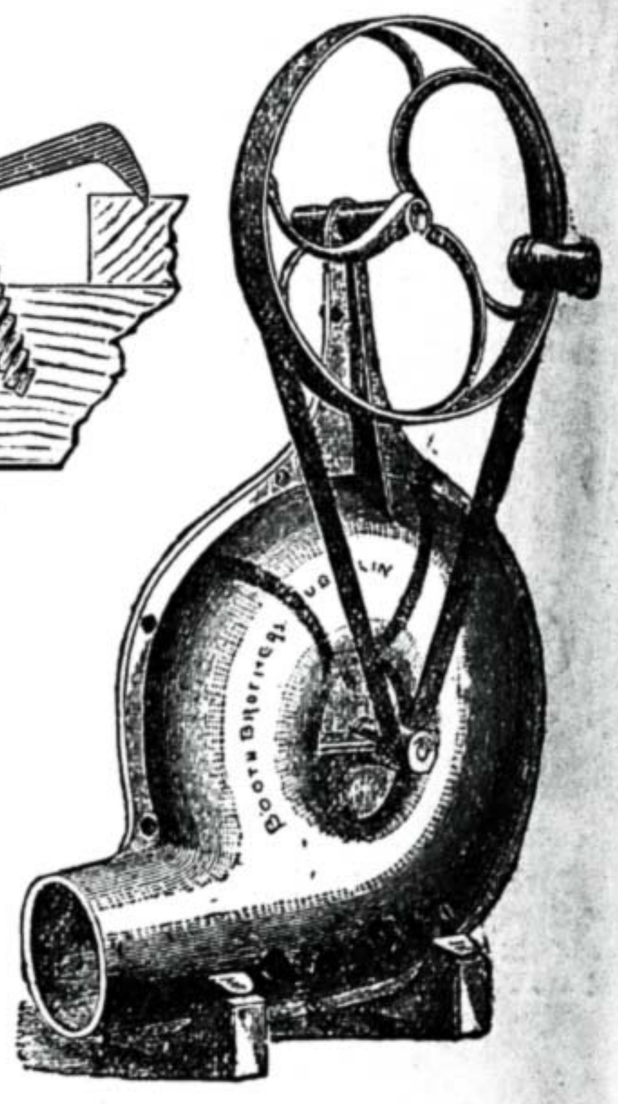


Fig. 2.

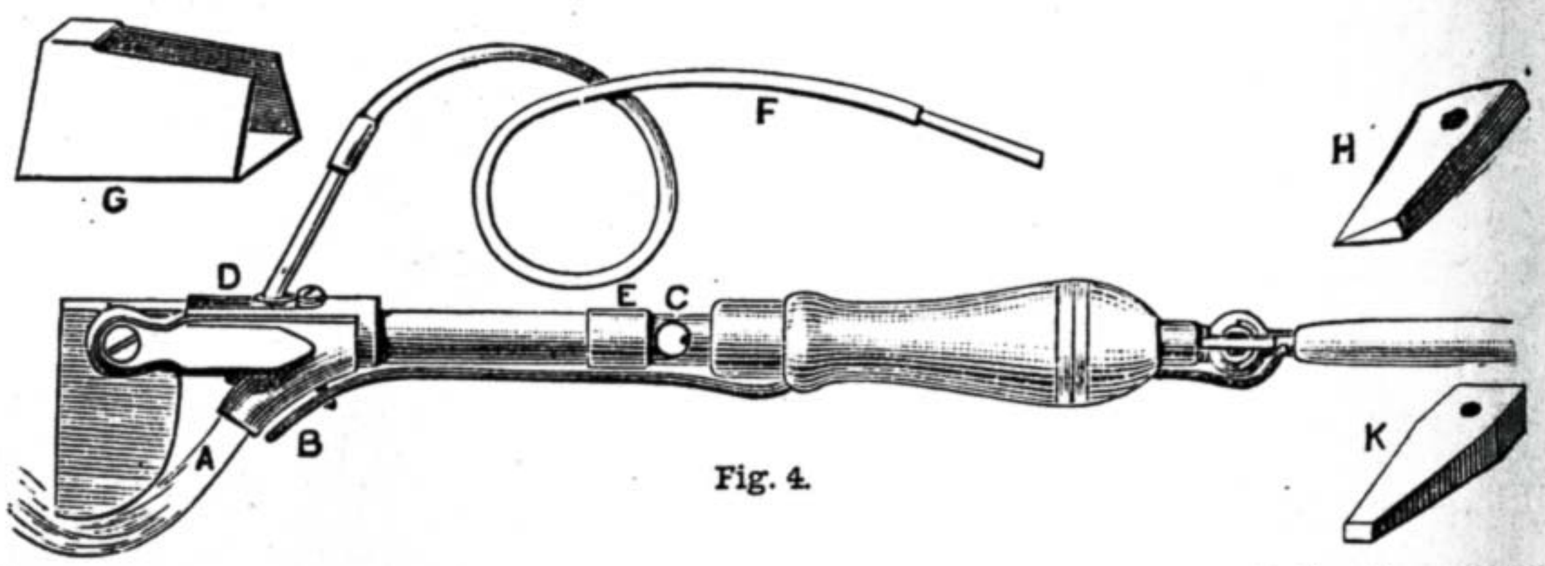


Fig. 4.

Fig. 1.—Philip's Adjustable Sundial. Fig. 2.—Booth Brothers' Blower and Ventilating Fan. Fig. 3.—Booth Brothers' Bench Clip for Wood-carvers, etc. Fig. 4.—M'Culloch's Patent Improved Soldering Bolt—G, Rest and Heater; H, Pointed Bit; K, Flat-tipped Bit.

92.—Booth Brothers' Measuring Rod.

Our friend Opifex suggests to me that no truly satisfactory answer has been as yet given to appeals of correspondents for "a rule for prompt and accurate measurement to $\frac{1}{16}$ in. of openings and spaces, etc., from 2 to 10 feet." Such a rule is certainly to be found in one which he has been kind enough to send me, and which consists of two sliding rods 2 ft. 7 in. long by $\frac{3}{8}$ in. by $\frac{1}{16}$ in., connected at each end by brass runners, an arrangement which allows the rods to slide freely one on the other, but at the same time preserves the rigidity of the rule. The rods are marked in feet and inches on the four sides, and the rule will accurately and promptly measure any opening from 2 ft. 7 in. to 5 feet, and the measurement may be read at two points on each side of the rule. It is made of boxwood, is well finished, and costs 5s. This rule, and a larger size measuring up to 10 feet, can be obtained from Messrs. Booth Brothers.

93.—Booth Brothers' Bench Clips for Wood-carvers, etc.

A handy clip for holding down wood to the bench has been recently introduced by Messrs. Booth Brothers, and is illustrated in Fig. 3. The clip or holdfast itself is a piece of iron about 2¾ in. long and 1 in. wide, indented with notches at the thin end and turned downward at the upper end with a tooth-like projection on each side, the better to grip the wood placed under it and to be fixed on the bench without chance of moving. It is also slotted in the centre to admit of the passage of a screw, eyed on the top, that it may be twisted into the bench by a piece of wire or French nail passed through the eye and having a piece of metal, hexagonal in form, under the eye, so that better pressure may be obtained on the plate when the screw is turned into the bench. I am not aware of the price charged per pair, but the cost may easily be ascertained by any reader on application to Messrs. Booth Brothers.

94.—M'Culloch's Patent Improved Soldering Bolt.

M'Culloch's Patent Improved Soldering Bolt is asserted by its inventor and maker, Mr. Francis M'Culloch, 47, Hopehill Road, Glasgow, to be the cheapest and most practical soldering bolt in the market, being simple, light, and durable, heated by gas, and so constructed that it is capable of doing any kind of work that is done by plumbers, tinsmiths, coppersmiths, brass-founders, wire-workers, glass-stainers, packing-case makers, opticians, etc. The form and arrangement of the bolt are shown in Fig. 4. In order to make use of it, a rubber tube is used to connect the bolt to a gaspipe, or to any ordinary gas bracket, from which the burner has been

removed. After allowing the air to pass out of the rubber tube, light the gas at the points A and B. Should it ignite at the air-holes at C, shut and reopen tap at handle, when the touch will instantly relight at the nozzle; then place in heater until required. The gas will heat the bolt ready for use in four minutes, while there is no danger of its becoming overheated. When not in constant use the gas can be shut off by the tap attached to the handle, a touch light or bye-pass B being conducted to the nozzle A, which will instantly ignite the heating flame when required. A blowpipe F can be attached when excessive heat is required for such work as is done by brass-founders, coppersmiths, plumbers, etc. It is attached by screwing the small tube into the socket D, and a cover E is then slid over the air-holes at C. The blowpipe in no way interferes with the ordinary use of the soldering bolt. By the simple adjustment of a screw, a copper bit of any shape, as shown in the illustration of the bolt, and at H and K, can be fixed in position to suit any kind of soldering work. The heating flame is regulated to pass under the points of the copper bits, and can be used in this way without tarnishing or doing any injury to the work. In such cases as glass-stainers' work, the flame can be toned down so as not to touch the glass and still keep up a sufficient heat for soldering. It is said that the cost of the gas consumed will not exceed 1d. per day. The price of the bolt with blowpipe and heater, and one bit, is 8s. 6d.; extra bits, 1s. each.

95.—Arnold's Blowpipe.

Mr. A. W. Arnold, Gas Fitter, Hartshorne Street, Bilston, Staffordshire, has sent a small blowpipe of his own make, and writes as follows:—"Seeing several inquiries in 'Ours' lately respecting blowpipes, I beg to forward for your acceptance, and, if you think fit, for notice in the 'Guide to Good Things,' a sample of a small blowpipe, of which I have made several for use among my friends and fellow-workmen. Although small, it is very handy for soldering composition, lead, or brass of sizes up to 2 in. lead, and also for brazing small work, such as jewellery, etc. By unscrewing the outside tube and removing the jet, I have brazed up to ½ brass tube with the aid of a small foot blower. If any of your readers care to try one, I can supply them at 1s. 8d., post free, or a size larger, ¼ in. brass, for 2s. 1d., also post free. The price would be more, but I make them in my spare time, and therefore can afford to sell them cheaply." I handed this blowpipe to Mr. R. Alexander, requesting him to test it. This he did, and he writes:—"The blowpipe you gave me to test I found a very useful little tool, capable of doing all that its maker claims. I brazed a new bow to a key *without* a foot blower, only by blowing with the mouth in the ordinary way. I can strongly recommend them, and say that they are very cheap indeed."

96.—Pollitt's New Soldering Tool.

As I am dealing with bolts for soldering and blowpipes, I may as well finish up all tools of this kind at present before me by mentioning a new soldering tool submitted by Mr. John Pollitt, Central Cycle Works, Lower Mosley Street, Manchester. He writes:—"I have sent you a sample of a new soldering tool which I am making. You will at once see the advantage which this possesses over the ordinary tool. The copper cap is taken off and tinned. When once tinned it always remains clean, as it is never put in the fire. The iron is put in the fire, and can be heated as much as desired. The sheath is then replaced and held in position by a pin. Thus there is no danger of burning copper, and no retinning or cleaning of copper." The end of the iron is about 2¾ in. long, and 1⅛ in. broad, tipped with a pyramidal point. Over this is placed a copper cap of the same shape, which is held in place by a pin as stated. Except for amateurs who go in for cheapness, the ordinary copper bit is preferable. The pin, which has an eye ⅛ in. in diameter, to facilitate insertion and withdrawal, is much in the way of the operator. The price will not be more than 2s. 6d.

The Editor.

SHOP:

A Corner for Those who Want to Talk It.

II.—Questions Answered by Editor and Staff.

Model Hansom.—Amateur Carpenter.—In making a four-wheel vehicle there is only the draught to be taken into consideration; but in making two-wheel vehicles, the wheels, springs, and axle have to be so adjusted as to make the vehicle balance; and in case of a hansom it should be just a little "heavy on" at the shafts so that the counter balance is regulated when the fare is inside the hansom, or, in the case of an ordinary hansom, when the driver mounts the box or seat behind. Fig. 3 shows the most modern and approved of hansoms running, either for public or private use. First of all make a large drawing—full size of the model, as you will want to work to it—of the side, including the wheel, spring, shafts, etc.; a circle will do for the wheel, as it is the body you want in detail. The wheels are made of wood, and will be 2 ft. high over all; felloes, 1 in. by 1½ in.; nave, 3 in. by 3½ in.; spokes, 1 in. by ¾ in. The axle will be 1 in. thick, springs of spring steel 1 lap 1 in. wide, ¼ in. thick. The framework of the body is made of good dry ash or any hard wood. It must be remembered that the way of making a model hansom would not be the same as making a real one, as, for instance, when we nail our panels on to the framework in the model, we shall pin a moulding all round, whereas, in the ordinary coach-built hansom, the framework would be grooved out and the panel

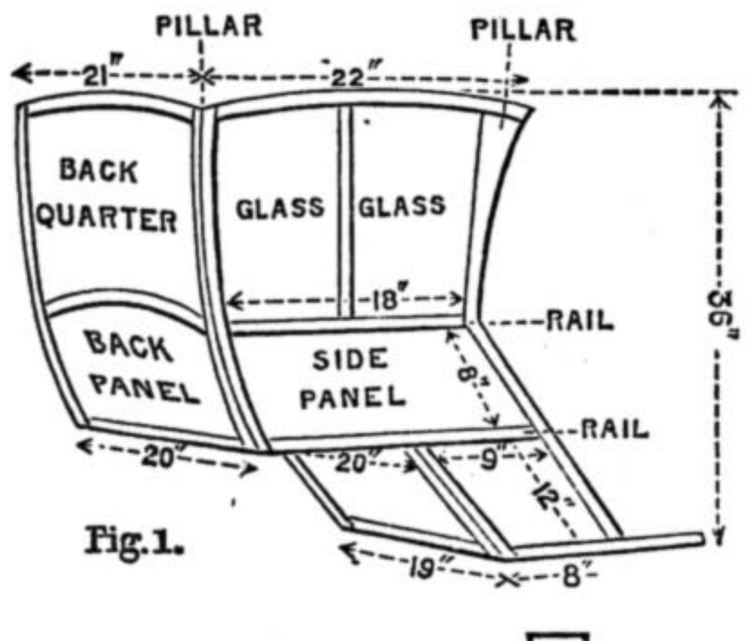


Fig. 1.

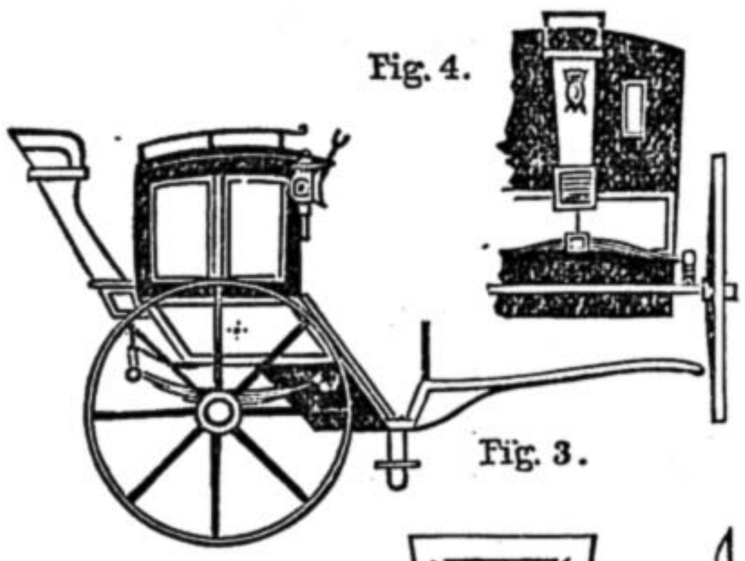


Fig. 4.

Fig. 3.

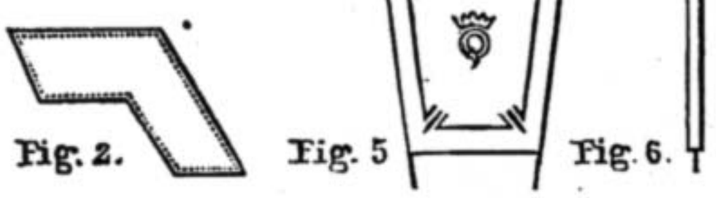


Fig. 2. Fig. 5 Fig. 6.

Model Hansom. Fig. 1.—Framework. Fig. 2.—Panel Side. Fig. 3.—Side View of Hansom. Fig. 4.—Back View. Figs. 5, 6.—Door Front and Side View.

fitted into it, the outside of the framework of course being the moulding. We therefore commence by making the sides. Get two front pillars 3 ft. long, 3 in. wide, at the top curved down to 1½ in.; two side pillars 2 in. wide, 1 in. thick, 2 ft. long; four side rails 18 in. long, 1½ in. by 1 in. thick; two top rails 22 in. long, 1½ in. by 1 in. thick; two bottom rails or rockers 14 in. long, 1½ in. by 1 in. thick. The front arch is 2 in. wide, ¾ in. thick, 21 in. long; the footboard, which fits between and comes flush with the top of the rockers or bottom rail, is 15 in. long, 5 in. wide, and 1 in. thick; this will make the footboard the narrowest part of the hansom on account of the shafts, which will be 30 in. long, 1½ in. thick, tapering down to the points. The back has a curved top arch rail 21 in. long, 1½ in. by 1 in.; middle and bottom rail of the same thickness; underneath, for the well, a bottom rail 19 in. long, 1½ in. by 1 in., and two small pillars, 1 ft. long, 1½ in. by 1 in.; there is also a rail fastened at the top of these two small pillars which the seat is fastened upon, also the back panel near the axle or underneath panel; two small pillars will also be required to stand 9 in. high from the footboard to fasten the shafts to; this pillar must fit into the shaft and an angle plate fit upon the shaft, and the bar between the pillars, besides a stay underneath the rocker and the shaft. A pillar, 2 in. wide by 1 in. thick, fits between the head rail and the middle rail to divide the windows, whilst a roof stick 1 in. by ½ in. thick is placed in the centre to support the roof and in a line with the front and back arch. In ordinary coach-building the bottom part would be made first, but we tenon and mortice our pieces and fit together as shown in Fig. 1. When the two sides are made, we fit the back, which should be 21 in. at the top to 19 in. at the bottom. The widest side of the pillars and rails must be placed at the sides. When the framework is all finished, we finish the roof off with a piece of whitewood or baywood 21 in. by 22 in., ¼ in. thick; to get this convex, wet one side, then place the other to the fire, then fasten on the roof by pinning it with coachmaker's pins. Next get a stiff piece of brown paper and cut the pattern of the side panel out; then cut a baywood or whitewood panel to the same size as the pattern, no thicker than ¼ in., as Fig. 2; pin it on the frame only round the edges; also cut out the back panel; this panel will be convex just a little, but the pins will draw it in position. There is now the top quarter to be put in all in one piece, and to be nicely jointed to the back panel, or it can have two small windows in if required. After these panels have been pinned, get some canvas and cut out the required quantity and glue it to the inside of the panels, letting the edges overlap the frame, or before you put the panel in its place you can rub some glue to the frame and panel, then pin it in its place; the canvas prevents the sun from splitting the panel, but the glue which is used in the canvas must be weak or you will not be able to spread the canvas on evenly. We now fix a board for the seat by nailing it at the inside on the top of the seat bar, and the other end is nailed or screwed to the back bottom rail. Next pin the back bottom panel in, then the bottom which is fastened to the bottom rail and the footboard. We next fix the box and seat at the back; this will require the box screwing to the back rail by means of strap, bolts, and screws; next fit a panel at the front near the shafts, and also a small dash. We now fix the springs. The body should now be turned upside down, standing upon a cushion to prevent the ground from marking it, whilst we fix the springs, axle, and wheels; the back spring should be fixed upon a stay in shape of an **U**, a small block of wood, then a couple of clips and clams and nuts, then the side springs with india-rubber robins in iron rings or shackles. We now come to an important part, and that is, setting the axle; if set in the centre it should be right, but the hansom can be made "light on" or "heavy on" by not being in the centre. Revolve the wheels round, and try the measurement from the back of the wheel; when it is alike at both sides, then the axle can be fastened to the springs with clips and with a spring block of wood between. We take the wheels off, up end it, and fasten ash or oak beading ¾ in. by ¼ in. thick all round the panel at the sides and front, as shown in Fig. 3. Next make the knee boot or flap-door; make a frame first, then panel it; the hansom must have a couple of steps, on the sides of which the hinge of the door is fastened with a bolt, as Fig. 5. It should now be glazed; small strips of wood should be pinned in the inside of the framework, then filled up with putty, then the glass put in and strips of wood embedded in putty, pinned down. After it has been cleaned off it is ready for painting, and if you take my advice let a coach painter paint it for you, as he will finish it off better; or, if you paint it, keep the black parts as shown in Figs. 3 and 4; the light parts are painted in any colour. The mouldings are blacked and fine lined; the wheels, shafts, and front (except the dash), together with the door panels and box, are painted in any colour you choose; the inside at top is painted white, the ironwork must be blacked, the inside must be blacked, and the footboard. The inside is now ready for upholstering; a small pair of lamps must be fitted to this goat hansom.—W. P.

Spectacles.—Concave.—You should endeavour to obtain some spectacles from a reliable London optician. By paying a deposit you could doubtless have several pairs on trial, and these should be tested on various sizes of print, until you get a pair most generally suitable. It would be impossible for me to say the exact number you require, as this can only be ascertained by personal trial. I may add, however, that you will in all probability require two pairs of spectacles—one pair for ordinary use, and another pair for reading or writing. You should write and state your wants to Mr. Browning, 63, Strand, London, or to Mr. A. A. Wood, 74, Cheapside, London. Either of the above gentlemen make spectacles to suit all sights and *pockets*. Mr. Wood will send you a pamphlet on defective vision free of charge, and Mr. Browning publishes a booklet on "The Eyes, and How to Preserve Them," price 6d. The latter work is very useful to persons about to buy spectacles.—C. A. P.

Varnish.—South Staffordshire.—I cannot advise you to attempt the work you propose, as I fear that when the varnish has been removed and the job stained and revarnished, you will wish you had left it in its present condition. However, if you wish to try, the only available methods are to remove the varnish by a solvent or by mechanical means, such as scraping and papering; the latter is to be preferred for a piece of fretwork. If at all possible, take the job to pieces, or you will find it extremely difficult to remove the varnish from corners.—D. D

Taking out a Patent.—G. E. B. (*Accrington*) wishes to know how long he will have to wait for a patent to be granted after making application for it. According to the Official *Circular of Information*, the patent, if unopposed, is sealed about ten weeks after the acceptance of the complete specification." From the time that the acceptance of the complete specification has been advertised in the *Illustrated Official Journal*, two months are allowed for notices of opposition to be lodged.—C. C. C.

Patentee's Agent.—A. W. W. (*Baltinglass*) will have received the information he asks for if the address he gives is sufficient; if not, he will do well to write again to the Editor of WORK.—C. C. C.

Model Electric Lights.—C. H. (*Old Charlton*).—The first of the articles in this series appeared in WORK, No. 76.—ED.

Circular Saw Hammering.—SAWYER.—You should have asked for information in reference to your circular saw before you commenced hammering on it. Perhaps before you hammered it the saw was tight in the centre, or what we term centre-bound; or may be it was rim-bound, and by hammering at random, and in places where it should not have been touched with the hammer, caused the saw to twist or buckle; and I have no doubt that it is beyond the skill of anyone to get it true, except one who has learned the whole art of saw hammering. Therefore my advice to you is to send it to Moses Eadon & Sons, President Works, Sheffield; or to Messrs. Weatman & Smith,

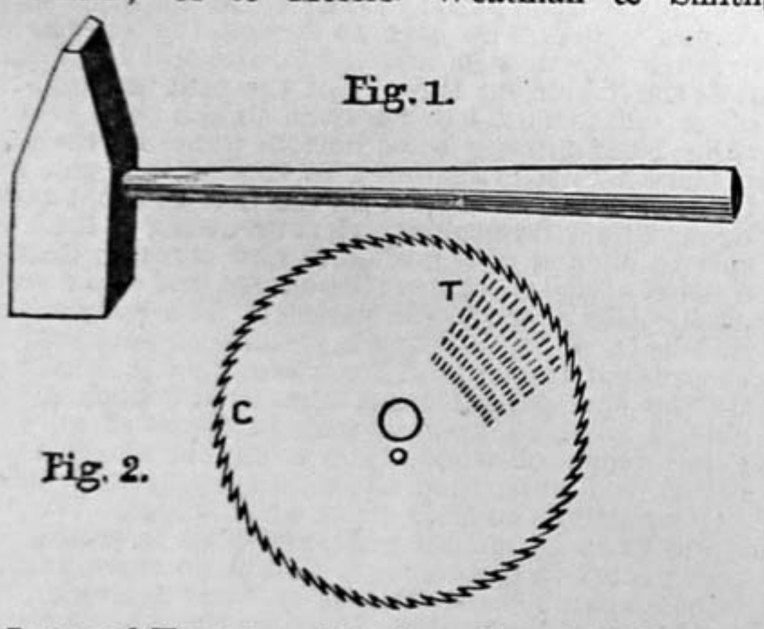


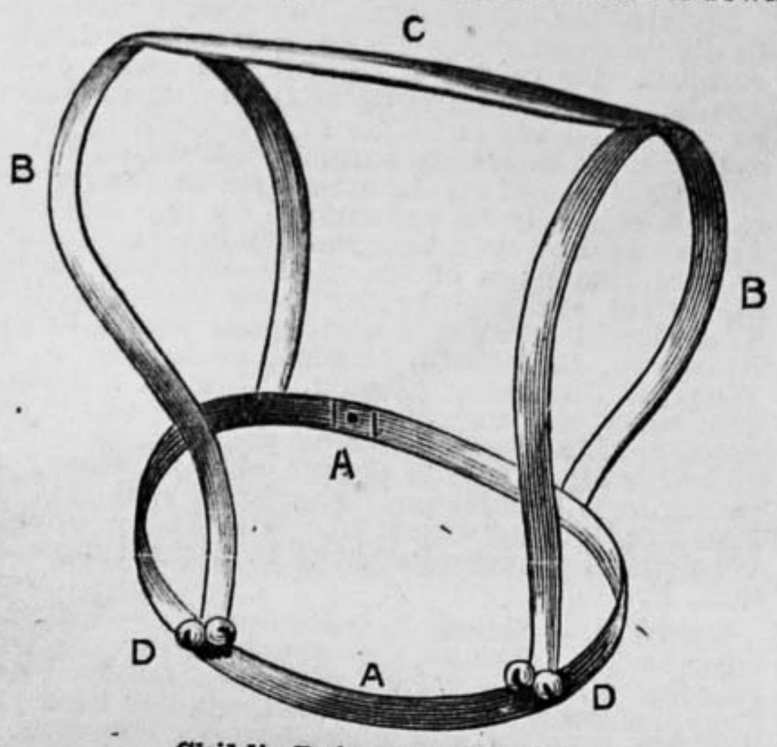
Fig. 1.

Fig. 2.

Saw and Hammer—T, where Saw is twisted.

Russell Works, Sheffield, or any good saw maker, and get it hammered by a man who knows the whole art of saw hammering, and if your saw is stout enough to allow one gauge to be ground off, have it ground at the same time. Had your saw been twisted in working, the following would be the way to proceed:—We will suppose the rough sketch circle C, Fig 2, to be a circular saw twisted at T: you should place the saw buckle side down on an anvil, the face of which should be a little convex, and hammer with a cross-faced hammer (Fig. 1), as indicated by marks in the circle. I acknowledge that I do not know the whole art of saw hammering, but can give a deal of information in reference to hammering saws—circular saws especially.—A. R.

Child's Reins.—SADDLER.—The body, braces, and belt form the essential part of this toy. The waist-belt only, with a ring at the back, is a device to which children apply reins. The shop-made braces and reins have an attractive finish, and if well designed are harmless. Bells attached have the merit of letting people know the team is coming. The sketch will show how made, and the method of attaching reins, so as not to be harmful. A A is the belt, with shoulder straps (B, B) attached to the belt direct, by being sewn there, but better if sewn



Child's Reins and Braces.

to "dees" at the top edge of the belt; the two back dees (D, D) take the reins, which are best attached by light spring swivels that take these dees easily, for attaching or detaching the reins. The breast strap C joins the shoulder straps together in front; a similar strap high up is often used behind. The only buckle needed is for the waist-belt, and this the players should be cautioned must not be tightly buckled. Children, the same as men, vary in size, so that the body braces should be made to suit the child using them. The waist-belt should never be below the pit of the stomach, or the pull of the belt from the reins presses injuriously on the cartilages of the short ribs.—J. C. K.

Sewn Heel.—M. M.—You must start to sew your seat round at A (Fig. 1) with a stout thread (the welt thread is generally used), and when you get round to B, go on sewing the welt in, as at C. Then the rough edges must be pared off tolerably close to the stitches, more especially the stitches on the insole side. Then put a shank in the waist (a piece of leather, pegged in and skived) as at D. Then dip your heelawl in water, and put it under each stitch that lays on the upper side, as at B. Then put your sole on, and round it up, leaving about ¼ in. on all round. Then skive off the sharp edge right round the top, cutting away about one-third of the substance, and about as far in, towards the centre, as the stitches will come; then peg on your split lift, get the pegs as near the centre as possible, and do not let the lift come to the edge of the sole, but only let it just cover the seat stitches—this leaves the sole free to be beaten or paned up over the stitches when finished. Now do the same with the first, second, and third whole lifts, paring them up each time to the shape of the split lift; and to keep them firm while sewing, put in two long lasting

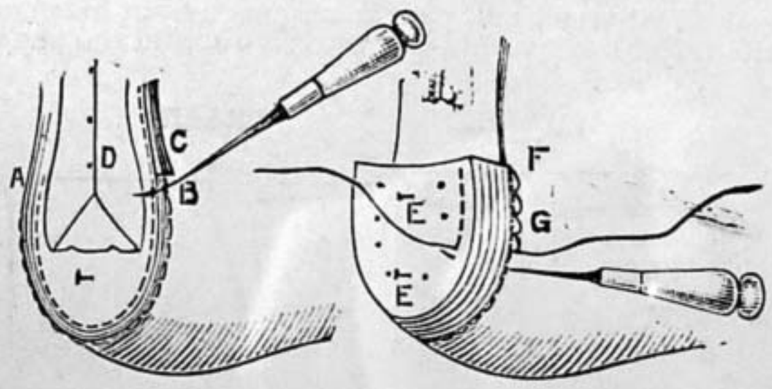


Fig. 1 Fig. 2

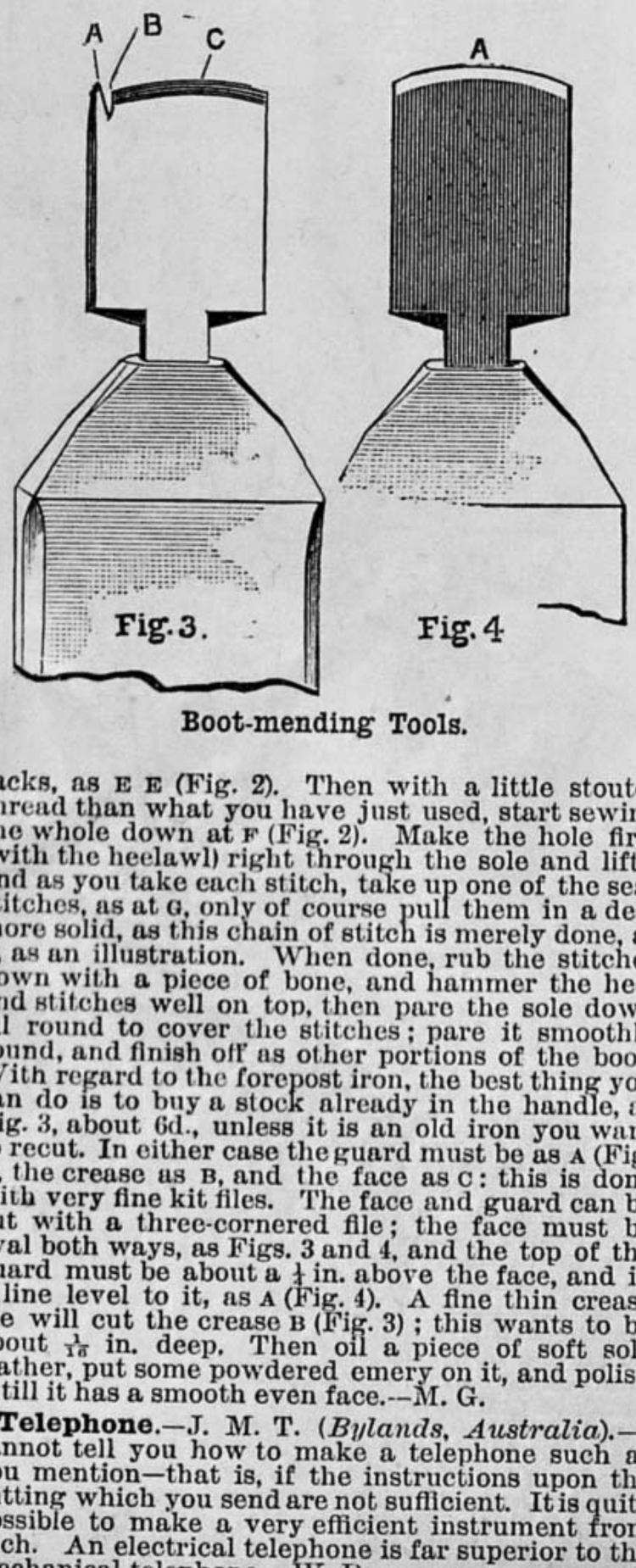


Fig. 3. Fig. 4

Boot-mending Tools.

tacks, as E E (Fig. 2). Then with a little stouter thread than what you have just used, start sewing the whole down at F (Fig. 2). Make the hole first (with the heelawl) right through the sole and lifts, and as you take each stitch, take up one of the seat stitches, as at G, only of course pull them in a deal more solid, as this chain of stitch is merely done, at G, as an illustration. When done, rub the stitches down with a piece of bone, and hammer the heel and stitches well on top, then pare the sole down all round to cover the stitches; pare it smoothly round, and finish off as other portions of the boot. With regard to the forepost iron, the best thing you can do is to buy a stock already in the handle, as Fig. 3, about 6d., unless it is an old iron you want to recut. In either case the guard must be as A (Fig. 3), the crease as B, and the face as C: this is done with very fine kit files. The face and guard can be cut with a three-cornered file; the face must be oval both ways, as Figs. 3 and 4, and the top of the guard must be about a ¼ in. above the face, and in a line level to it, as A (Fig. 4). A fine thin crease file will cut the crease B (Fig. 3); this wants to be about $\frac{1}{16}$ in. deep. Then oil a piece of soft sole leather, put some powdered emery on it, and polish it till it has a smooth even face.—M. G.

Telephone.—J. M. T. (*Bylands, Australia*).—I cannot tell you how to make a telephone such as you mention—that is, if the instructions upon the cutting which you send are not sufficient. It is quite possible to make a very efficient instrument from such. An electrical telephone is far superior to the mechanical telephone.—W. D.

Ivory.—B. S. S. (*Richmond Hill*).—Your want in this respect shall be met as soon as possible.

Repairing Broken Spoke in Wheel.—W. M. (*Kildare*).—When you say that you have a broken spoke in the wheel, I presume that it is broken off at the tenon which fits into the felloe. If this be so, you can hold the spoke fast in its place, and prevent it from rattling by having two spoke clips made as Fig. 1; these are of wrought iron, and have a hole through the spoon. The spoon is concave, to fit the convex of the spoke. In driving the clip down into the felloe, bore a hole with a gimlet to start it in driving; then drive the clip down tight by hitting it at its strongest part (marked A), and not on the top of the spoon. These clips are best knocked in by holding a dull cold chisel, the point being at A, and driving the chisel with a hammer. When both clips are driven home, bore a hole through the spoke, so that you can push a round iron rivet through. If the rivet be too long, cut off leaving, and rivet both ends

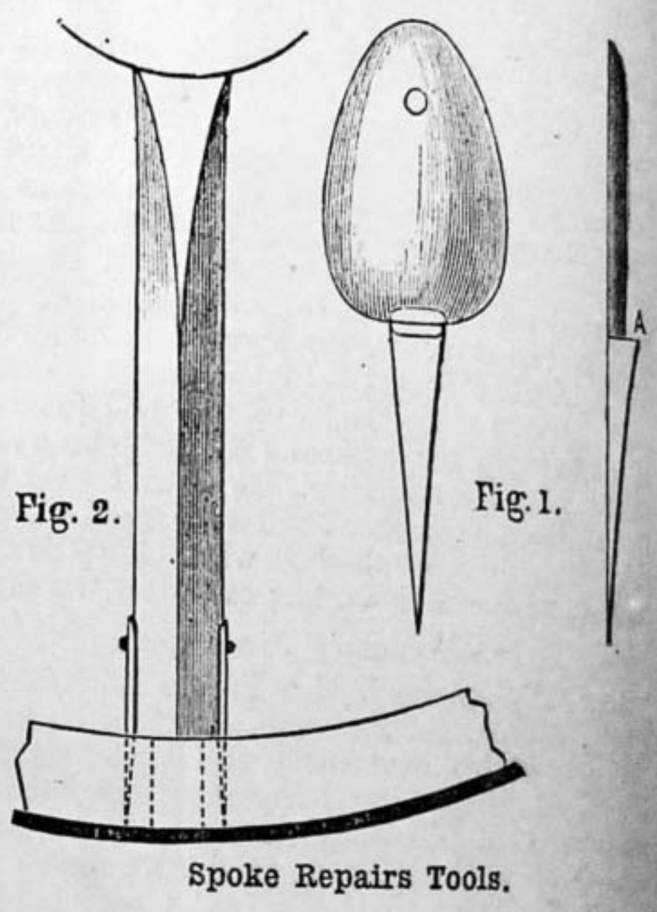
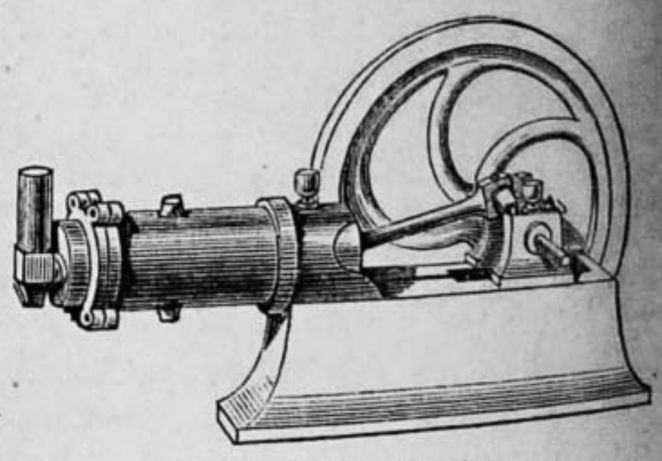


Fig. 2. Fig. 1.

Spoke Repairs Tools.

firmly. Nails and screw will not do instead of a rivet. The clips when in (Fig. 2) should be painted to match the spoke. These clips will make a good job, and will last a long time. But if the hoop should ever come loose, or other spokes break—more than two—then, of course, you would have new spokes put in.—W. P.

Gas Engine.—H. B. E. (*South Wigston*).—I herewith send illustration of the "Seal" gas engine; the dimensions are as follows:—Length, 22 in.; height, 12 in.; length of crank shaft, 10 in.; weight, about 60 lbs. This engine is sold as a half-man-power engine, but it will develop about three-quarter-man-power when working at its full power.



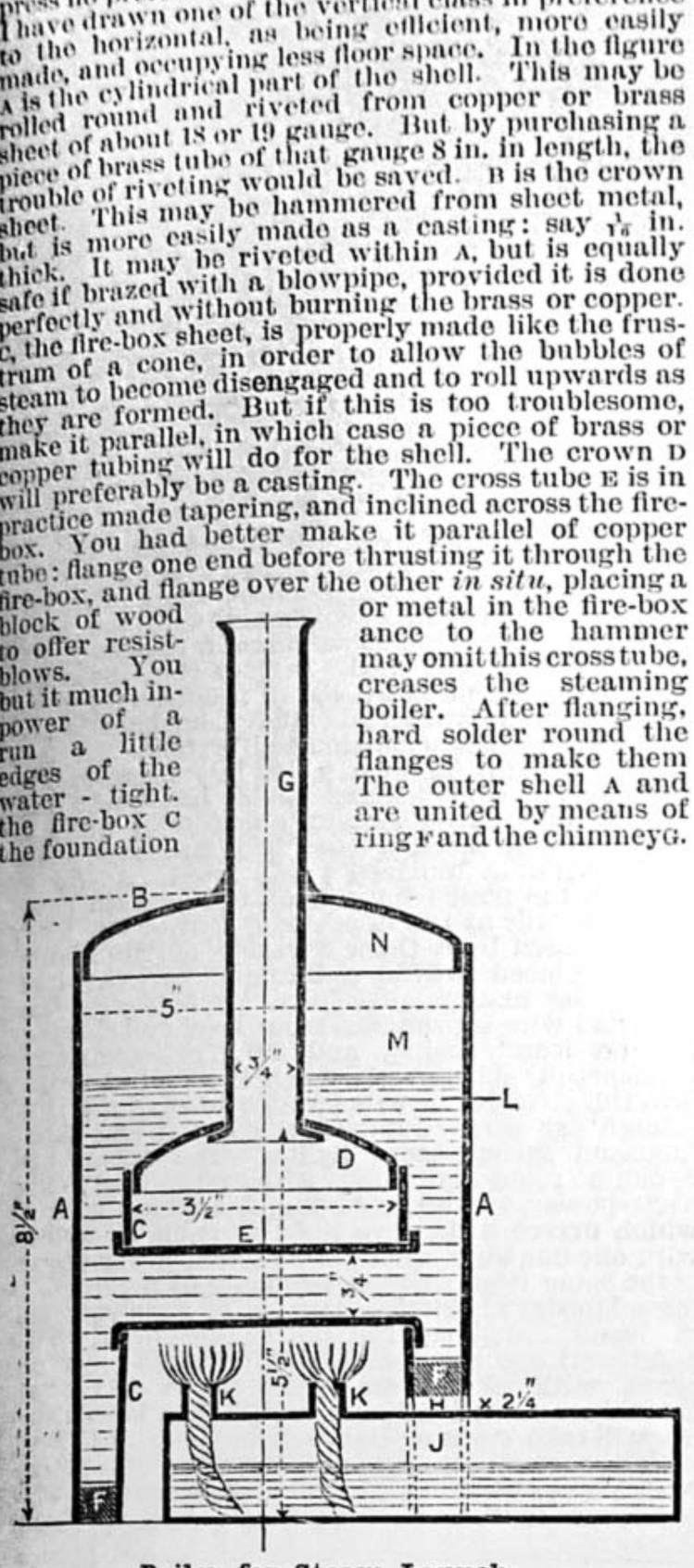
"Seal" Gas Engine.

The illustration shows engine with one fly-wheel, but they have two fly-wheels, one on each side of the engine. The price of this engine is £6 10s., including gas bag and water cistern; if engine is fitted with a governor the price is £1 more. This engine has sufficient power to drive a 3-in. lathe or fret machine.—S.

Dining Table.—AMBIGITUR.—I have given a sketch of a table which would suit you, by altering the dimensions, in No. 64, Vol. II., page 194. If you do not require an extending article you need only leave that part out. Mahogany is the best wood to use; but you could veneer a less expensive material. There are some good instructions and hints in the paper on "Joints," in No. 82, Vol. II. There is an Index to WORK, Vol. I., price 1d.—J. S.

A Canvas Canoe.—W. J. M. (*West Cowes*).—The difference in the dimensions of a canoe to carry two would be as follows: Length, the same, 14 ft.; depth amidships, 10 in., and breadth amidships, 30 in., instead of 2 ft. 2 in.; sheer or rise at bow and stern, the same; the well-hole 4 ft. long—that is, about 2 ft. each side of the centre of the canoe. The scantlings given for the frame-work of this canoe will be the same as the other. I made a canoe to carry two of these dimensions, and have been upset in the surf with three of us in it, no harm resulting beyond a wetting.—J. B. F.

Model Steam Launch.—HOBBY.—As you express no preference for any particular type of boiler, I have drawn one of the vertical class in preference to the horizontal, as being efficient, more easily made, and occupying less floor space. In the figure A is the cylindrical part of the shell. This may be rolled round and riveted from copper or brass sheet of about 18 or 19 gauge. But by purchasing a piece of brass tube of that gauge 8 in. in length, the trouble of riveting would be saved. B is the crown sheet. This may be hammered from sheet metal, but is more easily made as a casting: say $\frac{1}{16}$ in. thick. It may be riveted within A, but is equally safe if brazed with a blowpipe, provided it is done perfectly and without burning the brass or copper. C, the fire-box sheet, is properly made like the frustrum of a cone, in order to allow the bubbles of steam to become disengaged and to roll upwards as they are formed. But if this is too troublesome, make it parallel, in which case a piece of brass or copper tubing will do for the shell. The crown D will preferably be a casting. The cross tube E is in practice made tapering, and inclined across the fire-box. You had better make it parallel of copper tube: flange one end before thrusting it through the fire-box, and flange over the other *in situ*, placing a block of wood or metal in the fire-box to offer resistance to the hammer blows. You may omit this cross tube, but it much increases the steaming power of a boiler. After flanging, run a little hard solder round the edges of the flanges to make them water-tight. The outer shell A and the fire-box C are united by means of ring F and the chimney G. the foundation



Boiler for Steam Launch.

For a tiny boiler a brass casting will be best for the ring, and it must be arched upwards over the opening H, through which the lamp J is thrust. The ring must be riveted through or brazed to shell and fire box. The chimney G, of copper tube, is flanged at its lower end, and passes through holes in the fire-box and shell crowns. The fit must be close, and a little hard solder run round each joint to make it water-tight. An oblong tin casing J, with, say, two openings K, K for wicks, is a suitable lamp for burning methylated spirit. The spirit can be poured through one of the wick openings, or a special larger screwed plug inserted at the outer end of the casing. You should screw in a little brass tap at L, about $\frac{1}{4}$ in. or $\frac{3}{8}$ in. above the crown of the boiler, and the water should not be allowed to sink below this, or the fire-box crown will become burnt. A similar tap should be screwed in at M, and the water should never rise beyond this, or the steam space will be encroached upon. A safety valve should be screwed in at N, and the steam pipe and tap may be brought either from the crown of the boiler or from one side, according to convenience. You can fill the boiler either through the hole into which the safety valve is screwed, or through a hole specially made for the purpose in the crown, and closed when not wanted with a screwed plug.—J.

Oil in Top of Machine Table.—J. B. L. (*New Kent Road*).—You will find it a difficult task to entirely remove this. You may to a great extent kill it by repeated applications of benzoline spirit or oxalic acid (1 oz. to ½ pint of hot water); in either case it would be best if these could be used before the final cleaning off; then fill in with a "filling," coloured to match, and mixed with benzoline or turps. There may, after all, be a dark stain left by the oil. If this still looks unsightly, it will be necessary to stain the other parts to match by the aid of stained polish. Unless you have had some experience in polishing, it would be best, in the long run, to pass the job on to a practical man. If, as I surmise from your letter, the stain only penetrates the centre, would it not be better to cut this out, say, a ¼ in. deep, and inlay in black or other dark wood a star or some similar pattern; so cutting out the defective parts, taking the precaution, before gluing, of killing all oil that may remain by benzoline, as before suggested. I need hardly remind you that benzoline must be used with caution, by keeping it at a distance from naked lights or fire.—W. J. M.

Gun Carriage.—H. A. T. (*Bermondsey*).—As you have not mentioned any particular kind of gun-carriage, whether field or stationary, I send you four rough sketches of same. Figs. 1 and 2 are simple and easy of construction, the sides being held together in position by a couple of slots. In Fig. 3 you will observe a slipper suspended by a chain underneath the carriage to fasten to the wheel when travelling along a mountainous district. Fig. 4 is the model of a carriage mostly patronised by model makers, and when cast in iron or brass the ends are generally curved round to allow a better and more artistic finish, as Fig. 5. Fig. 4 A is the front, and Fig. 4 B the back, of gun carriage.—W. P.

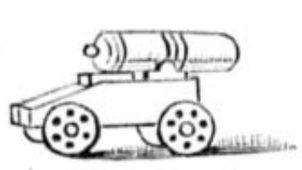


Fig. 1.

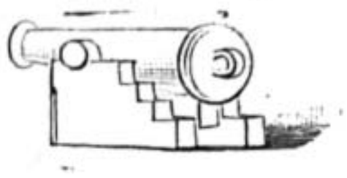


Fig. 2.

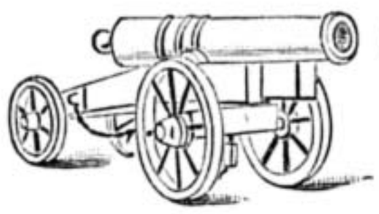


Fig. 3.


Fig. 4.

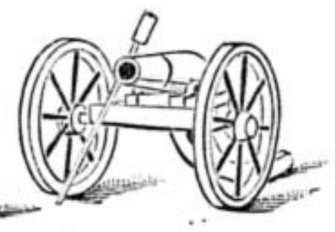


Fig. 4A.

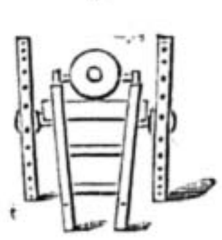
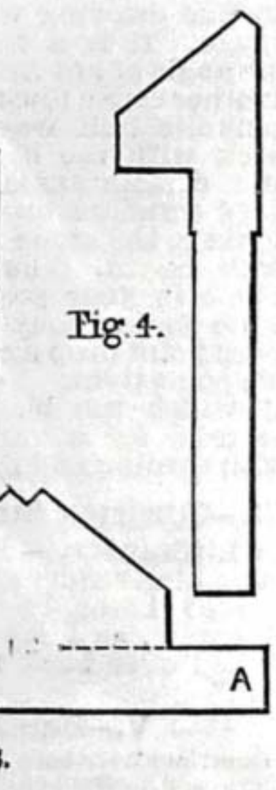


Fig. 4B.


Fig. 5.
Gun Carriage.

Ruling Covers.—P. C. B. (*Newcastle-on-Tyne*).—I am pleased to be able to give the desired information to the querist. There is nothing to hinder him from making the pens which he wants. He will want a set of at least three pens—fine, narrow, and broad points. They are all made in the same manner, the only difference being the points and the mode of holding the pen when in use. However—to make them. The description will be of a single one. Get a piece of lateen brass, such as paper rulers make their ruling pens with, 4¼ in. by 2 in.—the size is not important, but what I have given will do. Make two cuts with a pair of scissors in the position indicated by the heavy lines in Fig. 1—the figures are about half-size. Make three folds in it according to the dotted lines in the same figure—*i.e.*, fold it in two first, and then the ends into the centre like a three-fold football card. When this is done, take the scissors again and cut it the shape of Fig. 2; the small cut is at the back fold, and forms the point of the pen. Now open it out like Fig. 3, and get a penholder and lay it down upon A, and roll this strip of brass round it, stopping in the centre; bring over the strip B, and roll it round the holder also; a little pin should now be passed through, which will make it fast to the holder. The pen must now be pressed into shape with the pliers; the folds must be pressed very tight together. The pen should not be dipped in the ink pot; to feed it a little ink is lifted upon the point of a knife or piece of card and passed into the flap-looking part of the pen. To use it the flap part is uppermost. For the broad point, all that is necessary is to rub away a part of the side of the point and use the pen side to the paper with the flap outwards; lines any breadth may thus be made, and it is not necessary to go over the work twice, I hope this will do for our friend.—G. C.



Ruling Covers.

Mounting Emu Eggs.—BERTIE (*Stapleford*) asks for some ideas for mounting emu eggs. I think it will be best for him to decide in the first place as to which article he would prefer, and to design something himself. Then if he will send a copy or tracing of his sketch to the Editor I will tell him the easiest way to carry it out. If he does not care to do this, well, I will make him a simple sketch of any article that he prefers, and will give him the simplest and most complete directions that I am able to. Here are a few hints to set him thinking:—1st. Are the eggs to be left as they are—*i.e.*, uncut—and, as a necessary consequence, treated as ornaments and nothing else? or, 2nd, can they be cut, so that some use can be made of their interior space? Regarding the first, I cannot call to mind at present any way of using them but as parts of candlesticks for the mantel or overmantel, or as the centre of a make-believe vase. For these, nothing but two mounts are required, and they can be screwed together. So these are easy enough to obtain ideas for, simple or otherwise, just as your taste lays. For the second—that is, where we can cut the egg—there are a good number of things to be suggested. If cut like Fig. 1, it can be formed into an inkstand with a jointed lid, or two, as a pair of flower vases, or as cases for the drawing-room table, for the ladies to keep their odds and

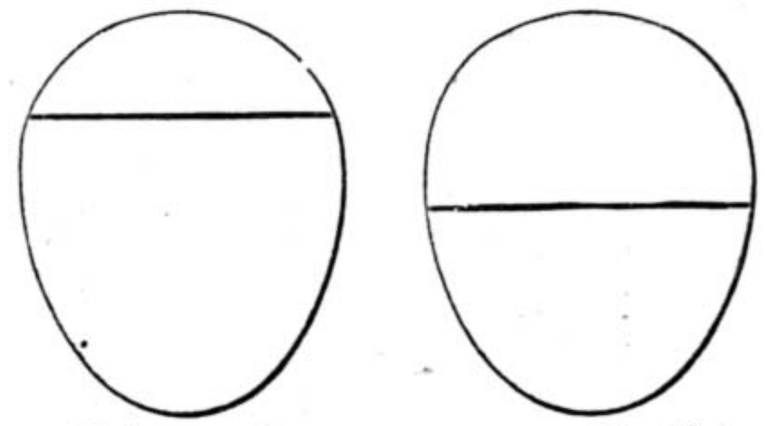


Fig. 1.

Fig. 2.

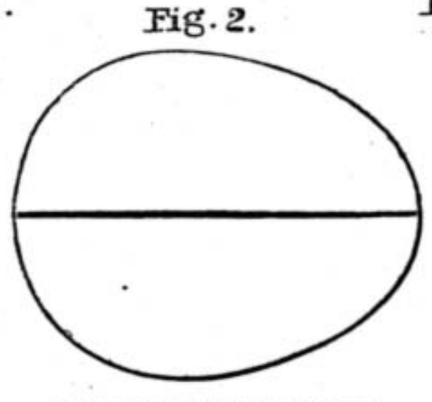


Fig. 3.

Emu Egg Mounting.

ends in, or as a sugar basket, or tankard, or cup; or two might be mounted in a frame for preserves, with a jam spoon, suppose we say with a gold-miner's shovel for the bowl and with an emu for the handle, or they could be made into spill-holders for the smoking-room. If cut like Fig. 2, then we should get another shape box, or perhaps use one half as an ash-tray. If one were cut like Fig. 3, then it could be mounted as a pair of salt-cellars. So much for the articles; now for the principles, on which I should ponder a little before beginning my sketch. In the first place, we want to find out the simplest way to make it useful in the highest degree. Then, when that is decided on, there is the ornamental part of the design to be considered, and your guiding motives should be simplicity and suitability. For example, a bird's claw for the base is more in harmony with the egg than is the claw of a lion or an ox, but it does not follow that you need a foot taken from the animal kingdom at all; a scroll or plain ball may be better. Then for the top or handle of a lid, I should certainly like a model of an emu, but some simple ornament may do just as well. If you really mean to make an interesting piece of work of it, you might look up the habits of the bird, and then see if some notion cannot be obtained from its natural surroundings. Again, it is possible that something connected with the sender of the egg may be able to be introduced in an ornamental manner; but all depends on the amount of interest you feel able to take, so I will leave you to think of other things yourself. All the details as far as concerns the usefulness of the article should be worked out very clearly—I mean as to the sort of well you will have to hold the ink, or the means you will take to retain the liquid in the case of a tankard or flower vase being selected. I trust that these hints will set you to work, and you will see from this reply that until I know more of your ideas I cannot even attempt to enter on the mechanical details. When you write again, please give the fullest details of your capabilities that you can, so that my answer may be made in a manner suited to your abilities, for we "Shop" workers are all willing to help wherever we can, particularly when the questioner takes a little trouble to let us know the materials we have to work on and to work with.—H. S. G.

Easy Boot Making.—BOOTLAST.—I am supposed to gather from your letter that you feel quite competent, as far as taking the plaster casts. To detail the taking of plaster casts, I am afraid, would take

up too much room in "Shop." But suffice to say, you not only need the casts of the foot (which must be taken with sectional parts that you may be able to release the foot), but you want a model of the foot from the cast, which is the foot, in plaster. Plaster casts are taken by shoemakers—that, so to speak, the customer leaves his foot behind that the shoemaker may adapt a last of wood to the requirements of that foot. This, for an amateur, I think, is too far advanced; nevertheless, I am not one to discourage anyone who seeks, or tries to gain, knowledge. So if you have made the casts of your foot, you must now oil them, and, in plaster, cast a foot from them; but it is not necessary, as you have your own foot to guide you. Only wood or iron is used in last making; any compo would not stand the tacks or strain of the pincers in lasting the uppers over them. Your best plan is to take an old shoe that you have done with, determine its length in inches, buy a penny shoemaker's tape measure at the leather seller's, and find out the exact size of the shoe, and buy a last that size (or length); or another way is to stand on a sheet of paper on a smooth surface, and draw a pencil right round the foot, being very particular to hold it quite perpendicular

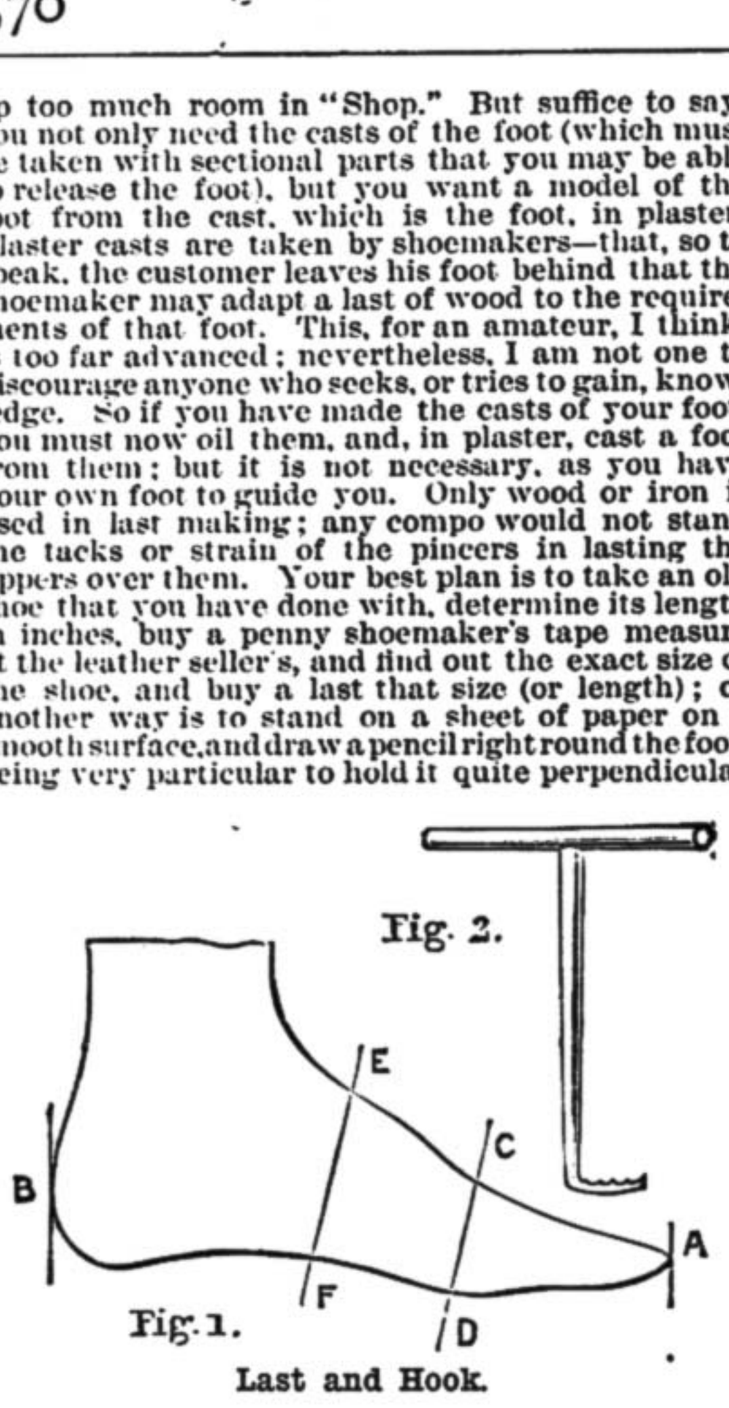


Fig. 2.

Fig. 1.

Last and Hook.

at the toe and heel, then, with the tape measure, see what this draws; and, say it was size six (that is, from A to B, Fig. 1), you must buy a last, size eight, and as near the shape toe that you require as you can, then place it on the sketch of the foot to see if its lines of construction are similar to it. Its girth measurements can be taken in inches round the great toe joint and round the instep, as shown in Fig. 1, from C to C again, passing under D, and the same at E and F for the instep. When you have bought the last, if it needs it, rasp it, till it just fits in the shoe; it can be taken out again with a lasthook, cost 6d. (Fig. 2); then try on the old shoe again, and chalk-mark it where it in any way hurts the foot; put the last in again, and with a fine awl prick through these marks into the lasts, then you can put pieces of wet leather on the lasts at these points, and make the proper room for your corns. These pieces of leather should be pegged on with wooden pegs, making a hole first with a peg-awl (cost: pegs, 4d.; awl and handle, 1d.). You can cut through these and skive the leather down to the last, leaving a nice smooth bump; compo would not do, or the process you name, as you would only get the shape and size of the foot, and when it was shaped up to the form of a boot, it would be too small. Really, you want the last as big as the measure—in fact, a sixth of an inch larger at the joint—if you want them easy. I think by following the above you cannot fail to get a last to suit you and at a small cost.—W. G.

Making Elbow.—IRONWORKER.—I am glad to be able to give you some information on the subject. It seems to me that your chief difficulty is in joining the pipes at the mitre or angle; as you have not been in the trade before I will give you the simplest way of making an elbow. Directions for marking out an elbow of any angle have already appeared in "Shop," No. 45, page 717; but you appear to have missed it, as you say you have taken in WORK from the commencement. But you must not suppose that workmen as a rule take the trouble to mark out elbows like that. I can myself, through constant practice, strike out an elbow by freehand drawing after drawing three lines on my piece of stuff. For example, say I want a 3 in. stove pipe elbow about 14 in. long each way, I cut a piece of stuff off a 2 ft. wide sheet 10 in.; I draw a line right down the centre, and another across it, about 11 in. from one end (Fig. 1). Set off from A to B, a distance equal to the diameter of the pipe, in this case, 3 in.; from the point of intersection of the two lines C a curve is drawn to B B, and, as I said before, by practice it is possible to draw this curve with almost geometrical precision. The setting of the lines A A and B B 3 in. apart, or whatever the diameter of the pipe may be, forms a right angle, and the nearer these lines are to one another the flatter the curve and the more open or obtuse the elbow. With regard to joining the two pieces, the easiest way for you will be what we call a Scotch elbow. Fig. 2 shows how this is put together; the piece with the long seam is flanged out a little in the throat about 3 in.; the flange may be about $\frac{1}{16}$ in. in the middle and go off to nothing each side. This flange is then hooked in the other piece of pipe, and the throat of that must be cut down so as to allow enough to turn over at B; this is knocked over with a small hammer, and the elbow is complete. It is of course not so good a job as a seamed elbow, but it has the advantage of being able to be made out of common iron, while a seamed elbow must be made of charcoal iron or soft steel. Instructions for making these will appear in due course.—R. A.

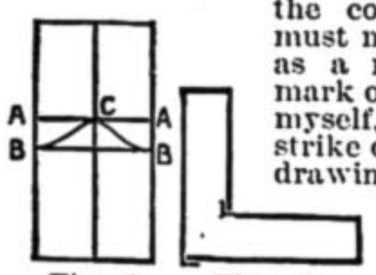


Fig. 1. Fig. 2.

Making Elbow. Fig. 1.—Elbow marked out. Fig. 2.—Ditto put together.

Turning Back Hands of Watch.—J. G. (*Glasgow*).—(1) The reason why the hands of a watch can be turned back without causing injury, is that the arbor which carries the hands can be moved backwards and forwards independently of the remainder of the works of the watch. The pinion or spindle of the centre wheel carries the hands, but if the spindle were perfectly fast to the centre wheel it would be impossible to move the hands one way or the other, because the centre wheel only moves when the watch is going, being geared with other wheels. Hence it was found necessary to adopt some plan by which the hands could be moved independently of the watch. The system is very simple. The pinion or spindle of the centre wheel was drilled through with a nice straight hole, and then an arbor fitted in with a square for the key at one end and a pivot at the other end, on which to fit the hands. This arbor is fitted tight enough to go round with the centre wheel, and yet loose enough to be moved with the key. Take a crude illustration of the system. You are no doubt perfectly familiar with the ordinary penny blacklead pencil, with a tin tube at the end containing a bit of indiarubber. Knock out the indiarubber at the end and force the tube into the centre of the pencil. The end of the pencil will project at each side, just as the square arbor projects through the hole made in the centre pinion. The tin tube and the pencil are tightly enough fixed together to form one piece for ordinary purposes, and yet if the tube were fixed in the centre of a wheel, and the pencil had a square at one end, you would be able to move it round without moving the wheel if the wheel were stationary, as in a watch—that is to say, stationary to the extent of only travelling round very slowly. Hence it is that when you move the hands of a watch you do no injury. There is another system for moving hands, but the principle is the same as the one I have already described, and therefore I need not enter into any further details. You will easily see what is meant, particularly if you follow out the idea of the pencil and the tube. It would be impossible to turn either backward or forward the whole movement. Each wheel of a watch is calculated to go round at a certain fixed rate. The fourth wheel, which carries the seconds hand, goes round once every minute. The centre wheel, which carries the minutes hand, goes round once every hour. You cannot alter this arrangement without smashing the works of the watch. The loose arbor, however, obviates this difficulty. (2) The drawing which you send is that of a bevel gauge. It is a tool which enables you to obtain the angle of any article you may be making. Take another crude illustration. Open the blade of your penknife half way. Then lay your knife on its back with the blade uppermost. Your blade is at a certain angle. Now suppose you want some fixed standard by which you could open the blade again to the same angle after the knife had been once closed. You could get the angle with the gauge in your possession. Lay the back of your knife on the body of the gauge, and then let the loose point drop against the blade, and then screw the point tight. You will thus get the exact angle at which the blade was open. The gauge can be used for a variety of purposes in connection with turning and filing.—HERR SPRING.

III.—QUESTION SUBMITTED TO CORRESPONDENTS.

Chiffonnier.—DUSTY POOL writes:—"Would some kind reader give me a detailed design for the above? I would prefer something neat, and not too elaborate, as I intend making it myself. I have looked over back numbers, but cannot find one to suit."

V.—BRIEF ACKNOWLEDGMENTS.

Questions have been received from the following correspondents, and answers only await space in SHOP, upon which there is great pressure:—T. W. (*Thornhill*); ONE IN GREAT NRED; J. W. (*Burnley*); HIGH PEAK; ENGINEER; STOCKTON; H. P. (*Plaistow*); LETTERS; A. T. A. (*Lerwick*); F. P. (*Manchester*); R. H. H. (*Shutter Oak*); J. B. (*Berkshire*); P. J. C. (*Balbriggan*); CALIGRAPH; J. W. L. (*Hull*); JACK OF ALL TRADES; W. B. (*Paisley*); R. F. (*Newton Heath*); CHOCOLATE; FITZHUGH; R. B. (*Bradford*); ZOETROPE; G. W. B. (*Lancaster*); H. H. (*Ashbourne*); X. Y. (*Rochdale*); SPECTACLE; W. S (*Dover*); G. E. E. (*Leeds*); "N."; J. H. B. (*Pendleton*); J. M. (*Manchester*); LOCO; NO NAME (*Sheffield*); L. J. (*Huntingdon*); W. B. (*York*); SIGN BOARD; APPRENTICE MECHANIC; E. C. (*Norwood*); O. A. B. (*Redhill*); SUBSCRIBER; ARMATURE; BIRMINGHAM; CHIPS; G. N. (*Maidstone*); COUNTRY AMATEUR; J. W. (*Homerton*); W. D. (*Bath*); LITHO; J. C. (*Glasgow*); W. H. (*Hinckley*); M. S. A. (*Wigan*); L. C. B. (*Birmingham*); INQUISITAS; W. C. (*Birmingham*); A. R. (*Scorrier*); A. A. (*Peterboro'*); E. P. (*Warrington*); T. L. (*Holloway*); HUGH; R. K. (*Grays*); C. A. B. (*Kilburn*); P. H. Z. (*Hammersmith*); INDUSTRIA; J. P. (*Stratford*); J. W. B. (*Southport*); F. C. (*Cardiff*); S. J. (*Kensington*); COMPO; W. H. A. (*Canterbury*); D. H. J. (*Balham*); J. C. B. (*Glasgow*); TINKER; JACK; A. H. W. (*Brighton*); PAUL JONES; H. V. (*London, E.C.*); PETRO; T. W. T. (*Birmingham*); BALL VALVE; W. S. (*Stockport*); F. C. (*Bournemouth*); NOVICE; W. W. (*Inverness*); C. McC. (*Bangor*); NOSAM; APPRENTICE (*Burnley*); AMATEUR; WORKER BEE; AM. ASTRO.; JAY (*Dee*); R. N. B. (*Teignmouth*); M. & H. (*West Kensington*); RAT TRAP; J. H. E. & Co. (*London, W.*); J. F. M. (*Edinburgh*); J. C. (*Aberdeen*); A BLACKSMITH; E. B. M. (*Tunbridge Wells*); C. B. (*Derby*); NEMO.

"WORK" EXHIBITION.

NOTICE.

THE extension of time for receipt of application forms having now expired, the Secretary begs to inform the applicants for space that he cannot undertake to forward Labels, etc., for a few days, owing to pressure of work, but will do so as early as possible. They need not take the trouble to write for at least seven days, when anyone still without reply should then inform the Secretary.

JNO. W. HARLAND, Secy.

La Belle Sauvage, E.C.,
15th Nov., 1890.

Trade Note.

THE largest public electric light installation in the United Kingdom was opened recently in the city of Bath. Mr. Massingham, the contractor, has entered into an engagement with the town council to supply light to the street for seven years, at a yearly rent of £2,100. Besides this, there are about 3,000 incandescent lights fitted up for shopkeepers and private residents. The light is furnished on the Thomson-Houston system. An area of twenty-eight miles can be lighted from one centre. The underground cables have been laid through about fifty streets, about forty miles of cables having been used. The arc lamps are placed about a hundred yards apart. As far as possible, the mains have been put beneath pavements, usually at the depth of a foot or so. They are insulated by a thick covering of bituminised rubber, placed within a bitumen bar, the bitumen being manipulated in a liquid form. The insulated wire is protected from mechanical injury in "an iron" casing, and rendered completely waterproof. Altogether, when the central station is in full strength, it will be able to give out light enough for three hundred arc lamps and thirty thousand incandescent lights. The engine and dynamo room is fitted with four thirty-five horse-power vertical compound engines, each of which drives a fifty-arc light dynamo, as well as with one one hundred and fifty horse-power engine of the same type, driving by means of a rope belting a Mordey alternator, capable of supplying four thousand lamps, each of ten candle-power. Two additional one hundred and fifty horse-power engines, with alternators, were to be put down ere this. A boiler house, which has been fitted up, will take eight of Babcock & Wilcox's tubular boilers, each of one hundred and fifty horse-power, working at one hundred and fifty pounds pressure per square inch.

WORK

is published at La Belle Sauvage, Ludgate Hill, London, at 9 o'clock every Wednesday morning, and should be obtainable everywhere throughout the United Kingdom on Friday at the latest.

*** Advertisements should reach the Office fourteen days in advance of the date of issue.

PROOF OF THEIR EXCELLENCE.

From the Rev. A. CAY, Northborough Rectory, Market Deeping, April 10th, 1889.—"I find them a nice, efficient preparation."

From the Rev. J. ALLEN JONES, St. Asaph, April 15th, 1887.—"I find them excellent."

From the Rev. CHAS. RUTTER HARRIS, Skilgate Rectory, Wiveliscombe.—"They ('Frazer's Sulphur Tablets') have been very useful in a nasty case of 'blackheads,' and in two other cases of 'scorbutic ailments' and a case of eczema."

From the Rev. W. GOODBER, Langley Vicarage, Bishop's Stortford.—"Kindly inform me of the cost of six dozen packets to take myself and give away occasionally in my parish. I have already taken them and believe they have done me good."

From the Rev. Prof. HALES, M.A., 2, Minford Gardens, W., June 21st, 1889.—"Thank you for packet of Sulphur Tablets. I will certainly recommend them."

From the Rev. ALEX. GUNN, of Watten Free Church, Caithness, N.B., April 4th, 1890.—"An old soldier in my neighbourhood has had rheumatism, often very painful, in his left shoulder for four or five years. The shoulder was always cold, and so stiff that he could never lift his hand higher than his face. I gave him some of your 'Sulphur Tablets.' The pain, coldness, and stiffness are all gone, and to his great surprise he can wave his arm above his head. This happened more than a month ago, and the shoulder continues as well as when he was a boy. It appears to me such an astonishing cure that I cannot help letting you know it."

From the Rev. H. J. DYER, West End Villa, Rickmansworth, 7th March, 1890.—"Some months ago you kindly sent me two packets of Frazer's Sulphur Tablets for distribution among the poor of this town. I am very happy to tell you that I have found them to be worthy of the highest praise, for in several cases of skin disease eruptions they have been most beneficial—both for children and adults—while as a gentle laxative they surpass anything I have ever tried. The trouble is I am beset with applications for further supplies—those who have been benefited sending their friends to be cured. I should be very glad to have some more of the Tablets. Can you supply them at a reduced rate for gratuitous distribution among the poor? I shall be very glad if you can?"

A Medical Man's Opinion.—"Your 'Sulphur Tablets' are a decided improvement on Mrs. Squeers' mode of administration. Besides being useful in habitual constipation, in a gouty diathesis, and in hæmorrhoids, they produce a beneficial effect in Chronic Lepra and Psoriasis, and in Eczema.—M.R.C.S. Eng., and L.S.A., September 8th, 1890.

From STANLEY PHILIPS, Esq., F.R.C.S., Upper Long Ditton, Surrey, July 24th, 1890.—"They are excellent for taking away spots on the face, and keeping the skin free from all sores and pimples."

From the BRITISH VICE-CONSUL at Honfleur, France, January 30th, 1890.—"They are all that can be desired."—FRANK LETHERIDGE.

Mr. ERNEST F. TOZER, 29, Mill Street, Guernsey, thinks "Frazer's Sulphur Tablets" "a first-rate blood purifier."

"I have found great benefit from Frazer's Sulphur Tablets, especially for constipation."—Mr. W. J. HILLIARD, 32, Holden Street, Shaftesbury Park, S.W.

Sergeant G. PASHLEY, K Division, Isle of Dogs Police Station, Poplar, E., says, referring to a friend: "He informs me that he had an eruption break out at the back of the neck, which was completely routed by Frazer's Sulphur Tablets."

Mr. WILLIAM GREGORY, Knightsbridge Arms, West Ferry Road, Millwall, E., says:—"Since taking Frazer's Sulphur Tablets I have entirely lost some rheumatic pain I have had for upwards of two years. I am delighted with them."

"Brookwood, Dulverton, July 3rd, 1889.

"DEAR SIRS,—About a fortnight ago you kindly sent me a packet of your 'Sulphur Tablets.' I gave six of them to the mother of a little girl, Beatrice Baker, who for several months has been afflicted with breaking out in her hands and sores. I called on Mrs. Baker yesterday, and she says the Tablets have done the child a deal of good. She came in from school while I was there, and I was surprised to see how the sore places had nearly healed—only the marks were left. The child is about nine years of age, and her mother is extremely grateful to you for the Tablets. You can make use of this if you wish.

"Yours sincerely, E. BURROWS."

DO I NEED THEM?

If you have Rheumatism, Yes! They will kill the decomposed and poisonous exces of uric acid in the blood, causing the disease.

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If you have Ulcers, Scrofula, Scurvy, or other Impurities of the Blood, Yes! They neutralise the blood poisons causing the diseases, and expel them out of the system.

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