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A FIRE SCREEN WITH FOLDING DOORS.

BY OPIFEX.

IN Vol. I., page 568, of this Magazine, Mr. Fred Miller gave some very valuable hints on the subject of "Glass Painting and its Application to Domestic Purposes"; and in page 625, F. B. contributed an interesting article on "Silicine Painting"; and I am sure many readers of WORK profited by these papers. Some who are fortunate enough to reside in or near a city have, doubtless, tried their hand at glass painting, and are now rejoicing in the possession of stained glass of their own manufacture: enjoying that sweet satisfaction which is known to those who are sufficiently energetic and skilful as to be enabled to supply their own wants, or the wants of others, by the work of their own hands.

For my part, I regret that I cannot count myself amongst their number—at least, as far as the subject in hand is concerned—as I live far from any city or town where the requisite materials and facilities for glass painting are to be had. I have, however, so far appreciated the articles alluded to,

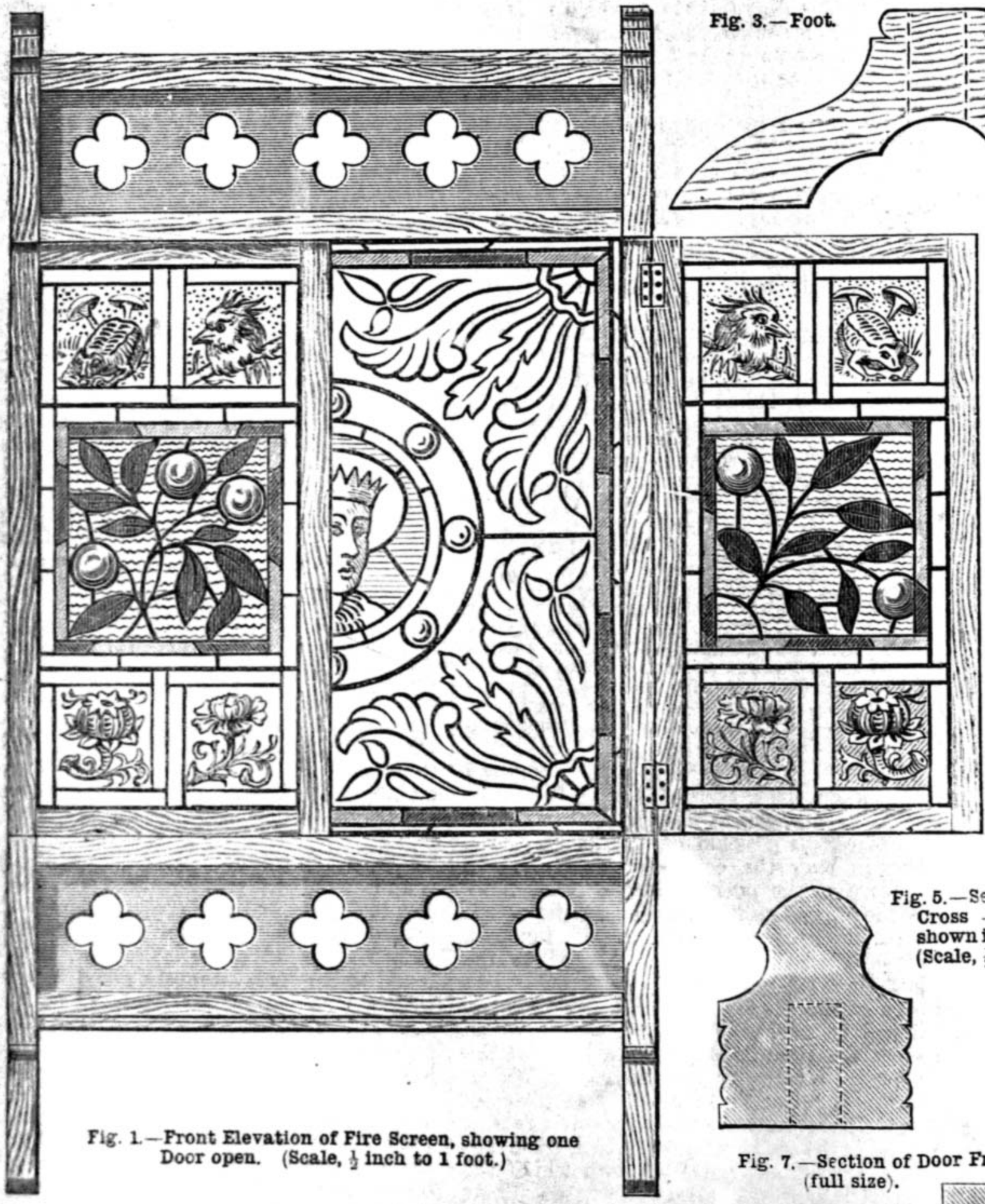


Fig. 1.—Front Elevation of Fire Screen, showing one Door open. (Scale, ½ inch to 1 foot.)

Fig. 2.—Left-hand Side of Framework of Screen.

Fig. 3.—Foot.

Fig. 8.—Centre of Large Panel, complete.

Fig. 4.—Top and Bottom Rails in Cross Pieces.

Fig. 6.—Intermediate Rails in Cross-Pieces.

*** Figs. 2, 3, and 6 are on a scale of 2 inches to 1 foot.

Fig. 5.—Section of Cross-Pieces shown in Fig. 4. (Scale, ½ size).

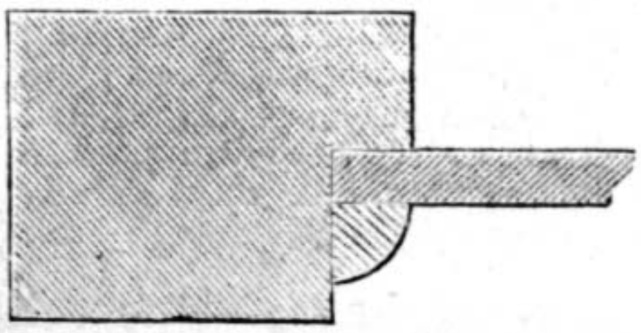


Fig. 7.—Section of Door Frame (full size).

that I am ready to "have a try" at the work whenever opportunity offers, and in the meantime have been considering the uses to which I shall put my glass when it is painted. There is a hall fanlight to be beautified, an unpleasant aspect of back premises to be shut out; there is a staircase lantern in wrought iron so far advanced that its "prospectus" adorns the workshop wall; and, lastly, there is the long-felt want, a fire screen for the study—which forms the subject of this paper, and of which Fig. 1 is a sketch, or rather, front elevation.

I recommend this screen as most effective for the particular object for which it is intended, and also as a most presentable article of furniture; and I may point out to any reader who may not feel inclined to attempt glass painting that plain, embossed, or ground glass may be employed; or panels of double glass decorated with dried ferns, grasses, etc. etc., would suit admirably; or, again, even the patent "glacier" window decoration might be used. Besides, leaded lights may nowadays be easily obtained of any shape, size, and almost at any price, from about 1s. 3d. per square foot upwards.

Pending the arrival of the opportunity before mentioned, I have contented myself with plain glass, but as I hope some day to have that "Toad" and "Laughing Jackass" (*see* page 568, Vol. I.), I have introduced them in my sketch—apologising to Mr. Miller for the caricatures of his highly artistic quarries.

The woodwork of the screen is of the very simplest construction, and in the drawings I have abstained from either mouldings or chamfers; but I need hardly point out to the reader that these will greatly improve the general appearance of the screen.

Good well-seasoned oak will, of course, be the best wood to employ; but it should not only be well-seasoned and sound, but also perfectly dried before working. If the various pieces required are first cut out in the rough, and then placed in a very warm place for a few days, there will be no danger of after shrinkage; but having regard to the purpose for which this article of furniture is intended, it goes without saying that this precaution is absolutely necessary.

Fig. 2 represents one of the two sides which, with the four cross-pieces, form the framework of the screen. These may be about 4 ft. long and 2 in. wide by $1\frac{1}{4}$ in. thick. The upper ends should be carved or otherwise ornamented, according to fancy, and should project about 2 in. above the upper cross-piece.

In Fig. 1 the small pierced panels are represented as being 5 in. wide, while the cross-pieces are 1 in. wide; but if these panels are made, say only $2\frac{1}{2}$ in. wide, the doors might be made 5 in. longer, and therefore the portion, A B, Fig. 2, where the uprights are halved to take the doors, may be cut accordingly. This is altogether a matter for the maker's decision, and does not interfere with the directions, or rather suggestions, given in this paper.

The foot, Fig. 3, is cut out of a solid piece 16 in. by 6 in. by $1\frac{1}{2}$ in., and if the grain runs in a slight curve, as indicated in the cut, the feet will be all the stronger; but even a perfectly straight-grained piece of oak will bear to be thus shaped and morticed without danger of splitting. The tenon and mortice should be very carefully made, and should be the full depth of the foot—*i.e.*, about 3 in.

Fig. 4 represents the top and bottom cross-pieces, or Nos. 1 and 4, counting from the top. These are morticed with a single tenon at each end, which for strength should be of the full depth of the cross-piece.

Fig. 5 shows a section of these cross-pieces (Nos. 1 and 4), the moulded sides being meant to be reversed in each case, the moulding on No. 1 being uppermost, while in No. 4 it is underneath.

Fig. 6 shows shape of cross-pieces Nos. 2 and 3, which for rigidity is secured by a double tenon and mortice at each end. These are of square or rectangular section, and all four cross-pieces are to be ornamented on both sides, with a centre reeding as suggested in the section, Fig. 5.

The door frames are of stuff $1\frac{1}{4}$ in. by 1 in., and although of such simple construction, call for accurate work to ensure the necessary strength and rigidity. They should be rebated to a depth of about $\frac{3}{16}$ in., and so that the glass, or lead lights may be placed in the centre of the thickness of the frames, in which they are to be secured by a small bead or moulding (*see* Fig. 7, which is a full-sized section, showing door frame, lead light, and the moulding just mentioned). The doors are hung with brass "butt" hinges, as shown in Fig. 1.

The narrow perforated panels should be of $\frac{1}{2}$ in. oak, and are secured in position by means of a small bead moulding on both sides; or glass, etc., as used for the other parts of the screen, might be substituted for these panels.

Fig. 8 is a sketch of the completed head that is half hidden by the closed door in Fig. 1.

With regard to finishing, polishing, etc., it is unnecessary for me to offer any remarks, as this subject has been so often and so well brought before the readers of WORK by abler pens than mine.

THE TRIUNIAL OPTICAL LANTERN: HOW TO MAKE IT.

BY CHARLES A. PARKER.

ATTACHING STAGE-PLATES TO LANTERN — REGULATING SCREW FOR STAGE-PLATES — THE ROLLING CURTAIN EFFECT — PREPARATION OF CURTAIN SHUTTER — MODE OF MAKING WOODEN FRAMES TO HOLD SLIDING CURTAIN —POLISHING THE WOODWORK — STAINING— FILLING—POLISHING—FINISHING THE BRASSWORK—REGISTERING STOP FOR SLIDE CARRIERS.

As a postscript to my last paper I may say that when the stage-plates have been provided with hinges as described, they should be placed in position on the body of the lantern over the condenser apertures, in order that the position of the screw holes of the hinges may be marked on the woodwork underneath, by means of a bradawl, after which each plate is hinged to the lantern with suitable brass screws. As soon as the stage-plates have been hinged, it will be advisable to mark on the woodwork the position of the two holes at the opposite corners to the hinges. A bed of sufficient size to take the foot-plate of an ordinary lantern regulating screw is then sunk in the wood where marked, by means of a brace and centre-bit, into which the regulating screw is afterwards fitted. These regulating screws consist of a small circular brass plate, to the centre of which a $1\frac{1}{2}$ in. length of threaded screw is riveted, the latter being provided with a couple of milled nuts, which travel along the threaded portion carrying the stage-plate between them. One of the cheapest houses from which to obtain these regulating screws would doubtless be Messrs. Noakes and Sons, of Greenwich, who are willing to supply amateurs with castings of brass-work at 2s. per pound; they will likewise furnish other parts of lanterns at equally low rates.

The rolling curtain effect about to be described, which may be said to be an ingenious form of dissolving arrangement, usually forms part and parcel of all the better class of lime-light lanterns, and as it is very simple in construction, the reader will do well to fit it to the instrument under description. The working part of the shutter, which takes the form of a longitudinal strip of moderately thin sheet brass, cut to the shape of Fig. 29, is made to pass between a couple of light grooved wooden frames attached to the stage-plates, the action of pushing the shutter downwards serving to shut off the light from the lower lantern, whilst at the same time it uncovers a corresponding amount of the disc projected by the top lantern, this movement presenting the appearance of a curtain being rolled up.

For the curtain diaphragm, or shutter, procure a sheet of tolerably thin brass, measuring 16 in. by $4\frac{3}{4}$ in., and, by the aid of a pair of shears, carefully cut it to the form indicated in Fig. 29, with a rectangular opening 5 in. by 4 in., commencing at two inches from the upper shaped end of the metal. After having been roughly cut to the required shape, it will be necessary to carefully file up the edges by means of a half-round and flat file, after which the surface of the brass should be brought up to an even state of semi-polish by rubbing it with pumice-stone and blue-stone moistened with water. When the shutter has been prepared in the manner above directed, a small light wooden frame will require to be fitted on to each of the stages, close against the condensers. Although the curtain shutter will simply require to pass from the top lantern to the second or middle one, it is usual to fit one of these frames to each stage of a triple lantern, as it thus permits the use of the curtain with the biunial or twin instrument at any time that the top lantern is removed. These frames, which should be 6 in. square and $\frac{3}{4}$ in. thick, may be made in any manner desired, provided they are furnished with a groove through the middle which is in connection with a slot at either end, of sufficient width to take the curtain shutter. Two modes of making these frames will now be described, either of which are equally successful, although the first is by far the simplest. This method, which is illustrated in Fig. 30, is almost self-explanatory, and consists of a couple of pieces of well-seasoned board 6 in. square, and about $\frac{3}{16}$ in. thick (machine-planed fretwood or cigar-box lids will be found to answer admirably), glued together with a thin slip of wood barely $\frac{1}{8}$ in. thick and $\frac{5}{8}$ in. wide, placed along opposite sides between them, a 4 in. circular aperture being afterwards cut clean through the two boards, as shown in the illustration. The boards should be so adjusted that the shutter will just slide through the frames when finished, and a small hole must be bored through the wood at each corner of just sufficient size to take the supporting rods of the slide-stage, on to which it should be made to fit. The curtain will be made to slide smoother if a narrow slip of velvet is glued along the inside of each board at the top and bottom, previous to being put together.

The second plan is to make three light

wooden frames similar in appearance to Fig. 31, each of which are slit at the top and bottom, and furnished with a groove on the inner edge of either side, along which the shutter may slide. For each frame, carefully dress up a strip of mahogany, to measure 24 in. by $\frac{3}{4}$ in. by $\frac{1}{2}$ in., and then run a narrow groove to the depth of about $\frac{3}{16}$ in. along the entire length of one of the half-inch sides.

Thus prepared, the wood should be sawn into four equal lengths, and then fitted together by mortice and tenon joints to form a frame 6 in. square, enlarged details of the mortice and tenon being shown in Fig. 32. If a couple of saw cuts $\frac{3}{4}$ in. deep are made longitudinally down either end of all four pieces, then a couple more saw cuts at $\frac{3}{4}$ in. from the end of the wood, and at right angles to the first, this will remove the two outer cheeks of the wood, and thus form the tenon. Having treated each end of a couple of the pieces of wood in this manner, the mortices to fit the tenons can be made by removing with a sharp chisel the central portion between the saw cuts at either end of the remaining strips of wood, after which the four pieces are glued and fitted together to form a frame 6 in. square. The top and bottom of each frame will require to be slit through by means of a circular saw, in order to admit the sliding shutter, and a small hole must be bored through each corner of the frame by means of a suitable-sized centre-bit, of sufficient size to take the pillars of the slide-stage, on to which it should be fitted as soon as finished. When properly adjusted, the curtain should slide freely through the slot in the top of the frame and along the grooved sides, and then out by means of the opening at the bottom. In order to put the curtain in action, the two upper lanterns are fully lighted, and the shutter is drawn up sufficient to expose a slide painted to represent an arrangement of curtains, which should be placed in the second or middle lantern, the view to be exhibited on the rising of the curtain being put into the stage of the top lantern. As the shutter is pushed downwards it enters the frame attached to the central lantern, and gradually obscures a portion of the curtain slide, at the same time exposing a corresponding portion of the view in the upper lantern, which makes it appear as though the curtain were being slowly rolled up in order to disclose the view behind.

A great many of the better class of lanterns are provided with a rackwork arrangement, in order to ensure a slow and regular movement of the curtain, but as this can generally be supplied by a steady hand, it would seem to scarcely warrant the expenditure of the extra time and trouble involved in the preparation of this rack movement.

The constructive details being by this time complete, the woodwork will be ready to be polished, this work being carried out in a warm dry atmosphere, free from draughts. The first proceeding will be to remove all the brasswork, and place this aside, ready to be lacquered as soon as the polishing is completed; after which the entire surface is carefully gone over with Oakey's No. 1 glass-paper, until every speck of roughness has entirely disappeared. The grain of the wood will now be ready for "filling in," unless it is desired to darken it, in which case this would require to be done previous to filling. The simplest plan of staining mahogany darker is to procure a pennyworth of chromate of potassium (sold by druggists in the form of amber crystals), and dissolve this in about a quart of hot water, applying the solution, when cold, to the surface of the wood by means of a soft woollen rag, care being taken to avoid splashing the wood with the chromate, as this would result in an unsightly stain, which will show through the polish when finished. For this reason the rag must not be made too wet, and it should be rapidly drawn across the surface of the wood from edge to edge, and then back again, until the stain has been laid evenly from end to end, without any of it running over the edges on to the next side. Some workmen use a large-size flat brush, in preference to a rag, for applying the stain, but this is merely a matter of taste. As soon as the stain has become dry, the grain of the wood must be filled with plaster of Paris, mixed into a rather thin paste with water, and rubbed well into the pores by means of a piece of rag until they appear to be sufficiently stopped, when the superfluous plaster is wiped off with another piece of rag before it has had time to harden. It is usual to tint the plaster to match the colour of the wood by the addition of a small quantity of rose-pink.

We shall now require a gill of the best orange polish, also some methylated spirit, linseed-oil, and finely powdered pumice-stone. For the rubbers a few woollen rags or some white wadding (sold by drapers at about 3d. per yard) will be wanted, and last, but not least, a good supply of washed-out linen rags. As the latter form the chief part of the rubbers, it is important that they shall be entirely free from all traces of grease or starch. The woodwork having been filled, or stained and filled, according to requirements, will now be ready for polishing, care being taken to see that the work-room is not in the least draughty, as this would chill the polish, and cause it to become white and creamy. Everything being ready, take a piece of wadding or flannel, of a convenient size to be held in the hand, and moisten it with polish by holding it over the mouth of the bottle containing the polish, and shaking the latter against it once or twice: this will cause it to imbibe sufficient polish to cover a considerable extent of surface. The rubber is now enclosed in a piece of soft linen rag (the finer the better), and made up into an oblong ball about the size of an hen's egg, the ends of the rag being gathered together in the palm of the right hand in order to form a kind of handle whereby to operate it, the two first fingers being placed on the fore part of it in such a position as to afford a good purchase, and at the same time assist in keeping the covering drawn tight. Thus prepared, the rubber is passed over the surface of the work in free, continuous, and uniform strokes with a circular motion, gradually traversing the entire surface from end to end, the rubber being occasionally moistened with fresh polish whenever it exhibits signs of dragging. As it passes over the work the rubber will be seen to make a cloudy mark, which may be lapped over by the next stroke, pains being taken to keep the strokes a uniform size as much as possible. It should be borne in mind that the first application of polish is intended to fill up the grain of the wood, and not merely lay on the surface; it must, therefore, be well rubbed into the pores of the wood, care being taken that every portion shall receive an equal amount of it. This can be ensured partly by regulating the degree of pressure given to the rubber, and partly by squeezing the latter between the fingers. When the grain appears to have been entirely filled up, and the wood presents a uniform coat of polish, it may be placed aside for an hour or two in order to allow time for the polish to sink and harden.

On returning to the work, the first proceeding will be to rub down the polish with very fine glass-paper until the smooth level surface of the wood is exposed upon which to resume operations. The outer covering of the rubber should be removed, and a little more polish having been added, a clean part of the linen is drawn over it and gathered together in the palm of the hand, the same as before. After having smeared a drop or two of linseed-oil on the face of the rubber by means of the finger, the polishing process is again resumed in the manner before described by passing the rubber lightly and rapidly over the surface in one uniform direction, occasionally easing it with a touch of oil whenever it appears to drag, and persevering with this rubber until the surface of the work is covered with an even coat of polish, when it is placed aside for a few hours in order to harden, and again papered down the same as before. On resuming operations, a fresh rubber is made up, and the same polishing process repeated until the surface appears quite smooth, and covered with a thin and even coat of polish, entirely free from spots; should any spots appear, it is a sure indication of sunken grain, caused by the evaporation of the spirit and the sinking of the shellac of the polish into the plaster or pores of the wood. In such a case the surface will require papering down again, the same as before.

At this stage of the proceedings it will be found an advantage to let the work stand for a couple of days, in order to allow the polish plenty of time to sink. If there is no indication of sunken grain at the end of this time we may safely say that the pores are properly filled, and the surface will be ready for the final operations of levelling and spiriting off. The levelling rubber is a long strip of felt rolled into the form of a coil, and tied together with string. Thus prepared, one end of the coil of felt is placed face downwards in a saucer containing some boiled linseed-oil, in which it is allowed to remain for about three days, at the end of which time it is removed, and placed aside to dry for a week.

Now dust some finely powdered pumice-stone over the surface of the work, and having smeared the face of the levelling rubber with a small quantity of oil, go over the work carefully with this, in order to remove any little irregularities of surface and leave the polish quite smooth and even. The finishing rubber, which is prepared in a similar manner to the polishing rubber, is now charged with polish and a small quantity of methylated spirit (each being applied separately without any oil), and is rapidly and lightly passed over the surface of the work until the spirit has evaporated, when the pressure may be slightly increased in order to effect the adhesion of the shellac to the former coat, the quantity of polish added to the rubber being lessened each time, so as to bring the work up to perfection. Towards the finish, the rubber, which should be charged with spirit only, must be passed across the surface of the work like a breath, and as the cloudiness gradually clears off the strokes of the rubber may be elongated, and finally traversed off either end of the work.

It must be understood that the object of spiriting off is for the sole purpose of working out the oil, and thus obtaining a glass-like surface, entirely free from all traces of

grease. In order to ascertain whether the oil has been properly worked out or not, a simple plan is to breathe on the freshly polished surface, from which the moisture should instantly evaporate as from a polished steel surface if it is free from oil, but if there is the slightest trace of greasiness the evaporation will be retarded. In polishing an instrument of this description, which will be subjected to a considerable degree of heat, it is important to work with as little oil as possible, otherwise the polish will be certain to sink afterwards. If the oil is being used in excess, a finger drawn across the surface of the wood will show a greasy or clouded line; and then, again, the rubber will slip over the surface and leave the polish about in patches. The writer always uses the first rubber without oil, as the polish is thereby rendered more tenacious. It is always advisable to allow plenty of time to elapse between each succeeding coat of polish, as a good hard surface upon which to recommence operations is thus ensured. When the work has been placed aside for a few hours in order to harden, the shellac will be found to have sunk into the plaster more than the wood, thus proving the necessity for papering down between each additional coat. A fresh rubber should always be skimmed over the surface as lightly as possible, otherwise the polish will be squeezed out unequally, and left on the surface in a number of unsightly ridges or patches, an occasional stoppage during the progress of the work producing a like result. The glass-paper employed for papering down should be the finest o o, and if desired, it may be glued on to flat pieces of cork of various sizes.

The woodwork of the lantern having been polished, the next proceeding will be to polish and lacquer all the brasswork. As full directions for finishing this class of work have already appeared in Nos. 55 and 58 (pages 35 and 82), it will be unnecessary to do more than outline the mode of procedure. The stage-plates and similar flat surfaces are prepared for lacquering by first filing or scraping up the straight or curved edges until perfectly bright and true. The flat surfaces are then brought up to an even grain by the use of emery-papers of different degrees of fineness, which should be wrapped round a flat piece of wood and rubbed in one uniform direction. When the finest or flour emery-paper is reached, the surface will doubtless be sufficiently good for the application of the lacquer; but if a further finish is desired, the emery dust must be wiped away, and the metal still further polished by the use of water of ayr-stone or blue-stone and water, which is rubbed in the direction of the grain left by the paper, the polish being afterwards brought up by means of whiting or crocus-powder, pains being taken throughout to preserve the sharp edges of the work. The work will now be ready to be lacquered with pale gold lacquer, which should be applied to the surface of the metal (previously heated to the temperature of boiling water) by means of a broad flat brush, and when every portion has received a coat, the various fittings can be returned to their respective positions on the instrument.

The back of the stage-plates and the inside and outside of the collar belonging to the spring-plate, together with the interior of the draw-tubes, should each receive a coating of dead black varnish, in order to prevent the reflection of light. The varnish may also be applied to any other portion of the interior of the lantern which would seem to require it. When the newly lacquered brasswork is being attached to the lantern, it will be found a considerable improvement in the appearance of the instrument if a small brass eye-piece is screwed over the sight hole of each door. These eye-pieces can be obtained from any manufacturing optician for about 1s. each.

A capital registering stop for the slides can readily be made by means of a milled screw and bush and a glass plate. One of these stops screwed on the woodwork at the side of each stage will act as a stop to the end of the wooden carrier containing the slide, registering it in position without any annoying jerking about of the picture upon the screen. The glass plates are made of brass, shaped similar to Fig. 33, and doubtless owe their name to the fact that they are generally used for the purpose of affixing chimney-glasses and mirrors to walls. These plates can be procured from any furnishing ironmonger.

For each of these registering stops we shall require one of the above glass plates, and a milled screw and bush; the latter can be obtained from Mr. Platt, of Kingsland—No. 61 in his list, price 5d. each. The bush belonging to each milled screw must be hard soldered over the top hole in the glass plate (on the under side), in the position shown by the section of Fig. 33; the process of soldering having had the effect of softening the plate, it will be a simple matter to bend the lower portion up to right angles in the manner shown in the cut. The stops are then lacquered and affixed to the woodwork by means of small brass screws. Although the use of these stops is not absolutely necessary, they will nevertheless be found a very useful addition, as a few turns of the screw will serve to register all slide carriers which are of a uniform size.

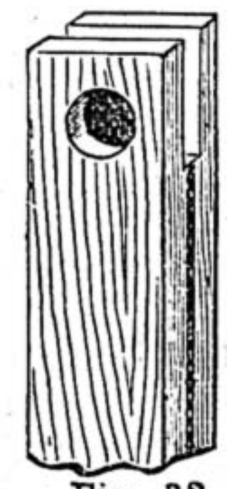


Fig. 32.

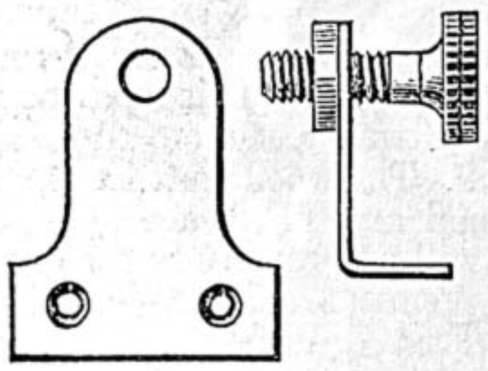


Fig. 33.

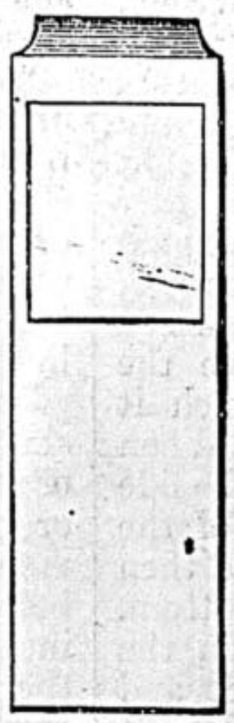


Fig. 29.

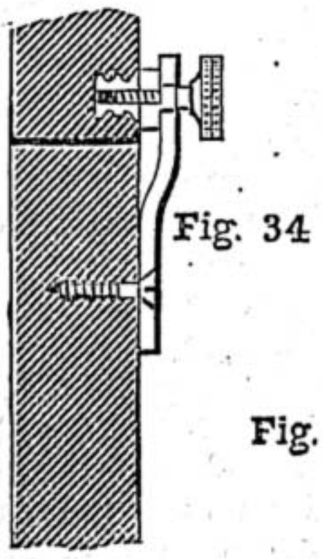


Fig. 34

Fig. 30

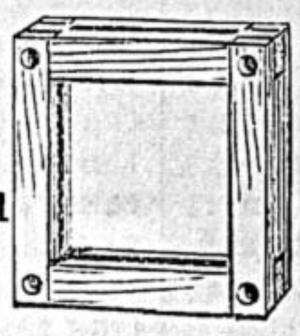


Fig. 31

Fig. 29.—Rolling Curtain Shutter. Figs. 30, 31.—Frames for Sliding Curtain. Fig. 32.—Enlarged Detail of Mortice of Frame. Fig. 33.—Plan and Section of Registering Stop. Fig. 34.—Section of Woodwork of Lantern, showing Portion of Clamping Plate.

MODERN FORGING.

BY J. H.

Miscellaneous Examples.

Cranks and crank axles appear in so many and various forms, that, though it is necessary to make some allusion to them, it is not possible to give a very fully detailed account of the methods employed in their construction.

We take a common bent or dip crank of round section (Fig. 95) in the first place, and suppose it has to be made without any assistance from a die-block. It would not do to simply bend a round bar to the cranked form, because at the corners where the bending takes place the area would be reduced by the stretching process. And it is of no use to have bad iron for a bent crank, for the process of upsetting and bending will open out the fibres.

Fagoted iron—of which more directly—is often used for cranks.

A crank of this kind may have one, two, or three throws, and the axles extending at each end may be long or short. The cranks may be forged separately, and the axles separately and welded together, or they may be all forged from one bar: in each case the question is one of practical convenience.

To simplify matters, we will suppose first that the crank has only one dip, and to a certain extent the same description will be applicable to cranks with two or three dips, the twisting of the dips to relative angles with each other excepted; of which matter I will speak presently.

Before bending the dips, there will be three upsettings of the iron: one along the length that is to form the future crank pin, A, and the bendings where the pin merges into the webs or levers, reaching from B to C in Fig. 95, and two others where the webs are to merge into the axle, or from B to D. and C to E (Fig. 95). These upsettings are done before the bar is bent.

The bendings at B and C will be done either at one or at two heats. If the pin is short, one heat will suffice, but if long, two will be necessary. Here the swage block, or, better still, the large shop levelling block pierced with numerous holes, comes in serviceable; for by inserting a couple of pins into holes in either block, suitable fulcra are obtained for the pulling round of the axles and the preservation of their true plane in the plane of the dip. If no swage block nor levelling block is available, a pin placed in the anvil hole must answer the purpose of a fulcrum, but it will not be suitable for heavy work.

It is necessary to check the length of the pin on the distance A before bending the other corners. If the distance A is too great, upsetting must be resorted to; if too short, drawing down must be done.

The bending of the corners D, E, will be effected around suitable pins, the axles F, F, affording good leverage. After this the crank webs from B to D, and from C to E, must be adjusted for parallelism, and the axles F, F, also for longitudinal alignment in relation to each other, and be brought into the same plane with the webs and the pin.

It is a matter of so much importance that the iron should be well upset before bending

for the corners, that I must emphasise this fact. In cranks of this type, it is desirable and usual to have rather an excess of metal at the corners, especially when they are to be filed up bright. It is not easy to round these corners very neatly: another reason why plenty of stuff should be allowed.

diameter of the crank, and ample depth is given. The length is not necessarily so great as that of the crank axle, but is sufficient to permit of true alignment of the axle being made.

The distances from the centre line A B to each end are made unequal to permit of the

such a block, those sections where the bendings are to be made are upset as before described, and the webs are turned round upon the levelling or upon the swage block, and the axles turned round at right angles with the webs with some moderate approximation to truth, though not neces-

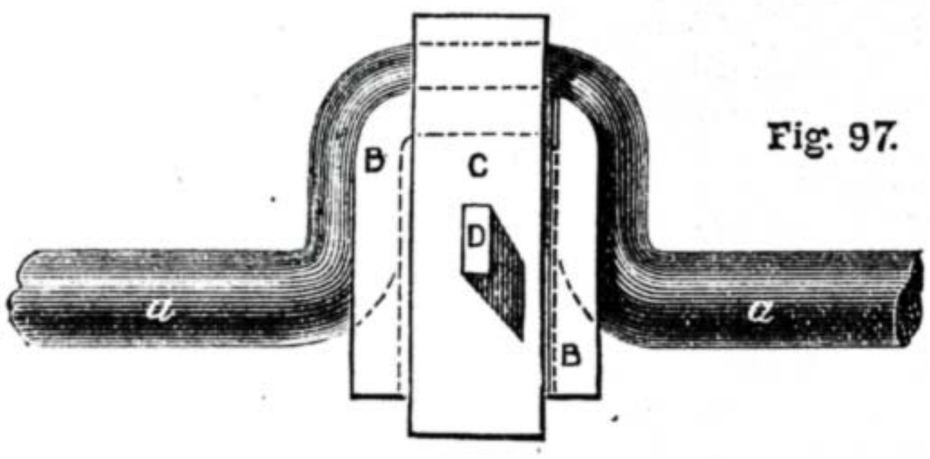
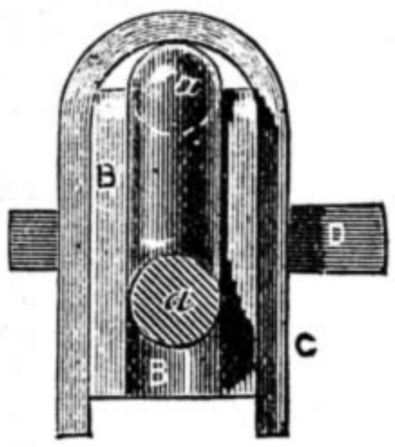


Fig. 97.



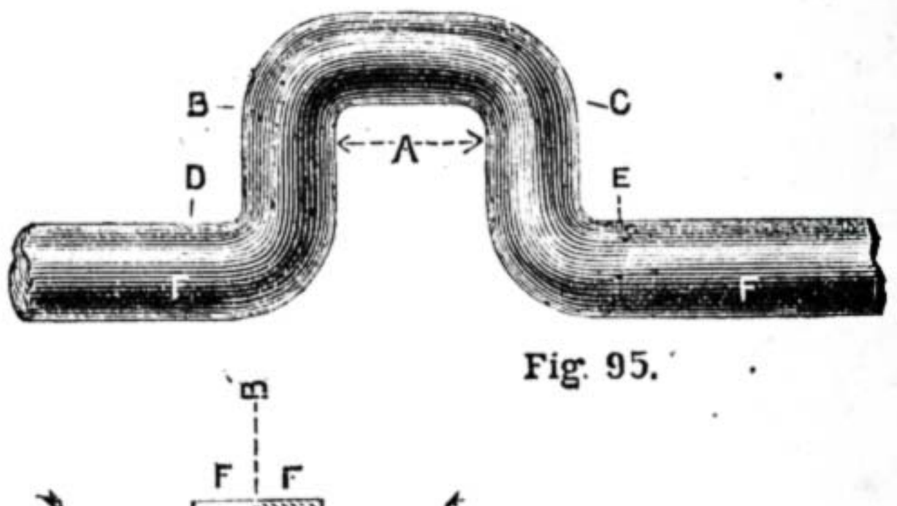
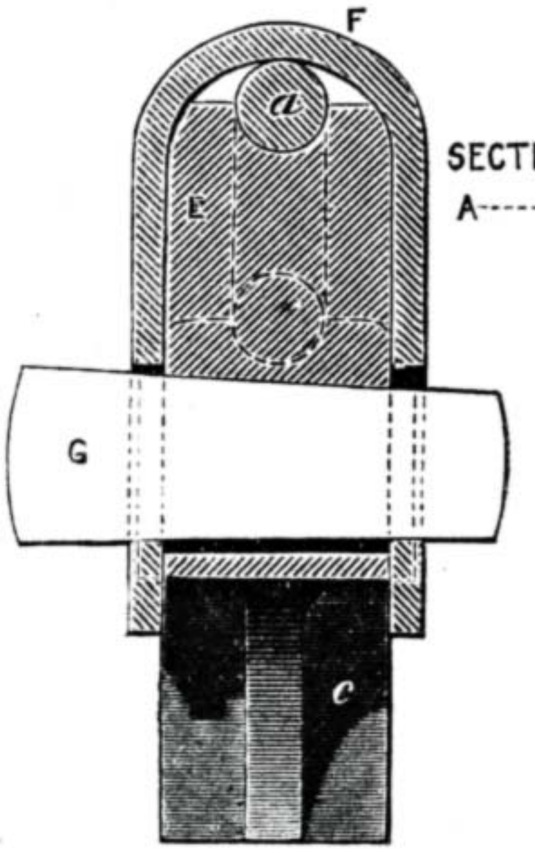
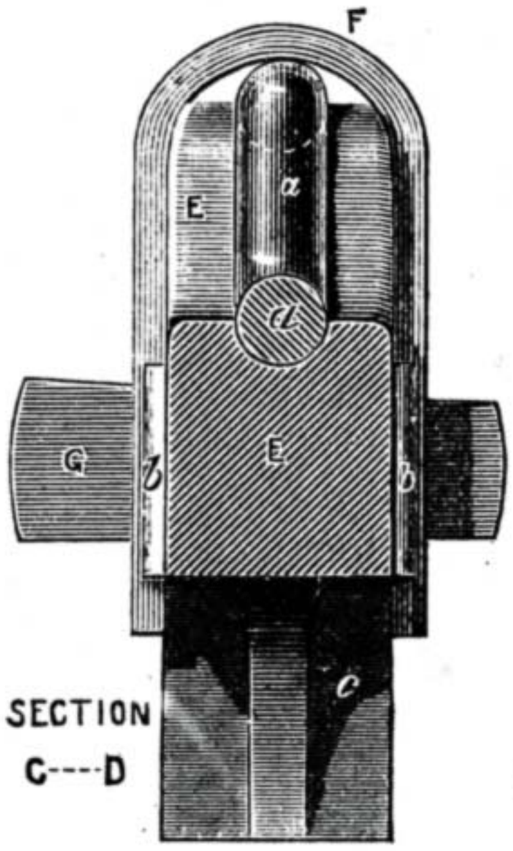


Fig. 95.





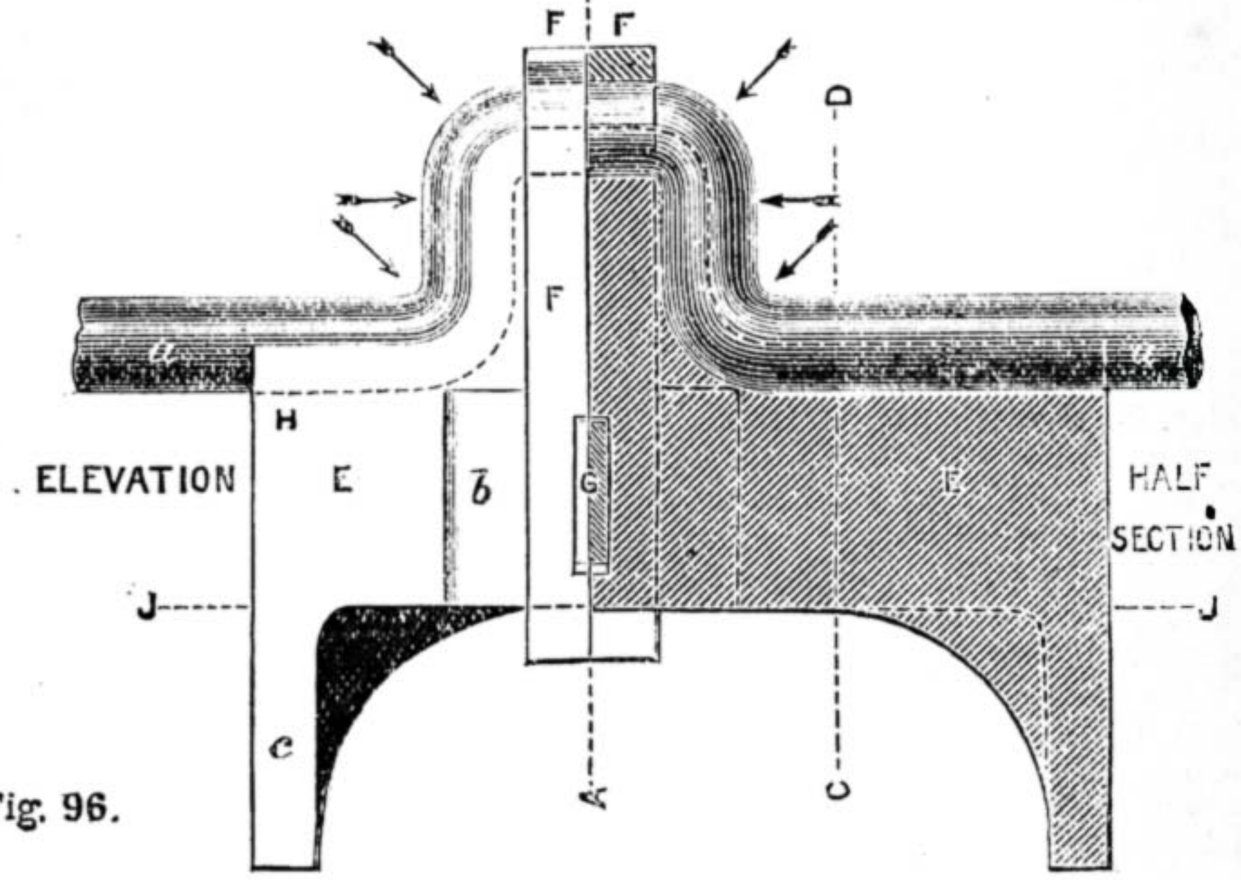


Fig. 96.

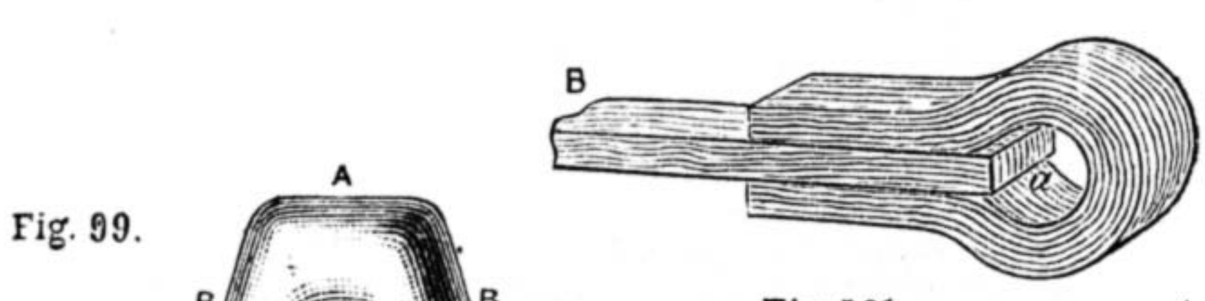
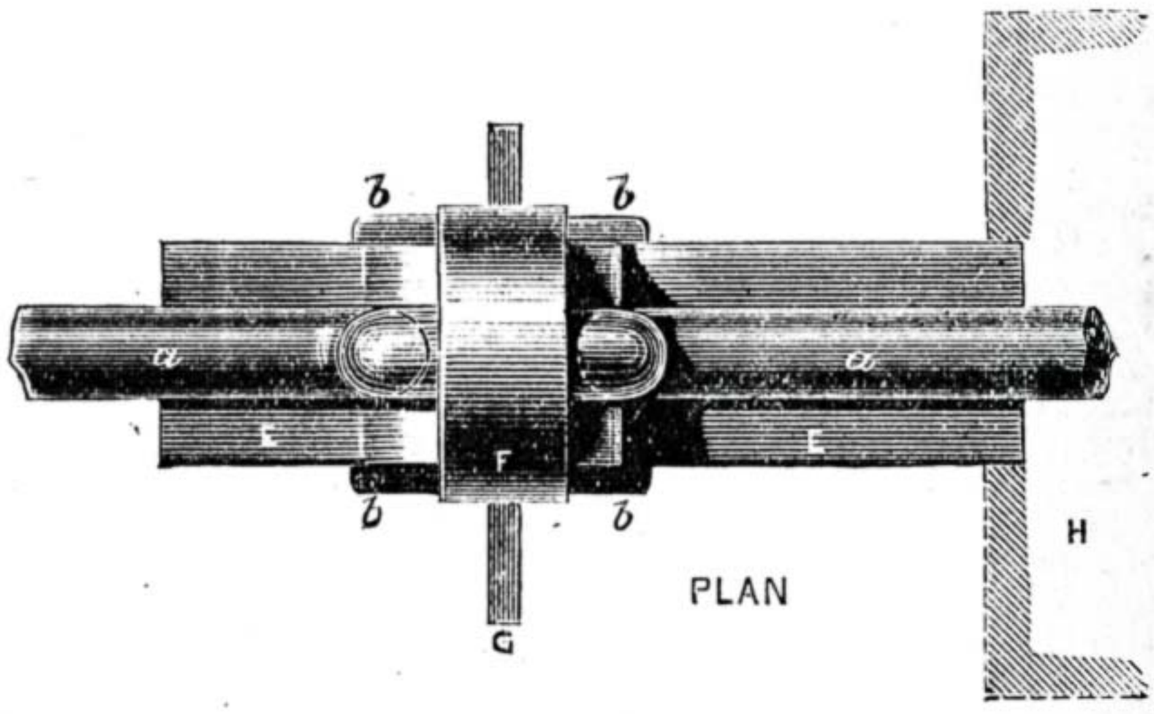


Fig. 99.

Fig. 101.



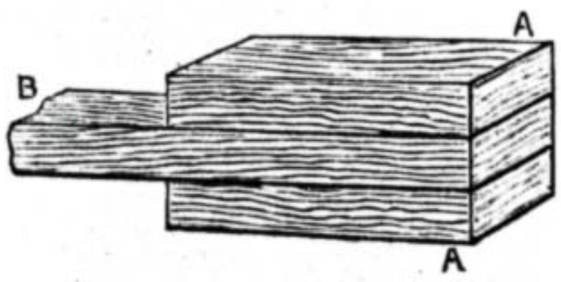


Fig. 102.

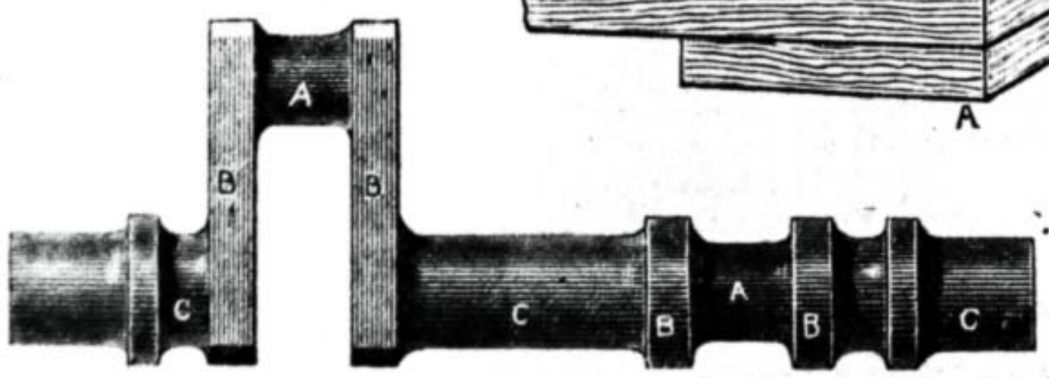
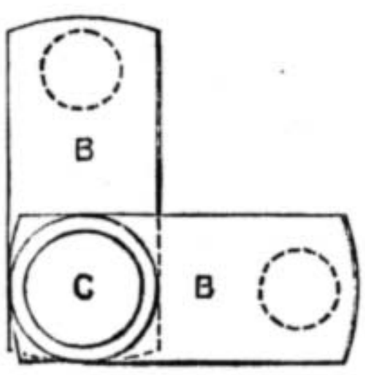


Fig. 98.



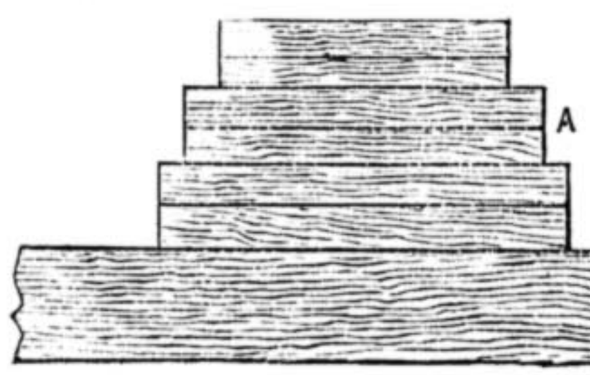


Fig. 100

Fig. 95.—Common Bent Crank. Fig. 96.—Bending Block. Fig. 97.—Filling-in Block. Fig. 98.—Locomotive Type of Crank. Fig. 99.—Crank roughly pillered into Form. Fig. 100.—Piled Crank Lump. Fig. 101.—Crank Boss. Fig. 102.—Lump for Crank Boss.

Such cranks are, when made in quantity, usually bent over a block, or even stamped; and I think the cost of making a block is saved if only three or four cranks are required.

A bending block is shown in Fig. 96. It is a casting, E, made sufficiently massive to resist the hammer blows necessary for setting in the bends of the crank. Its width is therefore considerably greater than the

forging of two-throw or three-throw cranks. In single dip cranks the lengths would be equal. In Fig. 96 the right-hand end is made sufficiently long to afford a good bedding for the axle *a*, but the left-hand end is made so short that after one crank is forged it may lie beyond the left-hand end to permit of the bending of the second or the third crank upon the block.

In the formation of a crank by the aid of

sarily so carefully as though the crank were intended to be finished by this method. The advantage of the block now comes in. Getting the crank *a* nearly to a welding heat, it is dropped over the block E, embraced by the strap F, tightened by the cottar G, which being driven in rapidly holds it in place, and the webs and the axles are quickly bedded down into the curved recess of the block; hammer, fuller, and hollow

tools being quickly brought into requisition wherever wanted. The crank is practically finished thus, only a little smoothing over being done after removal from the block, chiefly at the sides which could not be got at while the crank lies on the block. The crank should be quickly removed from the block, or it will become bound hard, owing to the shrinkage of the metal by cooling. For this reason the sides of the block should be tapered slightly, and in large crank blocks allowance for shrinkage in cooling should be given when making the block at the rate of about ¼ in. per foot.

In Fig. 96, *b*, *b*, are guide strips cast upon the sides of the block E for the strap F. If the strap is not sufficiently stout, a clamp or a rough gib may hold the bottom ends of the strap together. The two horns *c*, *c*, are cast on as a matter of convenience. As the blows for the most part are delivered in the direction of the arrows, the block needs to be steadied endwise. In the example from which this is taken, therefore, there is a heavy cast-iron block sunk into the ground a little below the floor of the shop. One end is grooved out to take the ends *c*, *c*, so preserving the bending block steady under the hammer blows. The grooved end of this casting is shown dotted at H, Fig. 96, plan: *c*, *c*, are below the ground—J J, in Fig. 96, elevation, being the level of the floor.

If a second or third dip has to be forged, the truth of the first one is preserved by inserting a packing block B, Fig. 97, in the dip. This is a cast-iron piece hollowed semi-circularly to fit the webs, and secured in place with a strap, C, and cottar, D. This is retained in place until the remaining dip or dips are bent.

This is a form of crank axle that is well adapted for forging into the strongest form possible, the fibre running round the bent portions. In some other forms the same advantageous disposition of metal is not secured. A few years ago it was quite common to see the largest crank axles of the general form shown in Fig. 99 built up by a round-about process of welding, the pin A, the webs B, and the axles C being prepared separately and welded together. The webs were opened out at the one end to embrace the pin, at the other end to embrace the axle, and all welded up together. But it is usual now, in very large cranks, to make and machine each of these parts separately and weld them together, shrinking the webs on to the pin. This is practised in marine engine work. In small cranks of this type, however, no such plan is adopted, but the forging is made solid and machined out. Briefly, the methods employed are as follows:—

The simplest and the worst way is to take a slab and cut the entire crank out of the solid—a poor plan, seldom adopted. Better than this is the drawing down of the axles from a lump whose width is equal to the total width of the crank from the outer edge of the axle to the outer edge of the pin. Superior still is the fullering out of a lump in such a way that an approximately curved disposition of the fibres is obtained (Fig. 99), leaving, however, a good deal of finishing and machining to be done afterwards.

Another way—not so good as the last, but more common—is to weld on one or several pieces, A, to one side of the bar, B, that is to form the axle (Fig. 100), leaving the gap to be slotted out or drilled out.

In two- and three-throw cranks the gaps have to stand at angles of 90° and 120° respectively. Cranks like Fig. 95 are usually forged with the dips at proper angles, but those like Fig. 98 are more often forged with the dips in one plane, and twisted afterwards. They are sometimes forged approximately at these angles when built up, as in the last example. Sometimes each crank is prepared separately and welded to suitable lengths of axle; but generally they are forged in one plane and the portion of the axle lying intermediate with the cranks twisted until the cranks stand at the angles required with each other. When twisting is practised, it must be performed over as great a length of shaft as possible, in order to be gradual. Two or three heats may have to be taken if the length is considerable, and a portion of the necessary angle imparted at each heat. One crank will have to be secured by some means, such as clamping down to the swage or levelling block or anvil, or pinching under the steam hammer, or even in the vice, if of small size, while leverage is exerted at the other end. The leverage may be applied direct to the other crank, or to the axle itself, by means of clips. A few well-directed blows of the hammer will assist and serve to regulate the dead pull exerted upon the lever.

If the cranks are welded to the axle, a long and somewhat bulky scarf should be made to give plenty of metal for subsequent consolidation and swaging down.

The bosses for some large stationary engine-cranks when they are not upset, or the webs not swaged from the solid, are built up or turned round in various fashions. In one method the boss is formed by bending round a piece of bar *a*, and welding it to a straight portion B (Fig. 101). The bending is usually done by placing the bar across two supports and fullering it down in the central portion. When the bar is thus partly bent, the curving is finished by hammering the ends and nearly closing them upon the anvil, or until they are sufficiently close to just embrace the flat bar B in readiness for welding. Obviously more than one lamina of metal may be employed in the formation of the boss, one or more being curved around and welded on the first to make bosses of any dimensions.

To finish such a boss, any excess of metal at the end, *a*, of the bar is cut off with a gouge, a suitable mandrel inserted in the hole, and the outer curves finished with suitable fullers.

Often, however, the boss is made simply by piling (Fig. 102). The pieces A, A, of any convenient thickness, are welded to the straight bar B, and afterwards are consolidated at a welding heat, and a rudely curved form imparted to them by means of fullering tools before final shaping with the set and finishing tools. This fullering gives an approximately curved disposition to the fibres.

When the two bosses are prepared, the ends B, which have fulfilled the function of porters, are cut off, and the bosses united by means of a scarfed joint, like that shown in a previous article. We have then a double-ended boss whose middle portion, or web, can be fullered and swaged down to the lesser section required.

I have not yet touched on the important subject of piling and fagoting for heavy forgings. It is well known that when extra strong and sound forgings are wanted the way to secure them is not to use a solid new bar, but to weld together a large number of selected pieces. These are of any conceivable size and shape, and of various qualities, though a selection of best material is made when specially desirable. They are laid together in bundles of suitable sizes, bound with iron round a porter or long bar of iron, and raised to welding heat and hammered and consolidated, and reduced more or less under the steam hammer. For specially good qualities of work this process is repeated two or three times, the pile being drawn down, and then cut off into lengths that are re-piled, and re-heated, and welded. The bars are not merely laid in parallel series, but are often made to cross one another at various angles, with a view to securing greater strength.

By this means, not only are forgings with the maximum of strength procurable, but all the odds and ends of metal cut off in the processes of forging are utilised in the best way possible. In large shops this is made a stock job which the men fall back on when the ordinary work is slackening. Accumulations of waste ends are used up, and the "uses" ready piled are stored away for future convenience.

Nothing of very large bulk can be treated thus in the forge fire. Where large masses have to be manipulated, the reverberatory furnace affords the means of thoroughly heating the pile.

STAINING FLOORS.

BY C. E. MAES.

Now that the healthy and economical fashion of having floors only partially carpeted has been so widely adopted, it is not surprising that many of our readers desire information on the subject of staining or otherwise giving a presentable appearance to the uncovered portions of flooring.

Perhaps before proceeding further, and describing the actual staining and other operations, it may not be amiss to offer a few suggestions to those who may be removing, re-carpeting a room, or contemplating alterations, and are not quite able to make up their minds whether they will have their carpets close fitted to the walls or only have a square, "art" or otherwise, in the centre, leaving a margin all round to be stained, or, as is often the case, covered with a floor-cloth surround of some kind.

The two great advantages of having a portion of the floor uncarpeted may, as stated above, be owing to sanitary and economical reasons. It certainly cannot be said that a close-fitted carpet is in itself dirty, and consequently unhealthy, but there cannot be any question that owing to the difficulty of taking it up it is frequently a cause of dirt being allowed to accumulate. A square of carpet loosely laid, and not necessitating the removal of any cumbersome piece of furniture, such as wardrobe, sideboard, or cabinet, can be taken up at any time without much trouble, and easily be re-laid by the ordinary domestic portion of the household.

On the score of economy even stronger arguments can be given in favour of squares. The initial cost is considerably less, for there is little or no cutting to waste, even when the "square" is made up of ordinary carpeting. Unless a particular width of uncarpeted margin is insisted on, it is seldom necessary to cut a breadth in half; whereas, when a room has the carpet fitted to it closely a considerable quantity may be, and often is, cut to waste. Thus we have not only to consider the saving effected by not covering so great a superficial area with carpet, but that from there being little waste—none, in

fact, except what may be caused by the necessity of matching the pattern. A carpet dealer might object to this; but no matter—his wishes cannot influence us at the present time. Of course, as is no doubt well known, art "squares" are manufactured in large numbers, and they are even cheaper than a made-up piece of ordinary carpeting. They are to be had in many patterns and colourings, and the objection cannot now be urged against them that in either respect they are objectionable. As a rule, both colour and design are good, most of the kinds being reversible, although there is always a "right side up"; when one side gets dirty or shabby the other may be made the top. One great economy of squares is owing to the fact that as they are rectangular they can be changed about as wear necessitates. If they are not only nominally but actually square, of course it does not matter in what position they are laid, but it may be presumed that it is known that these "squares," or, more correctly, centre carpets, are of varying portions in regard to length and width, as well as of different sizes. No one can have failed to notice that the carpet on some portions of the floor—as, for instance, near the door—gets more wear than at others. Well, with a close-fitted carpet it is seldom possible, without entirely undoing and re-making, to put the part which gets most worn in any other part of the room, but with a square at least two changes can always be effected.

It may be asked if there are no disadvantages to detract from the advantages of having a centre carpet merely, but the only objection that is ever seriously urged may be dismissed in a sentence, as it must be entirely a matter for personal consideration. It amounts to no more than the question about appearance, as some people appear to think that a room which is not carpeted all over the floor does not look so comfortable as it might.

With these considerations in his mind, the reader will now be able to approach the actual work of staining his floors with a decided opinion.

The colour to which floor margins are stained is generally a brown, the finishing being giving with varnish, wax-polish, or oil. It will be understood that ordinary floorings only are referred to—just such as will be found in the majority of houses, and not those covered with parquetry work, which are usually finished in such a superior way that they may be left out of consideration. For ordinary rooms the varnish finish is to be recommended generally. It looks well, and requires less attention to keep in order than wax. A coat of varnish every now and again will restore the margin to original gloss. Wax-polished floors look well, but they require rubbing up frequently, and they cannot be washed without destroying the gloss. Oiling has few, if any, advantages beyond the cheapness of the work, and can hardly be recommended as suitable for ordinary dwelling-houses. At its best, an oiled floor never looks as well as one that is varnished, but perhaps where there is much traffic, and expense is a prime consideration, oil is the most suitable finish. It is true, floors are sometimes French polished, but so seldom that nothing need be said about this finish, especially as it is carried out like any other work of the kind.

On deciding to stain and varnish a floor, the first thing to be done if it is an old flooring is to pull up any nails which have been used for fastening carpets to round by the skirting-boards. When the carpets have been laid with rings, nails are always sure to be found. The nail holes may be filled up with putty, but in recesses and dark corners it may not be necessary to take this trouble. It all depends on whether a first-class job is intended, so it need not be understood that all the preliminary preparations of the floor must be done. The worker will be able to judge best for himself to what extent they should be carried.

It often happens that the edges of flooring boards are above the general surface of the floor—*i.e.*, the boards have become somewhat concave on their upper surface, in which case, if necessary, they may be planed down. If the floor be a dirty or discoloured one, it is in this case advisable to plane all over the portion to be stained, otherwise the difference between the new and the old surface will probably be plainly discernible.

While preparing the floor it may be advisable to punch in any nail-heads and fill up the holes with putty. Wide joints between the boards may be either filled up in the same way or with thin slips of wood. With the almost unnecessary remarks that new floors do not generally want so much preparation as old, and that all dirt should be washed away, we may proceed with the staining operations.

The stain may be either purchased ready made, as wood stains are sold by most oil and colourmen, or it may be prepared at home with very little trouble. There are many recipes from which stains may be made, but there is none better than the following one. The proportions are of very little importance. The ingredients are vandyke brown, liquid ammonia, and water. The vandyke brown is mixed up with the ammonia to form a thin paste, to which water must afterwards be added to reduce the strength and liquefy the stain.

When a thin paste is mentioned, it must be understood that nothing thicker than this is satisfactory; but the same objection by no means applies to the converse, for the mixture may be liquefied to almost any extent with ammonia without detriment. Ammonia, of which only the strongest should be used, is, however, dearer than water. Care must be taken that the brown is thoroughly mixed. The mixed brown and ammonia may be either kept as a stock preparation to be used from with water as may be required, or it may at once have water added and be kept in a usable state. It is, however, advisable to mix at least as much as will suffice to do a room entirely, and to avoid any difficulty in matching to exact shade in any fresh mixture.

Instead of ammonia, caustic potash or soda may be used to mix the brown with. It is not, however, nearly so nice a preparation, and is open to objections from which ammonia is free. If potash or soda be used, it is better to mix them with a fair quantity of water, and to boil after the brown has been added.

Whatever the stain, it should be washed on evenly with a cloth or be applied with a brush. Care should be taken, especially if potash or soda has been used, not to let the stain get on the painted skirting-board. It will be found a convenience to mark a line showing the width to which the margin is to be stained, and this should be a few inches under the intended carpet. A straight line may easily be struck by means of a piece of chalked string. The stained portion should be allowed to dry before proceeding to the operation of sizing.

Size is used to economise varnish, being much cheaper and filling the grain of the wood, which thus absorbs less varnish, and allows it to remain where it is wanted—viz., on the surface. If the varnish sinks there is comparatively little gloss. The size may be bought at the same kind of shop as the vandyke brown, but can be got from almost any painter or decorator, as it is largely used in whitewashing, etc. It is applied to the floor like the stain, and must be allowed to become thoroughly dry before varnishing.

A good varnish for this purpose is "brown oak," but any hard-drying one will do very well. It should be bought ready made, as there is no use in amateurs supposing—as so many of them do—that they can prepare their own. Whatever varnish is used, it should be laid on with a brush, and it may be noted that two coats thinly laid on are better than one applied thickly. In many cases one coat is all that is needed.

For a wax-polished floor it is only necessary to stain, and then when dry finish with a mixture of beeswax and turpentine. As wax-polishing has been fully treated of in WORK, it is unnecessary to do more than refer to the article on it.

The same remarks apply to oil finishing, except that it may be understood that the same care is not necessary as with a piece of furniture. Indeed, on a floor it is useless to attempt to get any polish with oil. The oil is useful to enrich the colour of the stain, and that is all.

A very useful stain may be made by thinning ordinary paint with turpentine. Of course the turpentine causes the paint to dry flat or dead, but a coat of varnish will soon remedy this. Mentioning paint may induce some to suggest the inquiry whether a floor might not be painted instead of stained. If so, the answer is "Yes." But were all ways in which flooring might be finished enumerated, more space than can be devoted to the subject would be required; but in the "sweet by-and-by" I may have an opportunity of describing the finishing of a floor with wall-paper: a material not generally recognised as suitable.

MATCHBOARDING.

HINTS ON ITS APPLICATION TO WALLS AND CEILINGS.

BY ALEXANDER MARTIN.

WHERE the walls are covered with matchboarding all the way from floor to ceiling, the monotony is still more noticeable than when they are only partly covered. The long stretches of board may easily be shortened by introducing any of the previous designs as a dado, 3 ft. high, running the boards above the dividing bead on top of the dado right up to the ceiling. Perhaps our meaning may be made clearer by reference to Fig. 23, which shows the arrangement we speak of. The mitred squares in the dado are in marked contrast to the boarding above; and at about 15 in. from the cornice a flat frieze moulding is nailed on, to form a frieze round the room. A section of this frieze moulding is given, about half full-size, in Fig. 24, and an alternative section in Fig. 25, either of them being equally suitable for the position. A gas-bracket is shown in Fig. 23 in the centre of the vertical boards. It has a diamond-shaped panel prepared for it in the matchboarding, all the surface being in one face, and not raised, as might be supposed. Another arrangement for covering a wall from floor to ceiling is given in Fig. 26, where above a dado are placed boards set

to an angle of 45°, mitring into each other at regular intervals. There is no need for a frieze moulding in this; it is better without one. The grounds for these designs are so very much similar to others already given that it is unnecessary to show them again. The cornice may be either of plaster or of wood—the latter being, however, preferable, especially where the walls show no plaster at all. A section of a cornice suitable for a very large room or small hall, is given in Fig. 27; but as the size of cornice necessary is regulated by circumstances, the dimensions must be decided accordingly.

Another method may be adopted for decorating matchboarding, without interfering in the least with the usual method of attaching it to the wall, board against board, irrespective of design; and one that, at the same time, will not add much to the cost of the work. It consists of covering the wall first of all with the matchboarding, and afterwards sprigging on its face mouldings suggestive of panelled work, as indicated in Fig. 28. Two arrangements are shown, which may either of them be worked separately or alternately. The moulding used should be of a kind which will not require to be mitred at every connection, as one of the form in Fig. 29 would. Half of the mitring may be saved by using a moulding as shown in section in Figs. 30 and 31; for the square edge will receive the full moulding in a butt-joint. In the left-hand arrangement in Fig. 28, therefore, the two squares—the inner one and the outer—are mitred together exactly as a picture-frame is, and sprigged on the boarding: the four little connecting pieces are then butted between these two frames, and the design is complete. The diamond panel on the right-hand side of Fig. 28 is a little more difficult to manage, but it is made up in the same fashion. The outer square is easy enough, as is also the centre diamond, mitred and sprigged on. The four connecting pieces in this case require fitting at the corners of the diamond panel, but no mitring is necessary. In Fig. 32 is shown an enlarged sketch of this corner, by which our meaning will be made quite plain. This figure shows the short connecting piece; but the long one, of course, is fitted in exactly the same manner.

If a long stretch of wall is being treated in this way, the panelling should be broken up in some fashion to make more variety than the two kinds of panels alone afford. If there are any buttresses in the wall, they will naturally divide it into compartments, which may each have one or more panels;

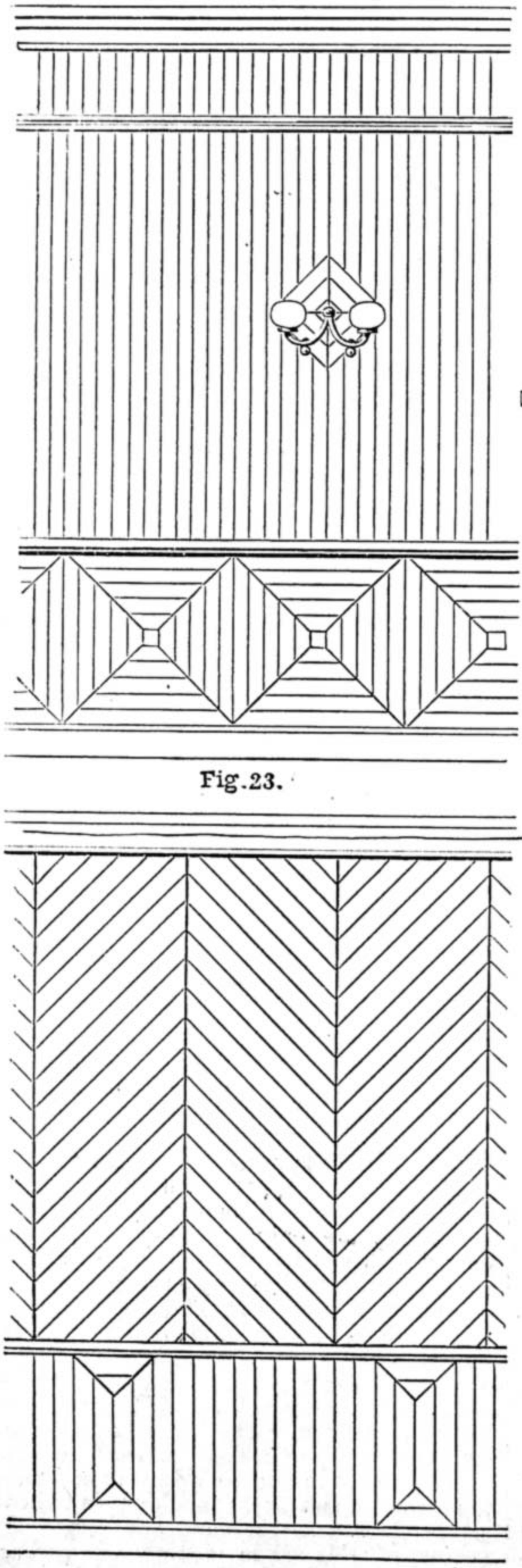


Fig. 23.

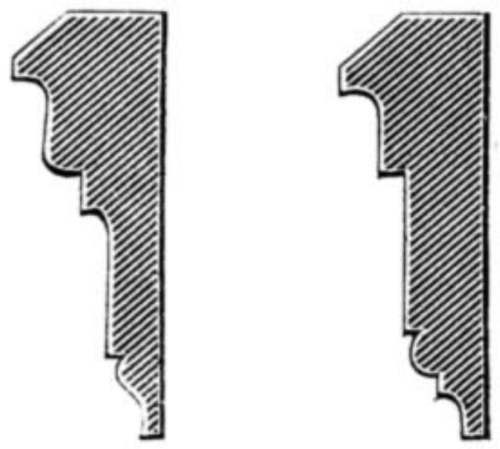


Fig. 24.

Fig. 25.

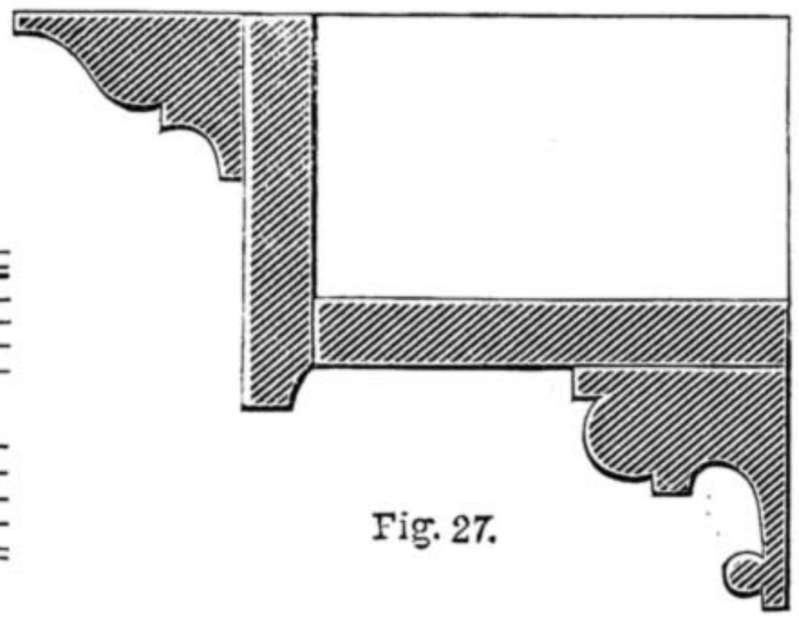


Fig. 27.

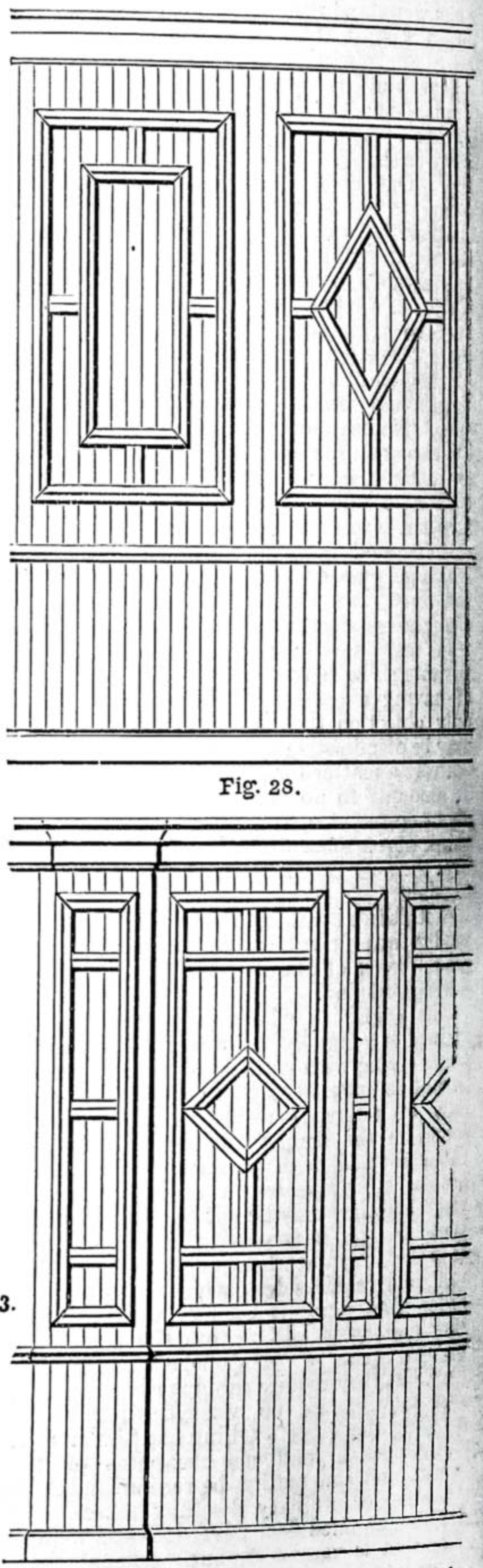


Fig. 28.

Fig. 26.

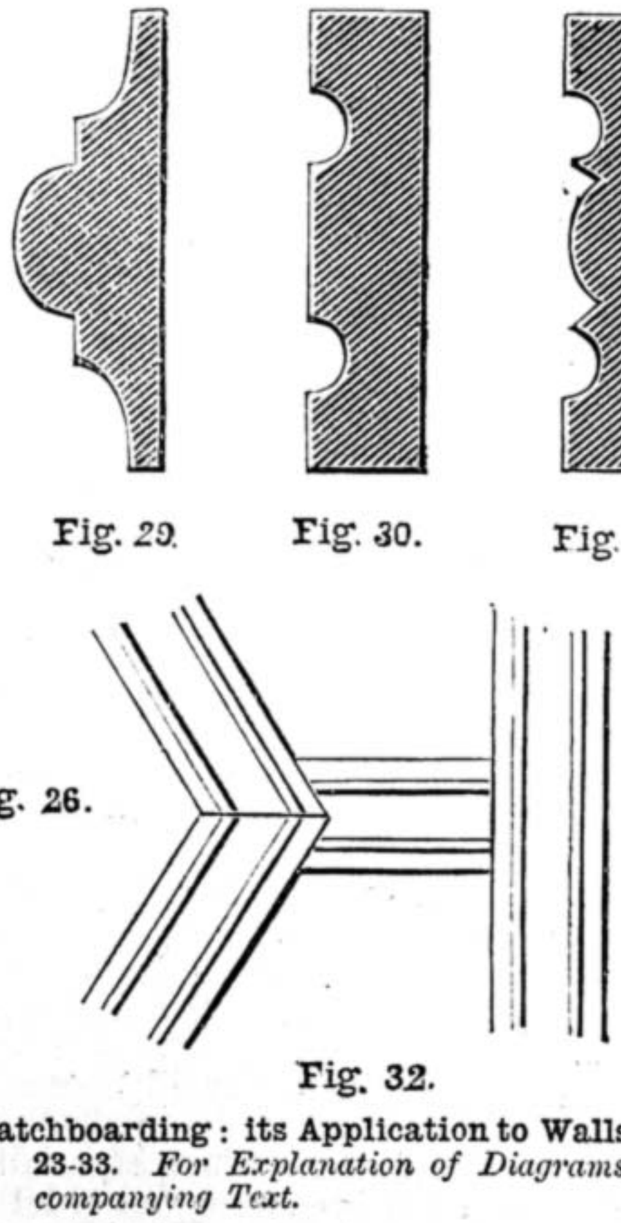


Fig. 32.

Fig. 29. Fig. 30. Fig. 31.

Fig. 33.

Matchboarding: its Application to Walls.—Figs. 23-33. *For Explanation of Diagrams, see accompanying Text.*

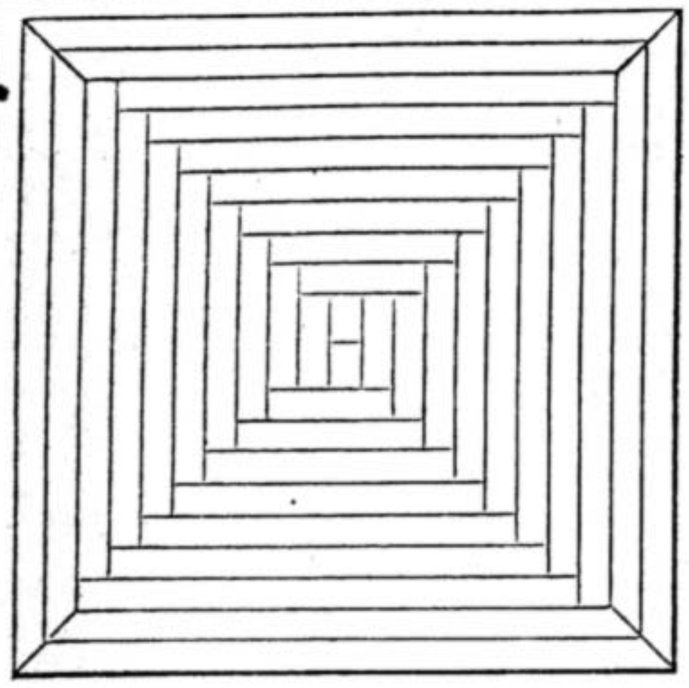


Fig. 34.

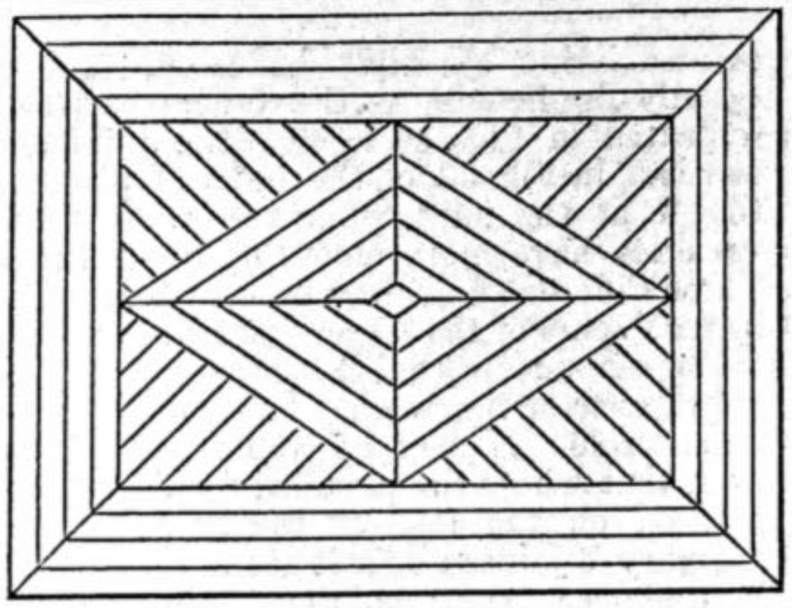


Fig. 36.

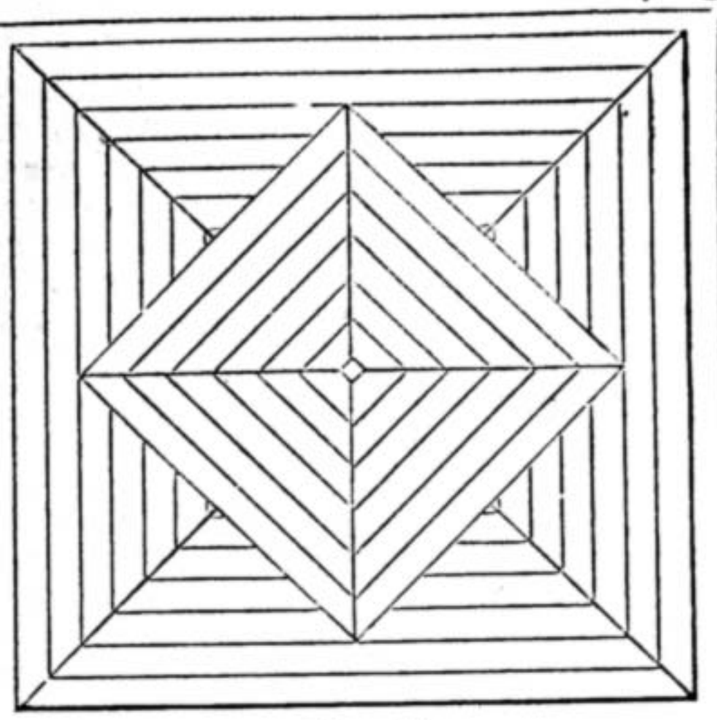


Fig. 35.

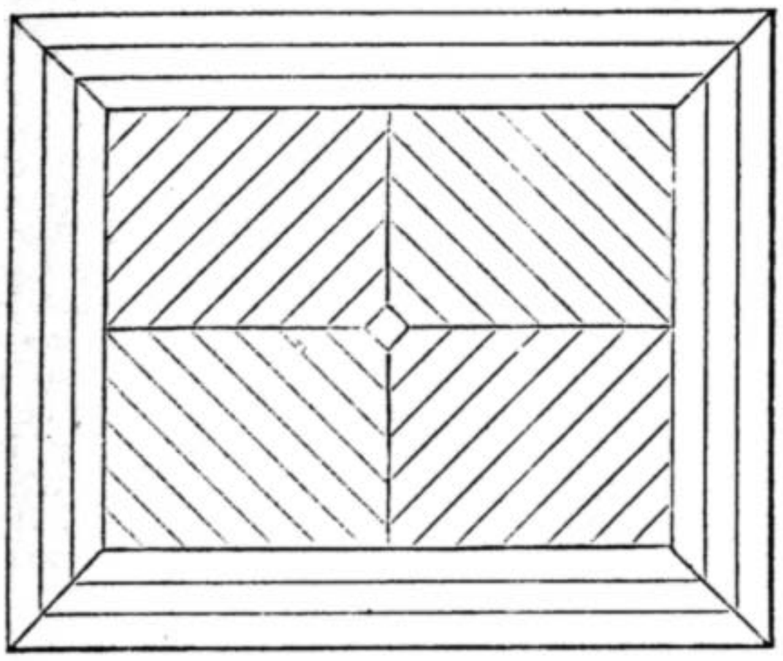


Fig. 37.

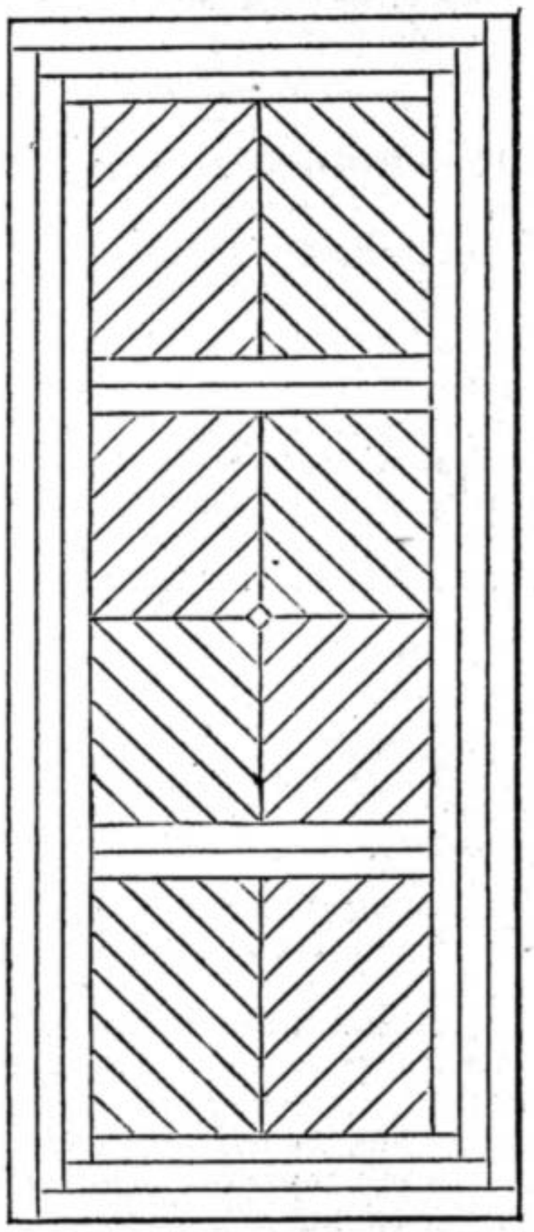


Fig. 39.

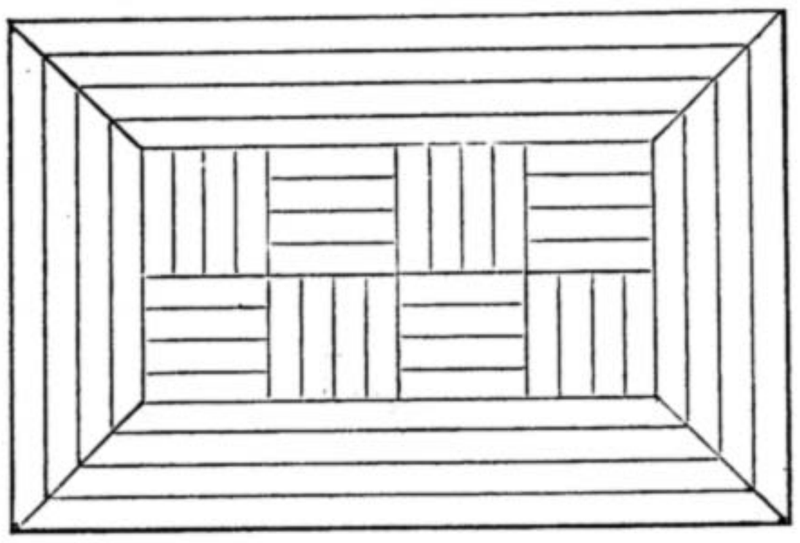


Fig. 38.

Fig. 44.

Fig. 46.

Fig. 47.

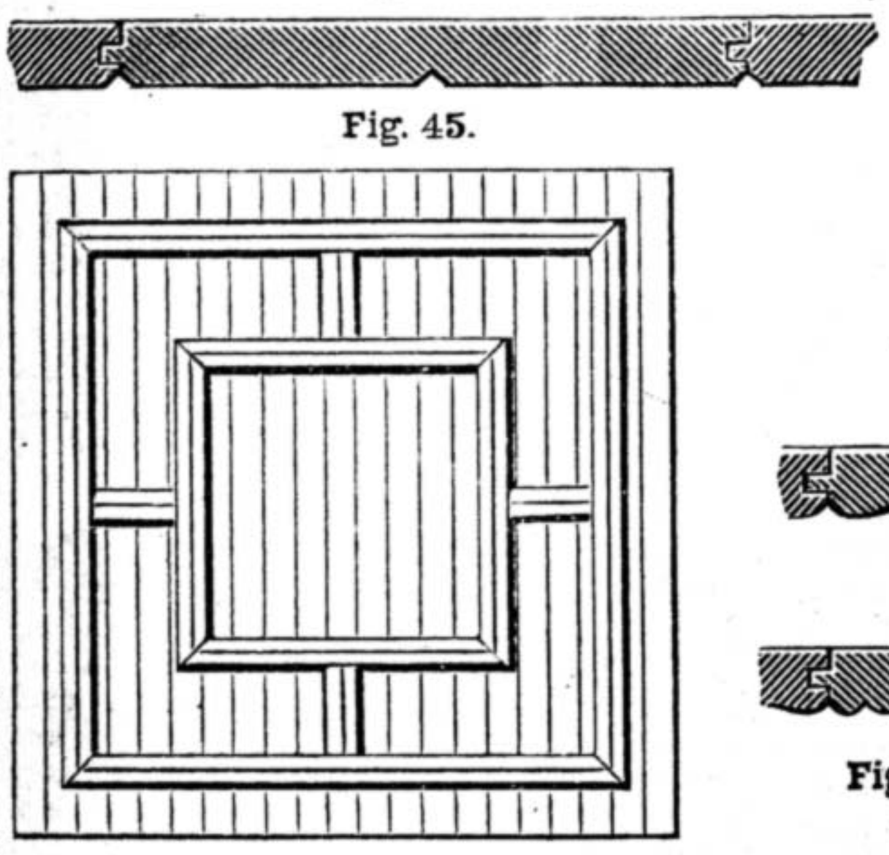


Fig. 45.

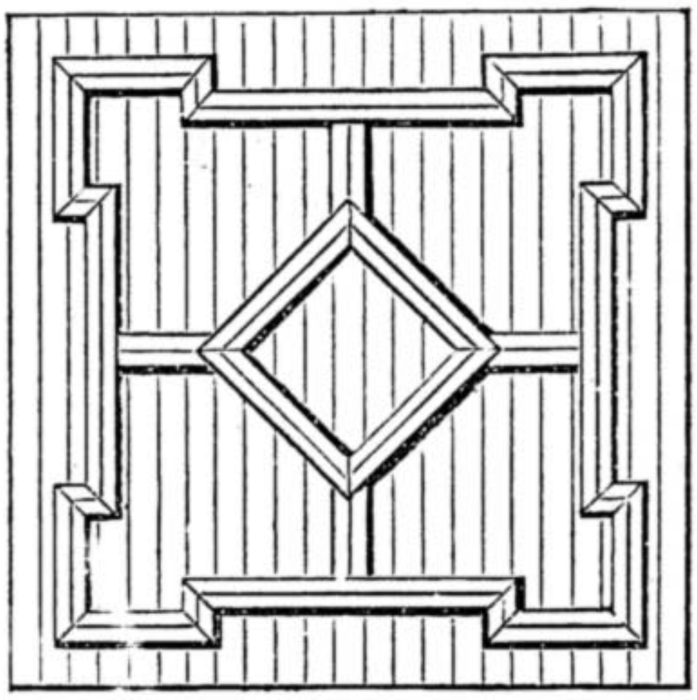


Fig 41.

Fig. 48.

Fig. 49.

Fig. 40.

Fig. 43.

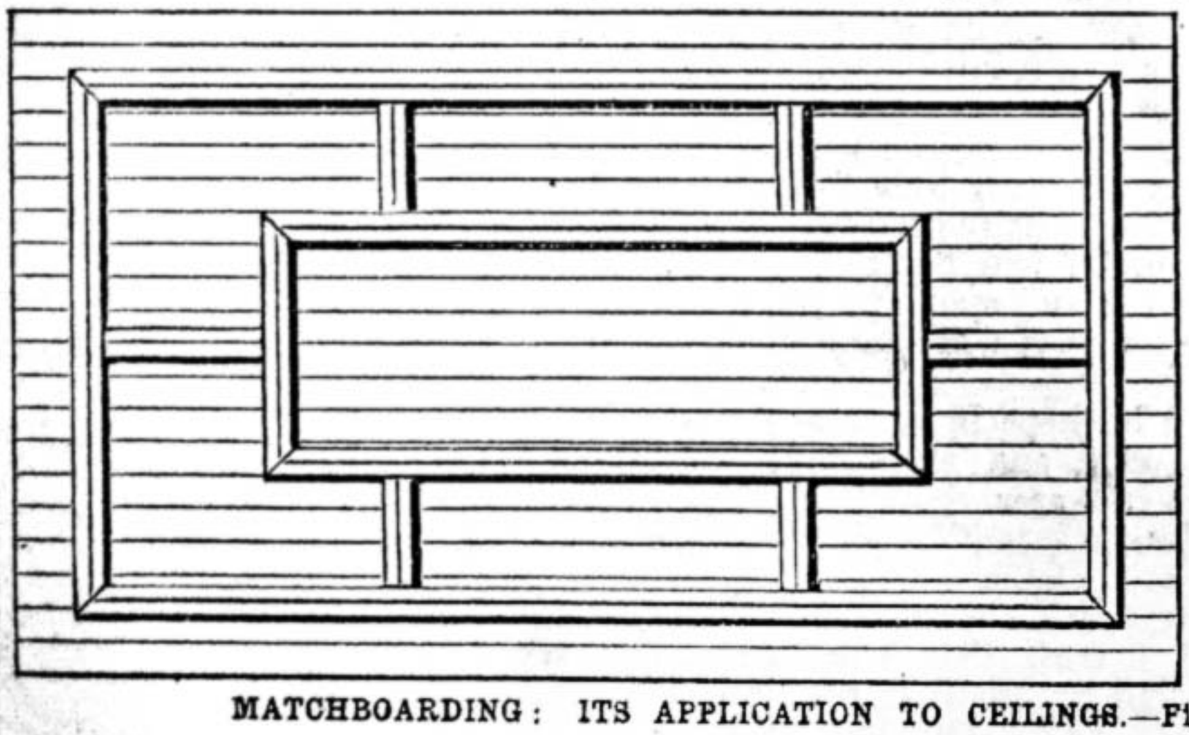
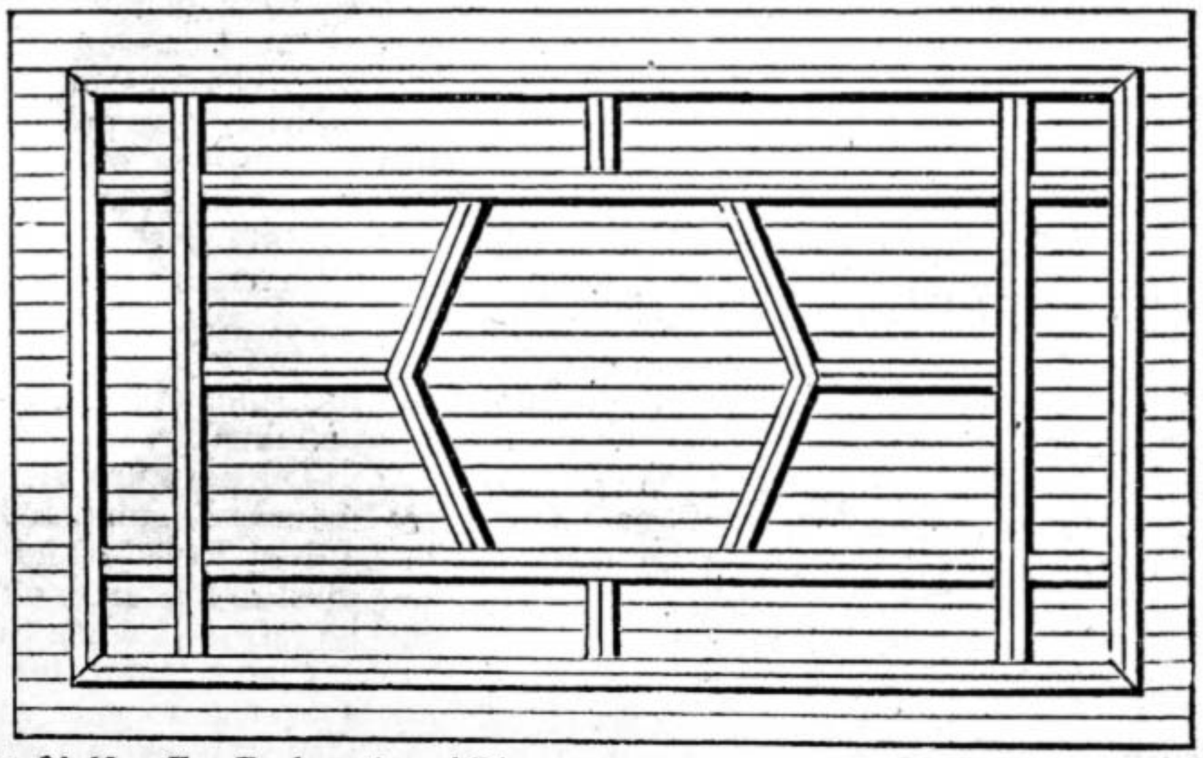


Fig. 42.



MATCHBOARDING: ITS APPLICATION TO CEILINGS.—Figs. 34-49. *For Explanation of Diagrams, see accompanying Text.*

and the face of the buttress, if it be broad enough, may be panelled also. In Fig. 33 a buttress is indicated with panelling on its face; and alongside of it is shown another arrangement of panel, carried out in the same manner as already described. A narrow panel, it may be observed, is placed between the two larger ones to relieve them from appearing side by side; a little management of this sort is invaluable in setting out the wall.

Ceilings require as much attention as walls when they are covered with matchboarding, and usually they get more. Perhaps it is because that in shops the walls are usually covered up with merchandise, while the ceiling is always seen throughout its whole extent. In Fig. 34 is shown a square ceiling, with mostly square joints; the two outer boards on each side are the only ones mitred, and they are so finished to give an effect of "completedness" to the whole. Another design for a square ceiling, and one which entails a good amount of mitring, is given in Fig. 35; this makes a very effective design. Almost the same idea is used in Fig. 36, but this being an oblong ceiling, a lot of the angles of mitring are different from the usual 45°. In the next (Fig. 37), all the angles are of the usual 45°, and will therefore be more readily put together on that account. A plainer design, yet neat enough, is given in Fig. 38; in Fig. 39 is shown an arrangement for filling up an exceptionally long and narrow ceiling.

In putting up such designs as these in any place, it will be found best to cover all the ceiling with rough boards—$\frac{5}{8}$ in. sarking will do nicely—so that there will be one flat surface to nail the matchboarding to. It may then all be made in the workshop; every different piece of wood being cut and mitred to its proper size and shape, there will be no difficulty in putting them all in their exact position just at once.

Where the walls have been treated with the sprigged mouldings formed into panels, the ceiling should be in keeping. In our next four Figs.—40, 41, 42, and 43—are shown various designs for different shaped and sized ceilings, Fig. 41 being suitable for a larger ceiling than Fig. 40, and Fig. 43 larger than Fig. 42. The mouldings used in the ceiling should be of the same section as those on the walls; and although the design on the walls and ceiling need not be exactly alike—it is better, in fact, that they should *not* be—yet some features of resemblance ought to be found in both. Any of these four designs for ceilings would go with either of the designs for wall-panels already given in Figs. 28 to 33.

Before finishing, a word ought to be said of the matchboarding itself. It usually consists of V-jointed, grooved, and tongued boards, 3 in. wide, as indicated in Fig. 44. Sometimes it is made of boards 6 in. wide, which have a V run up the centre, as shown in Fig. 45. This enables the matchboarding to be more expeditiously laid than when it is of 3 in. boards; but it has a great drawback in one way—viz., when the boards begin to shrink, as most of them do to a certain extent after they are put up, the alternate V's are much opener than the others, and therefore much more observable. This is bad; and the narrower boards are therefore the better kind to use. When they shrink, besides shrinking less than the wider boards, they also allow each V to get its own share of the extra opening.

These are the ordinary kinds of matchboarding, and it is of such that the preceding lines and sketches have been penned. But all that has been said is equally applicable to the other varieties indicated in Figs. 46 to 49. The difference consists, in Fig. 46, of the bead in place of the V at the joint, while the other three varieties have more moulding about them. These different finishings of boards may be had at some of the larger sawmills, and the extra amount of finish they give to the appearance of the work when completed is remarkable. It may be well to add, however, that where the panelled mouldings are planted on the face of the boarding, the ordinary V-jointed boards are most suitable in that case, the mouldings being seen to better advantage; and with these words, I must, in the meantime, bid farewell to the patient reader who has followed me thus far in my considerations.

MEANS, MODES, AND METHODS.

Hot-Water Pipe Chair for Soldering Iron.

As this column is meant for the communication of items of a practical kind, however simple, I pass no apology for pointing out what, to me, has proved a very useful article, in the shape of a rest for a hot soldering iron. It consists of what is known as a "chair" for the support of hot-

Hot-Water Pipe Chair as Support for Copper Soldering Bit.

water pipes, and while it answers this, its legitimate, purpose admirably, it seems also "cut out" for the use to which I have applied it. These chairs are made in different sizes, to suit pipes of various diameters, but one suited for a 3 in. pipe makes the best stand for a copper bit, etc. It is easily obtained, and costs only a few pence.

OPIFEX.

Tinning Mixture.

Amateurs who dabble in solder often find great difficulty in getting that rather capricious substance to "take" to iron, steel, etc.—at least, I have often experienced this difficulty; and as I found that the ordinary method prescribed in books—viz., treatment with sal-ammoniac—did not always answer satisfactorily, I tried the following simple recipe with good results. Make a saturated solution of corrosive sublimate in water—about 1 oz.—and in this solution dissolve some shavings or grains of block tin, when a whitish grey precipitate will result. Clean the surface of the iron, etc., with file or emery-cloth, and apply a little of the precipitate with a piece of rag; rub well, and then remove surplus mixture with a perfectly clean rag, when the metal will be found coated with the amalgam; and upon applying solder in the usual way, it will "take" delightfully.

The mixture should be kept in a wide-mouthed stoppered bottle, and when required for use the clear water should be carefully poured off into a clean vessel, to be returned when the job is done.

I have found this preparation of considerable use to me, and I trust that many readers of WORK will find it equally useful.

OPIFEX.

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 anyone 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.*

113.—Electro-Motors: How Made and How Used.

This is one of the volumes of "Whittaker's Library of Arts, Sciences, Manufactures, and Industries," published by Messrs. Whittaker and Co., Paternoster Square, at 3s. It is written by Mr. S. R. Bottone, the author of many useful works on subjects directly connected with electricity, and is, as he rightly describes it, "a handbook for amateurs and practical men." Its pages, which are freely illustrated, were, as Mr. Bottone explains in his preface, "originally penned, chiefly as letters, in reply to queries addressed to the author on the construction of electro-motors, on their many modifications, and on their mode of working." Mr. Bottone has done well to put his letters into book form, as thereby many will benefit by the information contained in them instead of the few to whom they were originally addressed. Readers unacquainted with the elements of electricity should read Mr. Bottone's "The Dynamo: How Made and How Used," before proceeding to study this.

114.—Metal Turning.

This is another volume of the same series as that to which the volume just described belongs. It is written by "A Foreman Pattern-Maker," one of the most practical and valued of the many contributors to WORK. The book, which is illustrated copiously with diagrams and cuts of lathes and lathe appliances, "is written to explain and illustrate the practice of plain hand turning and slide-rest turning as performed in engineers' workshops." It does not touch in any way on the ornamental section of the craft. The author gives us an insight in his preface into his past life, and shows his fitness for his task by explaining that his "constant employment as apprentice, workman, and foreman in an engineer's factory" for twenty-nine years past has made him "familiar with each of the departments into which engineers' work is divided, of which section metal turning is one of the most important."

115.—Electricity in Every-Day Life.

This is the title of a small pamphlet by Mr. Frank B. Lea, B.A., Assoc. Inst. El.E., and published by Mr. E. W. Allen, 4, Ave Maria Lane, London, E.C., for the inconsiderable sum of 2d. It is intended to show, within reasonable compass, the various uses to which electricity is put in every-day life, as its title implies. We are shown that the electric light in houses is pleasant, healthy, steady, reasonably cheap, perfectly safe, and truly æsthetic, and the means by which the electric current is generated, maintained, and utilised as a source of light is duly explained. We are then told how it is used on torpedo-boats as a means of search on the waters, and how pressed into the service of man as a motor for turbines, launches, cranes, tramcars, etc., for which I must refer my readers to the pamphlet itself, which is well and abundantly illustrated.

116.—Exposure Notes for Use with the Watkin's Exposure Meter.

In page 274 of this Volume a notice was given of the Watkin's Exposure Meter. This is a desirable handbook for use with the meter, dealing as it does in its text with the elements of photographic exposure, and instructions for manipulating the meter, with other desirable information, and many blank pages ruled for registry of exposure notes, etc. Its price is 1s. 6d.

THE EDITOR.

SHOP:

A CORNER FOR THOSE WHO WANT TO TALK IT.

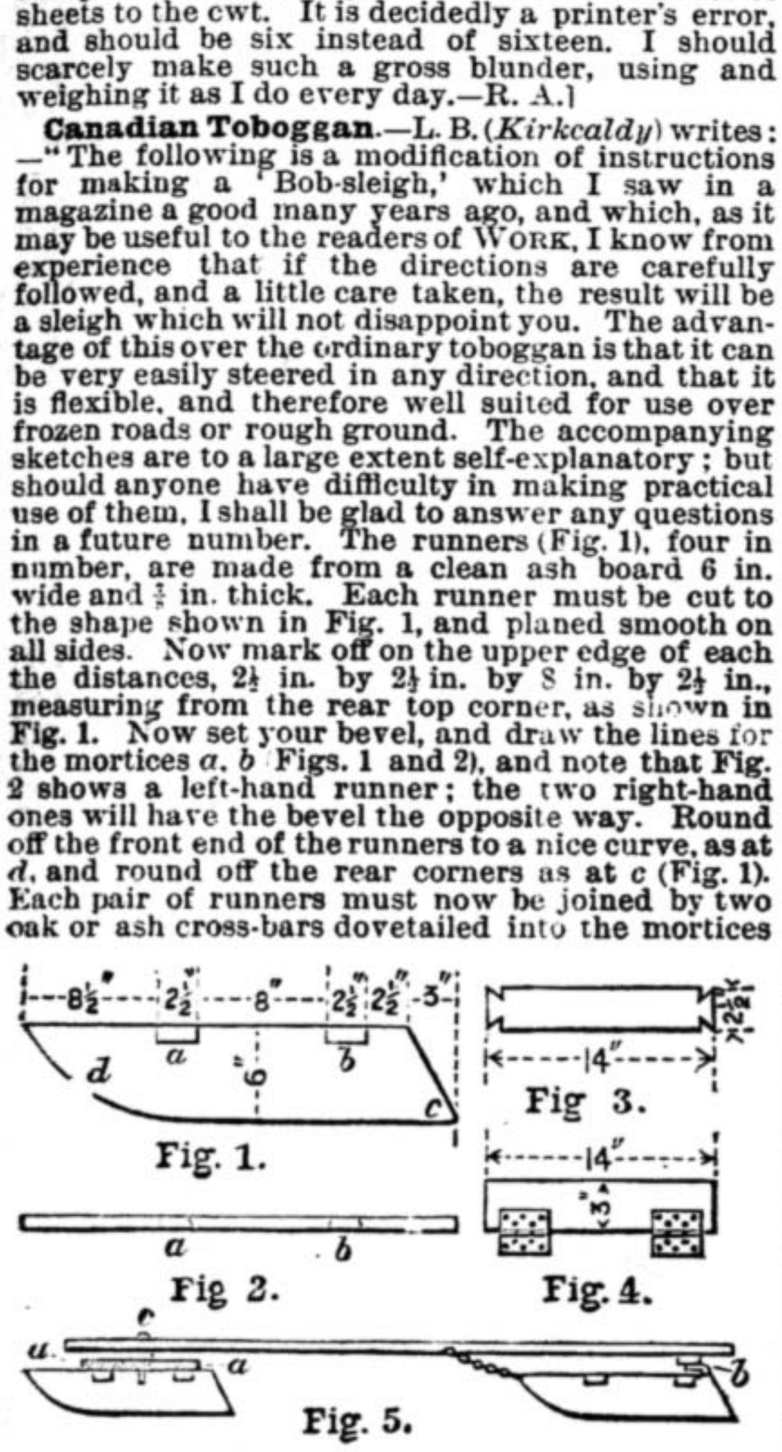
*** *In consequence of the great pressure upon the "Shop" columns of* WORK, *contributors are requested to be brief and concise in all future questions and replies.*

In answering any of the "Questions submitted to Correspondents," or in referring to anything that has appeared in "Shop," writers are requested to refer to the number and page of number of WORK *in which the subject under consideration appeared, and to give the heading of the paragraph to which reference is made, and the initials and place of residence, or the nom-de-plume, of the writer by whom the question has been asked or to whom a reply has been already given. Answers cannot be given to questions which do not bear on subjects that fairly come within the scope of the Magazine.*

I.—LETTERS FROM CORRESPONDENTS.

Erratum.—G. W. (*Brockley*) writes:—"I notice that in answer to A. S. (*Ayrshire*) (see page 505, Vol. II.), R. A. makes a slight mistake in saying there are sixteen sheets to the cwt., as there are only six sheets to 1 cwt. and 9 lbs."—[I find, on referring, you are quite correct as regards the error in number of sheets to the cwt. It is decidedly a printer's error, and should be six instead of sixteen. I should scarcely make such a gross blunder, using and weighing it as I do every day.—R. A.]

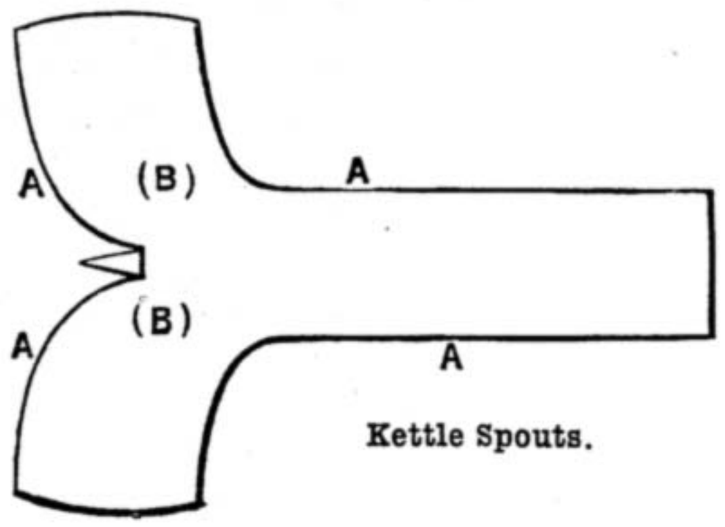
Canadian Toboggan.—L. B. (*Kirkcaldy*) writes:—"The following is a modification of instructions for making a 'Bob-sleigh,' which I saw in a magazine a good many years ago, and which, as it may be useful to the readers of WORK, I know from experience that if the directions are carefully followed, and a little care taken, the result will be a sleigh which will not disappoint you. The advantage of this over the ordinary toboggan is that it can be very easily steered in any direction, and that it is flexible, and therefore well suited for use over frozen roads or rough ground. The accompanying sketches are to a large extent self-explanatory; but should anyone have difficulty in making practical use of them, I shall be glad to answer any questions in a future number. The runners (Fig. 1), four in number, are made from a clean ash board 6 in. wide and ⅞ in. thick. Each runner must be cut to the shape shown in Fig. 1, and planed smooth on all sides. Now mark off on the upper edge of each the distances, 2½ in. by 2½ in. by 8 in. by 2½ in., measuring from the rear top corner, as shown in Fig. 1. Now set your bevel, and draw the lines for the mortices *a*, *b* (Figs. 1 and 2), and note that Fig. 2 shows a left-hand runner; the two right-hand ones will have the bevel the opposite way. Round off the front end of the runners to a nice curve, as at *d*, and round off the rear corners as at *c* (Fig. 1). Each pair of runners must now be joined by two oak or ash cross-bars dovetailed into the mortices



Canadian Toboggan.

just described. These cross-bars (Fig. 3) will be 14 in. long, 2½ in. wide, and 1 in. thick. The iron shoes, each 34 in. long, for the runners may be made from ¾ in. half-round iron bent to shape, and screwed on with 2 in. screws. Now take a piece of pinewood 15 in. long, 12 in. wide, and 1 in. thick, and draw diagonals from corner to corner. At the point where the lines intersect bore a ½ in. hole, and then on one side of this board draw semicircles with a 6 in. radius, touching each end of the board at the centre. Cut off the corners by these lines, so that the board will now be of a shape something like an ellipse. Place this lengthwise upon the cross-bars of the bob which you have decided shall be the leading one, and screw it firmly down upon them. The edge of this board is shown at *a a* in Fig. 5, and I have shaded it so that you may easily distinguish it. The bobs are now complete, and you must proceed with the platform, or reach-board. This is a good pine board 7 ft. long, 14 in. wide, and 1½ in. thick, all squared and planed smooth. Now cut two pieces of ash wood each 14 in. long, 3 in. wide, and ¾ in. thick for cross-pieces. Fix one of these across the under side of the reach-board, 8 in. clear from one end. In the centre of this cross-piece bore a ¾ in. hole right through it and the reach-board. Now take the other cross-piece and attach to it two strong door hinges, as shown in Fig. 4. Place this on the rear cross-bar of the rear bob, and secure the free flaps of the hinges to it, as at *b* in Fig. 5. Now place the reach-board on the bobs so that its rear end projects 5 in. beyond the outer edge of the hinged cross-piece, and fasten the reach-board to that cross-piece with screws. The king-bolt (*c*, Fig. 5), which is a ½ in. iron bolt, 5 in. long, is now passed through the hole in the reach-board and through the hole in the front bob, a washer or two put on, and the nut screwed up. Light side chains are fixed with eye-bolts as shown in Fig. 5, and a suitable cord for steering is attached to the front bob. Your sleigh is now complete; and my experience is that this form of coaster is superior to any other I know of. I trust yours will be the same."

Kettle Spouts.—TOM writes:—"In WORK, No. 88, page 583, there is a matter that I wish to draw your attention to, and that is 'Kettle Spouts.' One writer—I forget his name, not having the paper by me—rightly points out the faulty way in which he has been told to make them. And then you, in my opinion, make matters worse by telling him your idea of making them, which is quite wrong. The proper way of making spouts such as we see in copper and brass kettles is thus:—



Kettle Spouts.

I mean that they have to be cut out to this shape. Of course, the sizes are made as circumstances require. They are bossed out at B, until the edges A, A, A, A, come together, and are then brazed, and after being frilled in the lead, bent and planished with a bright-faced hammer."

II.—QUESTIONS ANSWERED BY EDITOR AND STAFF.

Line Wires for Bells.—A. W. (*Wakefield*).—Your plan is quite right in theory, but a practical bell-fitter would seek to economise wire and labour by taking the lines along a more direct route to the bell and indicator. If the corridor has a wood flooring, you should try to get the wires along under the floor instead of round the doorways. This you can do easily if the joists run lengthwise with the party wall. If they run transversely, you must take up a flooring board and make saw cuts in the upper part of the joists to lay the wires in, and secure them in the cuts with staples. It would be even better to run the wires along the cornice than to waste them round the doorway. Perhaps you can pierce the ceiling with a long gimlet and take the wires up through it into a room above, then down through the ceiling at the other end of the corridor where the bell and indicator are situated.—G. E. B.

Defective Coil.—R. J. W. (*Fulham*).—The probable cause of failure to get a shock from your coil is either defective insulation or a broken wire. If the insulation of the secondary wire has broken down, or if one of the wires are broken, you will not get a shock from the coil. Examine first the connections of the wire ends with the studs. If you find the wire frayed or broken at these points, it is possible you may only have to repair the faults discovered there. If the insulation has broken down, you will have to unwind the coil, repair the insulation, and wind it afresh. It is possible that the condenser or its connections are out of order; sometimes the insulation of the foil is pierced with sparks. If, on examination, this is found to be the case, the condenser will have to be taken to pieces and rebuilt with new insulating sheets. One can only conjecture the fault without seeing and examining the coil.—G. E. B.

Telephone.—TEE JAY.—These instruments, speaking generally, are divided into two classes—*i.e.*, electrical and mechanical. By electrical, I mean all those which depend upon a current of electricity, generated by some means or other, to enable them to do the required work. The best known of this class is the Bell, because it is the property of the National Telephone Company, whose system is in use in most of our large towns. Mechanical telephones are quite distinct from "Bell's" and all other electrical instruments. There is no battery nor microphone used with mechanical telephones. But if you want to use a microphone with Bell's instruments, the battery you name is what is generally used. There is no limit to the distance which the sound will run. The distance depends upon the resistance of the conducting wire and the strength of the current. But it is not the sound that travels. What actually does take place is as follows:—You make a noise in the neighbourhood of a telephone, which may be speech. This noise causes a little iron plate to bend to and fro in front of a magnet around the pole of which there is a little coil. The vibrations of the iron plate cause undulations in this little coil which are transmitted to the line wire, and after having traversed it, they set up vibrations in the reverse order at the other end which will reproduce the noise faithfully, and if an ear is held to the instrument an imitation of the distant speaker will be heard.—W. D.

Relief Stamping.—A STATIONER'S ASSISTANT.—It would require an article to answer you fully. You want to know how to do gold and silver relief stamping. In the first place, you want a stamping press, which you may get from Messrs. John Greig & Sons, Fountainville Works, Edinboro', or from any bookbinder's engineer. Wherever you get it, it must be a good one. You want also steel dies, but these the customer generally supplies, although you must be able to take an order for a die and suggest designs, as customers generally look for this from stationers. You require sole leather and gutta-percha for making matrices, and you want colours and varnish for mixing. And you want most of all experience, especially to stamp in gold or silver. Supposing now that you have provided yourself with all the necessaries, and you have a job to do. For the sake of illustration, we will imagine that it is a monogram to be stamped upon note-paper and envelopes. Your die is a round one, the monogram is cut into it on the face which is polished. In the bed of your press you will find a movable piece of metal with a hole in it; withdraw this and turn it up, and on the under side you will likely find three or four pins which fit into holes in the bed of the press. To this you must fasten your die rigidly; in some presses screws are provided for this purpose; if these are wanting, a piece of gutta-percha melted will fix it, or even glue may be used (I have tried all of these, and used the most ready). The die must, of course, be fixed straight, or you will have no end of trouble with your paper. Having fixed the die, return the whole thing to the bed of the press. Now cut a small piece of shoe-leather larger than the die and damp it thoroughly; place it upon the top of the die, and bring down the movable part of the press upon it gently and firmly. At the bottom of this movable part will be found a little plate called the head, having a roughened surface with one or two little spikes projecting. These spikes press into the leather, and cause it to stick to the head. The screw of the press is now worked up and down, causing the head with the piece of leather to strike the die again and again; by this means a clear impression in relief is taken upon the leather. A small piece of gutta-percha is softened and spread upon a scrap of paper or linen rag, and while soft and sticky it is placed upon the die with the sticky side up; the head is again brought down, and the gutta-percha adheres to the leather; the pressure is kept upon it until the gutta-percha is perfectly set, when a few more ups and downs of the screw will complete the making of the matrix. It is now taken off the head and pared neatly all round the impression with a sharp knife to prevent undue marking of the paper. When pared it is replaced. The next thing is to get the colour ready. The colours are dry vegetable colours, to be procured at any respectable colourman's, and the varnish to mix is white crystal varnish, to be had at the same place. A pick of colour is put upon a slab and mixed with the varnish, using a stone or muller to grind it down smoothly. The die is taken from its bed in the press and the colour worked into the monogram with a hard brush by daubing. The die is then wiped upon a piece of paper to clean the face and replaced in the press. A sheet of paper is now laid down upon the die (there are gauges to be set so that the design will appear in the proper place) and the head brought down sharply upon it. The result will be a coloured impression of the die in relief—any colour can be used, and for gold or silver, bronze of the required shade is dusted over the colour while wet, and after having dried, it is again placed in the press and the head brought down to burnish it.—G. C.

Venetian Blinds.—L. T. (*Middlesboro'*).—If L. T. will size his Venetian blinds with two coats of patent size, the first coat diluted with nearly half water, the second coat rather less water, he will do right. The varnish used in the trade is best "church oak." This is a hard-drying varnish, generally rather too dark for light colours, but will do to varnish pine either in its natural state or stained. To impart rather more colour than the varnish gives, I have used some oak or walnut stain mixed with the first coat of size. If wanted dark, of course the stain must be applied alone, before sizing. Should oak or walnut stain be too brown for the effect desired, I have found a little gamboge dissolved in water added to the size beneficial; and mixed with some stain, various tones of yellow or brown can be produced. Any yellow dye wood would serve just as well, but should either be applied before sizing or mixed with the first coat of size. As to hiding any knots, I fear it is almost hopeless; at any rate, I should not attempt it. If the querist wishes to try, he must make some opaque colour—probably yellow ochre and whiting—and touch up artistically the knots objected to, but the success of the operation is doubtful. In staining, remember that the varnish, as well as light and lapse of time, will darken the laths.—B. A. B.

Brickwork.—C. J. S. (*Trimsaran*).—There are several compositions now manufactured for preventing damp from striking through walls. The following are the names of the manufacturers of some of these:—A. T. Morse & Co., Ward Road, High Street, Stratford; Colourless Solution Silicate Paint Co., 46, Cannon Street; Bulmer's Impenetrable Paint, London; Hay's Waterproof Marine Glue, Chandos Street, Landport, Portsmouth; A.

Sanderson & Co., Humber Bank, Ropery Street, Hull; Ransome Patent Stone Co., 2, Queen Street Place, London. The solutions are applied generally with a brush in the same manner as paint, but instructions for laying on are generally sent. The walls should be thoroughly dry before laying the solution on; the summer is the best season. There is a good deal of difference in the qualities of the bricks, some being cured with one application, while others require renewing at intervals of one or two years. If the walls have no damp course at the ground level, a trench should be formed at the outside, the wall cleared to the foundation, the bricks pointed with cement, and the solution laid on when dry. The trench should be lined with brick, and a concrete bottom with an inclination to a trap connected to a drain. The trench should be covered with stone flags, with two or three openings to admit the air. Two or three openings should also be cut through the wall at the foundation to admit a current of air. These should have a grating fixed in front. If the inside of the wall is filled solid, an air course or trench should be made along it under the floor.—M.

Fairy Bells.—MIST.—If you will refer to the reply to KILDONAN (see page 814, Vol. I.), you will find all the information you seek.

Lock Picking.—S. D. C. (*Trowbridge*).—I am afraid you will not be able to obtain the instrument referred to in WORK, Vol. I., No. 26, as I do not think they are made by any wholesale firm. However, as you are a practical locksmith, you would have no difficulty in making it if you follow the description given. If there is anything you do not understand in it, I shall be pleased to help you, if you will write again.—T. W.

Holes in Steel Plates.—A. H. (*Birmingham*).—It would be exceedingly difficult to make such small holes in plates of such a thickness. You might try to drill and slot them, but unless the metal is very soft, neither drill nor slotting tool will stand. You might build the plates up of strips half an inch wide, notched out to templates, and screwed or brazed together.—F. C.

Horizontal Coupled Engine.—J. D. (*Glasgow*).—The indicator diagram shows a very bad condition of valve arrangements. The exhaust opens too soon, the steam ports are not large enough, and the steam is consequently so badly wire-drawn that the figure does not show where the cut-off actually occurs. You give the back steam pressure 40 lbs., and the front 43 lbs., but on the diagram those pressures scale only 28 lbs. and 30 lbs. respectively, and the mean pressure is 15 lbs. per square inch. Referring to my former reply (page 537, Vol. II.), this would give a horse-power of

$$1{\cdot}353 \times 15 \text{ lbs.} = 20{\cdot}29 \text{ (nearly } 20\tfrac{1}{4}\text{) h.-p.}$$

The wire drawing may be due to the steam pipes being too small. A very curious mistake in the valve is that both ends of the cylinder are open to the exhaust at once, the distance between the steam ports being given as $4\frac{7}{8}$ in., and the inside length of valve $5\frac{1}{16}$ in. This accounts for the angle at the heel of the diagram being so long. You should certainly have a new valve or put "inside lap" on the present one—that is, if the engine is worth the trouble.—F. C.

Carved Bowls.—J. B. (*Glasgow*).—As the stains in your plane-tree bowls are natural to the wood, they cannot be eradicated. The only thing that might do good is a solution of oxalic acid, but the effect of this would only be partial. The application of chemicals to woodwork for bleaching purposes is never very successful, especially in white woods. Why not carve your bowls, and afterwards stain them all dark? the defect would thus be hidden.—M. E. R.

Magic Lantern.—H. E. (*West Bromwich*).—TRIUNIAL OPTICAL LANTERN.—Part II. appeared in No. 87, Part III. in No. 91, and Part IV. appears in this number. The remaining paper will appear in the course of the current volume.

Violin.—W. C. P. (*Warwick*).—Papers on this subject are ready, and only await opportunity for publication.

Combining Chucks.—A YOUNG BEGINNER.—You want to know whether it would pay you to make a chuck to combine in one, the dog chuck, the die chuck, driving, flange, and taper screw; and whether it would pay to patent it. No, it would not. First, it would be difficult to combine these chucks; and second, only A YOUNG BEGINNER would wish to have them so combined. Fancy if you had a piece of work in the dog chuck and then want a screw for it; you would have to take it out and fix up the dies, perhaps, to turn the screw, and then rechuck your work again in the dog chuck. Combination tools have a strange attraction for beginners, but workmen will have nothing to do with them. It is not reasonable to suppose that A YOUNG BEGINNER can produce anything worth patenting; no one should expect to do such a thing without first making himself master of all that has been invented by others in that line. A successful invention is not the result of a chance hit by an unpractised shot; it means long practice and patient study. Trust to work, not luck.—F. A. M.

Varnish.—DANSEMBARAS.—French polish is far superior to varnish for a finish. The latter is not suitable for any but the commonest and roughest furniture. The flutes and mouldings to which you allude ought not to prevent you polishing your hall stand. Perhaps you may be mistaken also about the supposed possibility of polishing the carving, but as I have no idea what this is, I cannot speak with certainty about it. If the carving cannot be polished, and you want it bright, there is no alternative but to varnish it. For this purpose, you should use spirit varnish and apply it with a soft brush. It is, however, by no means an uncommon thing not to polish or varnish the carving, but to leave it untouched or "in the white." Sometimes it is merely oiled or wax-polished. The contrast between the carved parts dull, and the brightly polished surrounding, is often very pleasing. If you prefer to do so, you might wax-polish your hall stand, but the objection to this method is that wet umbrellas, overcoats, etc., might injure the appearance, as wax polish is damaged by excessive moisture.—D. D.

Machine Saw and Drill.—J. M. (*Midhurst*).—The top bar of machine (on front page of WORK, No. 87) does not cause the saw to recede from the wood when it drops—at least, not perceptibly. The matter is of no moment in actual work, and it does not matter whether you have the saw end higher than shown or not; it is a matter of convenience. Place it sufficiently high, or it will give you a knock on the head occasionally. You are all wrong about the treadle, and in proposing to omit the beam D and weight. This beam and the connecting rods are important parts; without them there is nothing to resist the strain or pressure of the wood against the saw, and it will not act. Again, to pivot the treadle in the centre and put a weight at the further end would be worse than useless. You can put a weight at the saw end if you like, but not at the other. Mattress springs might do if there is sufficient elasticity in them. Remember the saw has a 9 in. stroke.—F. H. R.

Re-enamelled Pails.—W. T. (*Alford*).—You will most likely get what you require in the way of enamelled pails from A. H. Kreuser, Wolverhampton, maker of all kinds of stamped iron enamelled hollow ware.—R. A.

Graining Trade.—ESPERANZA.—The study of graining and marbling at any school by a man totally unused to and ignorant of the trade of house painting and decorating would be utterly futile, so far as ultimately getting a living is concerned. There are thousands of good workmen who can grain and stencil well, besides being thoroughly practical house painters, and yet are out of work many weeks in a year. Graining and marbling were once "almost a fine art," but nowadays a grainer to the trade must be a clever and experienced worker, and possess a good trade connection in order to get a decent income throughout the year. The ideal house painter and decorator is one who can prepare and plain paint, grain, write signs, gild, stencil, and hang wall-papers; and this is really what things are coming to if the worker would get a good living at his trade. Hence you see the graining notion for your son does not savour of success. Two callings that we have some reliable experience of may be suggested to you. The first is that of sign-writing. Your son's faculties of copying may develop success in this line, and it can readily be studied at home, and without much expense. If this is suitable, purchase Vol. I. of WORK, and let him follow its directions for one or two hours each week-day for a year, and then purchase "The Art and Craft of Sign-Writing," 21s., 15, St. Ann Street, Manchester, a year's study of which will "finish him off" if he has anything in him. In the meantime, let him remember a spot of paint or whitewash on his clothes is no spot upon his honour or integrity, and that he must work or "go under." He will then, probably after a few months' practice, earn many shillings and get his practice at the same time. The other suggestion is photography, which is supposed to be a more "gentlemanly" occupation. This would ultimately suggest a little capital, but for some time he could study first simple manuals, and then purchase a plain but reliable amateur's outfit, costing from £5 to £10. He could then go in for practice, and meanwhile go to the lectures at the Polytechnic, take in a photographic paper—say *Photography*, 1d. weekly—and then, if he has any suitability for it, he would soon—say in two or three years—be able to get into the profession as an assistant. All his future will depend upon himself.—LONDON DECORATOR.

Clock.—VENATOR says that he has a thirty-hour American striking clock with weights which he wishes to convert into an eight-day clock. My advice is not to proceed with the change at all. It would be the height of folly to do so, even were it possible. It would first be necessary to insert an extra wheel—that is to say, an intermediate wheel—between the barrel and the next wheel of the train. This intermediate wheel would have to be calculated to fit the train of existing wheels; and probably other new wheels would be required. Then, with the addition of another wheel, the clock would have to be wound up in a reverse direction. I do not think it possible, under ordinary circumstances, to accomplish this conversion. But if it be actually possible, the trouble and expense would exceed the value of a new clock. No practical man would think for a moment of undertaking such a job.—HERR SPRING.

Dulcimer Making.—F. V. (*No Address*).—The best wood to use for wrest and hitch-pin blocks is good sound beech or straight-grained oak, which you can obtain ready cut from Messrs. Chilvers and Co., St. Stephen's, Norwich. The method of boring the blocks is described in the articles on "The Dulcimer" in Nos. 31, 38, and 41, Vol. I. of WORK.—R. F.

Mechanical Ship.—W. S. (*No Address*).—To obtain a result, fix an arm to the arbor which would carry the seconds hand. This arbor revolves once in a minute. If you fit a sliding piece so that it can rest within reach of the above arm, it will stop it and hold the mechanism at rest. If the sliding piece is withdrawn and immediately replaced, it will release the arm, but only for one revolution, when the arm will again be arrested. The sliding piece should be kept under the arm by a light spring except when momentarily withdrawn by one end of a bell-crank, on the other end of which the penny passed through the slot falls on its way to a receptacle. The connection between the coin lever and starting and stopping slide may be made by a light wire. The attachment to the clock will depend upon the arrangement of the frame. Inquire at some large picture shop for the picture you require.—F. C.

Leather Work.—UNCLE leaves doubt as to the kind of stamped leather required. If he needs ornaments for ordinary leather work, the keeper of any "fancy" shop will get them for him. For the producers of other kinds of stamped leather he should consult a London or Paris Directory.—S. W.

Graining.—E. D. (*Liverpool*).—The whole matter of graining and inlaying have been treated in the series of articles in WORK.—DECORATOR.

Picture Frame Compo.—ORNAMENTAL.—The subjoined, which appeared in Vol. I., will answer your purpose, and will make a large quantity, as desired. Take of best glue 7 lbs.; melt it in three pints of water. Dissolve also 3 lbs. of resin in three pints of raw linseed-oil. Now mix the two whilst hot, and boil in an old iron saucepan for about thirty minutes. Then procure best gilder's whiting, break it up to powder, and stir this into the hot mixture until it gets like dough. You can now "put in a few hours," well kneading it together while it is warm, and then it is ready for pressing into the moulds. These should be of carved boxwood. When the compo. which is not used gets cold and hard, it can be softened up again by heat and kneading.—F. P.

Distempering.—J. W. (*Lewisham*).—The difficulty you met with when using green-tinted distemper was due to the action of lime upon the green pigment which you used for staining the whiting. The green called "Brunswick" is a mineral preparation, and, therefore, of a nature easily affected by lime. I do not think the lime can be in the old plaster, but it may be owing to the walls having been coated with "calcarium," or some such preparation of lime. Purchase Vol. I. of WORK, and thoroughly master all the elementary papers on "House Painting," after which you will not again try "chrome and Prussian blue." The papers alone will probably be worth to you not the 5s., but £5. Buy and judge for yourself; they were specially written for such as you. In making green distempers in future, use only lime greens, or colours specially made for distemper by such firms as Mander Brothers, Wilkinson, Heywood & Clark, or Leach, Neal & Co., Derby.—DECORATOR.

Round Edge on Wood.—AMATEUR (*Glasgow*).—For rounding edges of wood you do not need any special kind of plane, though you may use moulding planes, as you must if you want other mouldings on the edges. No, you cannot get different mouldings with the same plane. For prices, inquire at any tool-shop in Glasgow or elsewhere.—D. D.

Phonograph.—DUMPER.—I can make nothing of your letter. State your wants a little more definitely, and I will try to help you.—W. D.

Phonograph Queries.—A. A. (*Duffield*).—(1) The keys mentioned on page 202 are not used for fastening the threads, but for keeping the cards in position while the book is being sewn. (2) There is no ready method of finding the centre of a section, and practice will overcome the difficulty experienced. (3) This question I cannot fully understand. I cannot make out your diagram, but you are right when you say the thread is not sewn through the band. (4) In cutting books in the flat, it is usual to pad them up with strips of waste paper. Do it in this manner: knock your book up straight and place it in the machine with the back towards your left hand; take a number of strips of paper longer than the breadth of your book and broader than the platen of your machine, lay them across the edge of your book that is about to be cut, taking care to keep them back from the back of the book, and bring down the platen and press it tightly, and cut in the usual manner. The object is to pad the rest of the book to the same thickness of the back. If you do this, you will find your book quite straight when cut. (5) Yes, if you are using head-band, but the leather is turned in upon itself, not upon the lining of the back. (6) No; reason given above. (7) They have double-ply lining, for the back of the book is lined, so is the back of the case. (8) In the rotary millboard machine the boards are cut by a series of knives which work against each other in pairs, one above the board and the other below. The edges of the knives are on the same principle as a pair of scissors: the board is taken through with rollers, and the knives revolving cut the board into any size. The knives can be set as desired. It is an extremely useful machine in a large shop. (9) Yes. (10) Plain enough in the article; please read it again. I cannot repeat the operation here. (11) Apply to Messrs. John Greig and Sons, Edinboro', or Kampe & Co., London. I do not wonder at Messrs. Royle charging you for their list.—G. C.

Battlesden Cart.—W. S. (*Preston*).—I cannot give you the addresses. I do not know any firms in Manchester or Liverpool who supply such fittings for carts. The principal portions of the ironwork may be procured ready made, but my experience is that it is very difficult for an amateur to get the minor parts, and unless one is able to make them himself, as I do, the expense does away to a great extent with the advantages of home-building. There are surely some ironmongers in your own town who could supply you, or if not, would be able to give you the information you require. The springs and iron for a cart like this cost me £4 10s., and the wheels £3, while the other materials should be obtained for about £3 or £4.—OPIFEX.

Slide Valve.—F. C. (*Cardiff*).—I append a rough sketch of model. Make a box or frame of convenient size in which fit a block of wood (see sketch marked A); make it to slide backward and forward. Next screw your frame to a piece of wood, say, 1 in. thick, and as broad as the box or frame is, and about four times the length. On top of frame paint the section of a steam cylinder. Also on the moving block paint a piston and rod as in sketch. Now construct a crank shaft of light tube, and place it on two bearings running at right angles to the centre line of cylinder, and distant from the centre of cylinder exactly the length of the connecting rod and the length of the piston rod.

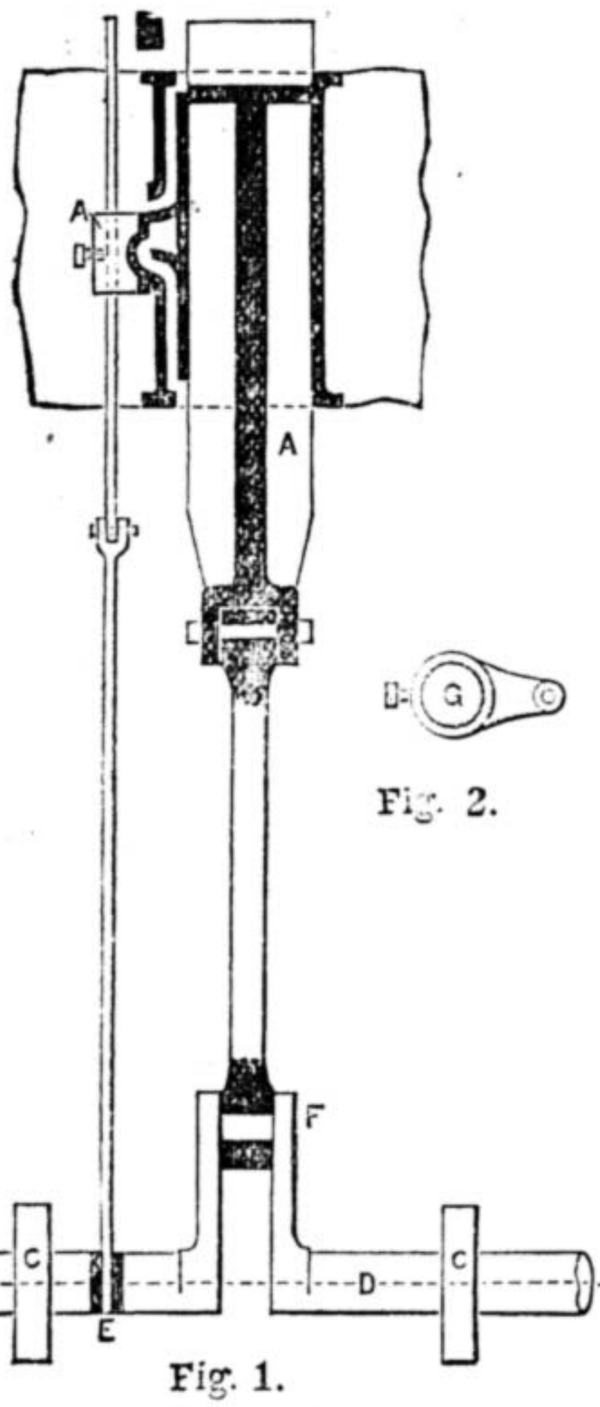


Fig. 2.

Fig. 1.

Slide Valve.

Now get a second block to slide parallel with the piston and along the steam port fence; on it paint our slide valve. Have to this a couple of rods attached as in sketch. The eccentric need not be in the usual form, but in the form of a crank (Fig. 2), so as we can give or take off less stroke of valve as we give or take off lap of valve. Having completed our model we can see the effect of lead, cusion, etc. A few months in an erecting shop of any good engine works will be worth a great deal more than experimenting with any such model. I have given it, however, so as any who have not that chance can master the mysteries of the slide valve if they will only persevere.—T. R. B.

Book on Colour.—W. F. (*Lyndhurst*).—You should get "Colour," by Professor Church, published by Cassell & Company, price 3s. 6d., or by post 3s. 9d.

Books.—W. S. (*Bow*).—The titles and prices of the books you inquire for are "The Practical Rabbit Keeper," by Cuniculus, Cassell & Co., 3s. 6d.; and "The Practical Pigeon Keeper," by Lewis Wright, Cassell & Co., 3s. 6d. Any bookseller will obtain them for you. If not, write to the publishers, Cassell & Co., London.

"Seal" Engine and Electricity.—BOSWORTH.—The address of the maker of the "Seal" Gas Engine, as noticed in WORK (see No. 87), is 67, Carthew Road, Hammersmith. A good book (not too expensive) to get a fair insight and grounding in electricity is "Practical Electricity," by Professor Ayrton, 7s. 6d., Cassell & Co.

Hand Cart.—W. N. (*Wood Green*).—As there is such a variety of shapes and sizes of hand carts, I send you a sketch of a plain one (Fig. 3), which I think will suit your purpose. The hind-board (Fig. 4) is not a fixture, but slides in and out of a groove made of wood or angle iron, bolted to the inside of the cart. The framework (Fig. 1) of the body is of ash, 1¾ in. thick by 3 in. wide. The chests, or shafts, 6 ft. 8 in. long; the chockrells or cross-pieces, 3 ft. 5 in. long. If common arms are used, a bed 4 in. square is fixed either under springs of 5 laps 2 in. wide, each ¼ in. thick, or the bed can be fixed on blocks, as Fig. 2. These blocks are 3 in. thick, 12 in. long at the top and 8 in. at the bottom. The wheels are 3 ft. 8 in. high. The nave turned cart or coach fashion 7 in. × 8 in; twelve spokes 2 in. wide, 1¼ in. thick; felloes, 2½ in. × 2 in.; tyre, ⅝ in. thick. Either two or four ash standards,

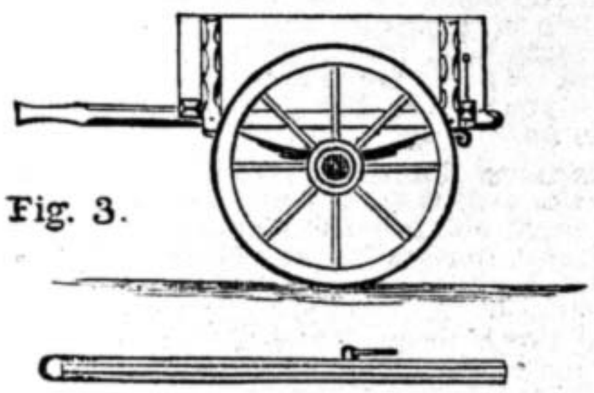


Fig. 3.

Fig. 5.

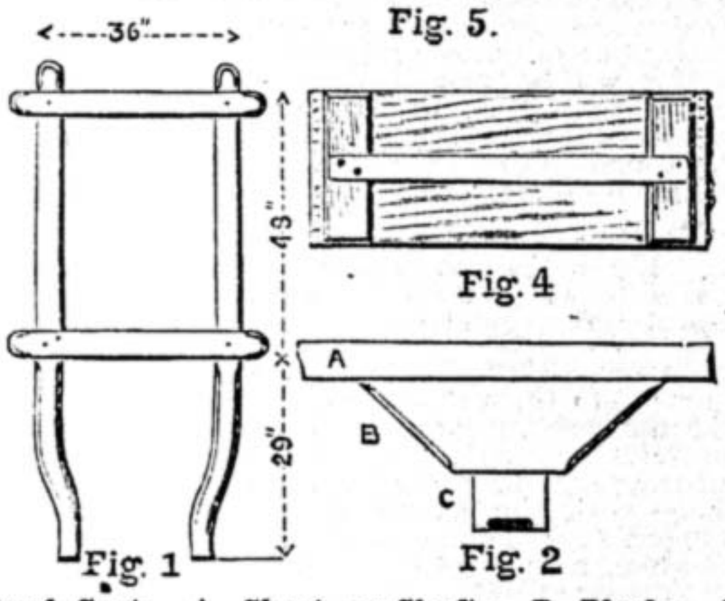


Fig. 4

Fig. 1

Fig. 2

Hand Cart—A, Chest or Shaft; B, Block; C, Bed.

1¼ in. long, 1¾ in. × 1¼ in., should be placed each side of the cart, the bottom part of the standard being bolted to the chest. The sides are of deal, 12 in. deep, 1 in. thick. The hind-board has two pieces fastened across the board. On these pieces is fastened an ash rail. A couple of legs, made of ash (Fig. 5), are made of 1¼ in. square stuff, planed octagonal. When finished, they are fastened in the centre of the cross-pieces underneath the body, and when not in actual use are suspended from an hasp in the bed or else slung over the axle. The link and staple shown on the leg is to be hung on the hasp. In fixing the wheels, have the axle in the centre of the body. The hand cart is now ready for painting. If the above sketch does not quite suit your requirements, just send me a rough sketch of what you want, and I will soon set you right. You can buy your timber of any English timber merchant, and the ironwork of any coach ironmonger.

Varnish.—R. B. (*Bradford*).—Re "varnishing over greasy paint," don't! If it is greasiness that prevents the varnish from drying, then you must clean it all off with turpentine, a brush and rag free from "fluff." A nice job that is. Varnish may sometimes be long in drying owing to damp air "catching it," and very occasionally the varnish itself is at fault. Old woodwork that has been previously varnished should not only be well cleaned with "dry-soap" solution, but should also, when dry, be given a weak coat of glue or patent size. This effectually kills any trace of grease.—F. P.

Polishing Bamboo Canes.—H. W. (*Peckham*).—Bamboos can hardly be said to require polishing, though they may be improved in appearance by brightening up with a little French polish or a thin varnish. Go over them lightly with ordinary French polish on a rubber of the ordinary kind. Bodying in, oiling, and spiriting are not necessary, though it is often of advantage to wash the canes to remove dirt. I am not acquainted with "paper mosaic work"—at least, under that name—so cannot tell you "what kind of beeswax is used to heighten the colours." Get two or three samples of wax, say ordinary yellow and pure white, and try for yourself. If, as I am inclined to surmise from your next question about a stamp-covered table, paper mosaic work is merely bits of paper—stamps or other—stuck on to a piece of wood, I do not think you will find any kind of wax suitable. Why not use a varnish at once, as you suggest for the stamps? There is no special kind of size used for "stamp-covered tables," as they are so seldom seen, that nothing specially adapted to them has, so far as I am aware, been prepared. Any good hard varnish ought to be suitable, the one you name as well as any other.—D. D.

Boot Making.—SNOBBY.—Had you mentioned the part of lasting in which you felt most deficient, I could have set you right better than I can perhaps by having to embrace the whole principles of lasting in the columns of "Shop," as I may deal least with the points you need most. I conclude that it is for machine-sewn work for which you ask the questions. This class differs much from hand-sewn, but its principles, which have to be understood to produce a well-lasted boot, are the same. In the sketch below I have used lasting tacks to give a better illustration, but in practice these would only be used for hand work, and drown as you come to them in sewing in the welt, whereas for machine work, tingles would have to be used, and driven in to clench on the iron bottom of the last, and they must be put in as near to the centre of the insole as the upper will admit, so as not to come in contact with the point of the machine needle. Fig. 1 shows the upper on the last, hoisted at the back about an inch, the toe having been pulled over the toe of the last, and the first tack (A) put in the centre (first being very careful to get the back seam and the centre of the vamp quite straight); then each side of A should be pulled with the pincers, working reasonable and equal stuff towards the centre of the toe (as all the pipes or wrinkles have to be got out at this point), and two tacks (B and B) put in; and if the boot is nice and straight, catch hold of the side of the toe at C, and pull as much as possible in the direction from H, and put in a tack (C), and the same on the other side at C. These two tacks are called the "draft tacks," as they hold the draft in the boot (if lasted tight) until the last tack has been driven in. It is also to get this draft that the upper is raised at the back, for when all the fore part, as far as EE, Fig. 2, and the heel of the last, has to be knocked down, it necessarily forms a line of tightness from H to C, Fig. 1. This line is called the draft of the boot. When the heel has been knocked down, the waist and heel can be lasted, only it need not be pulled so hard, more especially the waist. The greatest principles of lasting are: the draft lasting tight, lasting out all the wrinkles out of toe, and pulling equal at all parts, and at one side equal to the other. It is the evenness of the

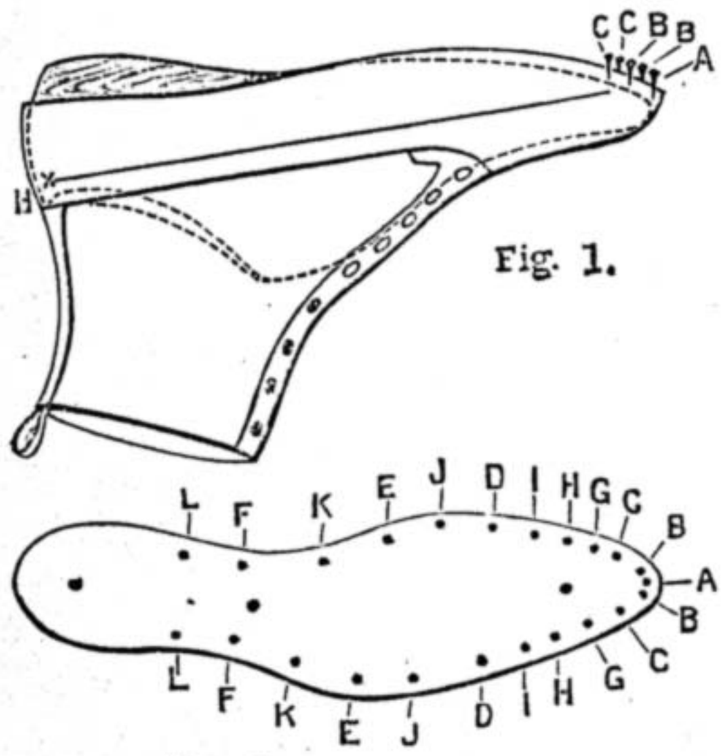


Fig. 1.

Fig. 2.

Lasting in Boot Making.

lasting that makes the boot set clear when the last is out. Fig. 2 gives the bottom of the last, and the dots thereon indicate about the position of the tacks, which are numbered alphabetically, to show that the one marked should be put in first—the two B's, then the two C's, and so on till finished. Of course, more tacks are needed than I have shown at the toe, but only to last out the wrinkles, so these are put in according to the number the stuff forms itself into.—W. G.

Staining Oak.—SIDEBOARD.—To properly stain oak in imitation of old oak, you may either darken it with a liquid stain or by fumigating it with ammonia. One of the best stains is made by mixing vandyke brown with liquid ammonia to the consistency of a thick syrup or thin paste, and then diluting as may be required with water. This is then rubbed into the oak, which when dry may be either French polished or varnished. The fumigation is managed by simply leaving the article you want darkened in an air-tight (or as nearly so as it can be made) box or room with some strong liquid ammonia placed in a shallow dish till such time as the wood is dark enough. If enough ammonia is used, a day or two ought to be sufficient time. The same effect may be obtained by putting the oak in a stable where the ammoniacal vapours will darken it, but not so quickly as the former plan. Fumigated oak is generally finished by wax polishing, but there is no reason beyond custom why it may not be French polished or varnished. In order that you may see which method of staining and finishing suits your taste best, try the effect on waste pieces of oak. You will then be able to tell exactly the depth of colour, etc., which you think will look best on your work.—D. D.

III.—QUESTIONS SUBMITTED TO CORRESPONDENTS.

Blackboards.—A. J. L. (*Paddington*) writes:—"Will any kind reader of WORK inform me as to the best material to use to blacken blackboards?"

Model Sailor.—SLIEV DONARD writes:—"I wish to make a model sailor with swords to be moved with the wind. Will someone please give me information as to how to proceed—proportion of parts, etc.? Sailor to be about 18 in. from head to foot."

Lathes.—A. T. B. writes:—"I can recommend the Britannia Company's lathes as being, in my opinion, the best value of any."

Card Surface.—D. P. (*Sheffield*) writes:—"Can any reader of WORK tell me how to make the composition with which cardboard or paper is covered so as to give it a surface which can be written on with common slate pencil, and also how to apply it?"

Stick and Umbrella Mountings.—NEW READER writes:—Will any kind reader of WORK be good enough to let me know where I can purchase umbrellas and walking-stick mountings?"

H.P. Formula.—PUZZLED writes:—"In a description of an electric light installation, the engine is described as a 'Westinghume of simple type, having two single-acting cylinders 10 in. diameter by 9 in. stroke. A test of the brake H.P. developed at 80 lbs. steam pressure gave 50·11 H.P., the engine running 350 revolutions per minute.' As I understand the formula for calculating indicated H.P. to be $\frac{2 A.S.P.R.}{33000}$ which in this case is equal to 200 H.P., how is the disparity between brake test and indicated H.P. accounted for?"

A.=area of piston=78·54 in.
S.=stroke, 9 in.
P.=pressure, 80 lbs.
R.=revolution, 350.

IV.—QUESTIONS ANSWERED BY CORRESPONDENTS.

Hanging Paper.—MIEUX QUE ÇA writes, in reply to JACK OF ALL TRADES, (see page 602):—"There are two ways of doing this job. I shall give you one way, when you have sent for a pattern-book to any of the following firms:—Charles Knowles & Co., 164, King's Road, Chelsea; Tine & Son, High Street, Reading; none better than the former. They bear expense of book to and fro. Having chosen and received your stuff, rig yourself up a pasteboard or table, get a long strip of zinc equal length of pasteboard, tack one end of it to under end edge of *p*, and flush with the edge of board next you. Draw it, and stretch over top of board to other end, and tack it under as same. Now get a straight-edge of very hard wood, or, if possible, with steel edge to it: a shoemaker's knife and hutt are indispensable articles in this part of the business as well as your own. Roll out a roll at right-hand end of table, face up. Sometimes this, as well as other stuffs, are rolled face or pattern side out. If yours come so, place a sheet beneath it, drag one end of it over top of table, and tie a piece of rag round your *lapstone*, and place that on the end to keep it from curling back on you. The edge of your stuff is supposed to be lying along middle of zinc; place your straight-edge on the edge to come off and carve away. But mind, do not cut straight down, but in, as it were, so that the edge of the knife inclines from you. This causes the edges when pressed against each other, or, as we term it, a close butt. When all your walls are rubbed down and sized, measure off each length (look out for drop pottery, if any) on wall, and run a brush full of flat same colour as ground of paper, for fear of shrinkage, which if not attended to, and it happens to shrink as it dries, looks something dreadful. You know how to make paste, but add some glue to it. As this stuff, as a rule, is heavily embossed, do not use a roller, but use a patt; rub on plenty of paste, and if heavy let it soak. Another tip: do not forget to keep a small hammer and a few copper tacks handy."

Luminous Paint.—MIEUX QUE ÇA writes to INQUISITOR (see page 602):—"At any oil and colour store. I cannot remember as to price, but it cannot be much, as you can get it in small bottles, not larger than penny gum-bottles. They will place another small bottle beside it, most likely telling you a lot of stuff, etc. Leave it, and bring along the night-light. Use a little clean white paint and rub up a pinch of sulphur in it and give one coat; stir up your night-light in bottle, and use it. You will find it work like fine sand and turps. It will not shine at night unless light gets at it in the day-time.

Luminous Paint.—J. C. K. (*London, N.W.*) writes, in reply to INQUISITOR (see page 602):—"It is sold by W. C. Horne, Dowgate Hill, E.C. (See WORK, Vol. I., No. 42, page 662)."

Gilding.—MIEUX QUE ÇA answers JACK (see page 602):—"There are many ways or kinds of gilding, but I shall give you two of the commonest methods used in my trade. Go to a colour-store and buy a gilder's kit-cushion; knife, tip, and map, cost about 3s. 6d. Get a bit of chalk, grind it up fine with a knife, put it in a piece of close rag, tie it up in the shape of a doll's head, and pounce or beat the article you wish to gild all over, which I suppose to have been painted and is properly dry. Now with a writer's pencil and a little Japan gold-size you mark—not much at a time. Get a book of gold, different prices, open first leaf, and blow it out on your cushion. Repeat this until you have blown as many as you think you require, then take a little oil—any kind—on your finger, and rub it on your hair at the right side of the head and in front of the ear. Now pass your thumb through that leather loop that sticks down beneath the cushion; the other one is for the gold knife to stick in. Breathe through your nose instead of your mouth, and it will not blow about so. Lift up one of the leaves; do not be afraid of it. Now try to spread it gently on the spare part of cushion next you, passing the knife beneath it, and turning it over as if it were a pancake, and did not wish to break it; and when you get it pretty near the mark, give it a little blow from the mouth straight down on top of it, and you will see it will spread out beautiful. Now cut it with your knife in strips the size you require—that is, a little larger than the lines of gold-size, which ought to be getting tacky now. Feel it with the back of your finger, and see if it be almost dry. If so, seize the tip, and give it a flick along your ear, so that the tips of the hairs will rub along the oil you rubbed on. Now lift up a strip of gold with this, place it up against your gold-size, and whistle at it, and you will find it there. Two or three hours after this squeeze it off with your mop. The particulars of the other way later on."

Camera Fittings.—W. E. D., JUN., writes, in answer to J. C. (*Glasgow*) (see No. 89 of WORK):—"You can obtain bellows for camera of J. Thompson, Lintmill, Portgordon, and brass fittings of Watkinson & Lonsdale, New Briggate, Leeds (who advertise in WORK). I can strongly recommend them, as they are both good and cheap, and I have tried several places for camera fittings; another point in their favour being that they will make to your own design or drawing. As for cost, I suppose you are making an ordinary square camera; if so, rack and pinion will be about 5s. I am making one that is only 6½ in. by 8 in., instead of 8 in. by 8 in., and yet allows of the camera being reversed instantly, my rack and pinion of course not costing quite so much as yours would."

Netting Machine.—W. K. (*Castletown*) writes, in reply to A. G. (*Dublin*) (see No. 89, page 599):—"If A. G. will write to R. Knox, engineer, Douglas, Isle of Man, he will obtain all particulars."

Rabbit Skins.—C. W. B. (*London, W.C.*) writes, in reply to IDEM SONANTIA (see page 634):—"Lay the skin fur downwards on a board and tack it, stretching it as tightly as possible. Then scrape off all the fatty matter with a blunt knife. Dress it daily with the following solution till the skin appears dry:—Four ounces of bay salt, two ounces of alum, four ounces of corrosive sublimate, and two quarts of boiling water. Let the mixture stand till cold."

Cardboard Models.—A READER writes, in reply to J. F. (see No. 91, page 634):—"He can get cardboard models, with instructions, for a penny each, from Mr. Folliance, toy dealer, Cable Street, St. George's, London, E.; he must send a stamp for postage. I think if he is a beginner at model making, these are good practice, as they are so cheap, and when he learns a little about making them, he should send to Steven's Model Dock Yard, Aldgate, E.C., and then he will get a model ready mounted on cardboard for a shilling, carriage paid, to any part of England, which, if made up well, is worth putting under a glass case: when sending, he must state what sort he would like, as they keep a good many patterns. If he has penny ones, I should advise him to have the Poulterer's Shop or the Village School. If J. F. cannot get them, and he writes again, I will get them for him."

Fretwork Stencils.—T. S. (*Willington-on-Tyne*) writes:—"I saw in 'Shop' that S. H. H. (see page 520, Vol. II.) has been inquiring about fretwork stencils. I have never heard of any for sale. I think most people cut them themselves; but there are not many who go to so much trouble. This is how I treat my fretwork patterns when I buy any: I first gum them on good stout foolscap paper, and then cut them out with my penknife. But it requires a lot of patience, and when I want to cut one from the pattern I get some white tissue paper and lay on the pattern; get two books, lay one on one-half of the pattern, and then rub the other part over gently with shoemakers' heel-ball. When this is done I place the other book on the part that has been done. Raise the other book quietly up, and serve the other half the same way; this makes a true copy of the pattern, and it will last for years. Some of my patterns I have had for over twenty-two years, and I have cut dozens of things from some of the patterns. I have two large books full of fret patterns that I have cut out, and they make a nice scrap-book, but they have cost me no end of labour and patience."

V.—BRIEF ACKNOWLEDGMENTS.

Questions have been received from the following correspondents, and answers only await space in SHOP, upon which there is great pressure:—J. H. (*Sheffield*); J. M. P. & Co. (*Nottingham*); J. W. (*Homerton*); W. H. G. (*Hornsey*); W. E. (*Liverpool*); S. P. (*Oldham*); A. K. B. (*Hull*); J. B. C. (*Coatbridge*); J. L. (*Nelson*); A. G. (*Sunderland*); W. C. W. (*Chiswick*); CRUDE ELECTRIC; MAGTELO; N. W. (*Leicester*); PLUMBER (*Hackney*); CANE; C. N. & Co. (*London, S.E.*); C. W. S. (*near Liverpool*); W. W. W. (*Nottingham*); G. K. (*London, N.W.*); L. S. L. (*Kirkcaldy, N. B.*); J. H. H. (*Manchester*); C. P. (*Wanstead*); C. R. K. (*Paris*); RULER; O. B. M. (*New York City, U.S.A.*); J. L. (*Exmouth*); T. E. (*Rothesham*); KILOMÉTRIQUES; AMBIGITUR; W. M. (*Plaistow*); LOCO; A. H. C. (*London, W.*); T. J. (*Plaistow*); H. W. R. (*New Cross*); M. E. E. (*London, W.*); TOM; JACK; S. O. R. (*Notting Hill, W.*); J. L. (*Hornsey*); M. O. (*Battersea, S.W.*); W. C. (*Kensington*); F. O. J. (*Bayswater, W.*); F. B. C. (*Liverpool*); J. (*Withernsea*); RICHARD; MOP.

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