

Hobbies

WEEKLY

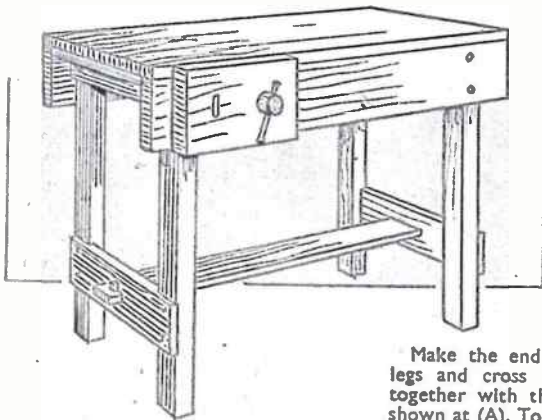
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January 2nd, 1952

Price Fourpence

Vol. 113 No. 2931



Every woodworker needs

A PRACTICAL WORK BENCH

WHILE many woodworkers turn out numerous articles on a made-up bench or even the kitchen table, a really practical bench is most necessary. The design, which is the subject of this article, shows a good type for the amateur, being reasonably strong, and not too heavy, also it is portable, being capable of taking apart for removal.

To Suit Requirements

Some suitable dimensions are shown in the front elevation, Fig. 1, and side section, Fig. 2. These can, however, be easily extended both in length and width to suit requirements. The construction is quite simple. Any woodworker can undertake it with confidence, and only the simplest joints are employed. As the sizes of timbers are given in the cutting list, no reference need be made to them in the text to avoid needless repetition.

Make the end frames first. Cut the legs and cross rails and screw these together with the simple lapped joint shown at (A). To make these joints, the legs are cut away $\frac{1}{2}$ in. deep where the rails will come, and the rails have $\frac{1}{2}$ in. thick slices cut off to fit in, the result being that the rails will sink in the legs to half their thickness without being unduly weakened. Glue, as well as screw the rails in, for a strong joint, as a bench must be firm to stand the strain put upon it.

The sides (B) are cut to length and width given, and at 3ins. from each end a $\frac{1}{2}$ in. deep groove is sawn out to fit over the legs. The upper part of this groove must be widened to also fit over the end rails, a fact that the reader will see for himself during construction. Where these sides contact the legs, a $\frac{1}{2}$ in. thick strip should be sawn away (see detail C), then the sides will project just $\frac{1}{2}$ in. from the legs. Fit the sides to them with two bolts to each joint, and where the joint to which the vice closes on, comes, the bolt heads should be countersunk to offer no projection. These recesses should be bored before the actual bolt

holes, obviously, and should be no deeper than is actually necessary.

The hole for the bench screw (D) should be accurately marked off, and bored to suit the screw, say, 2ins. diameter. To the left of this is seen the oblong opening for the slide, which guides the action of the vice. This is cut $\frac{1}{2}$ in. by 2ins. and should just touch the leg behind. To support the bench top, a couple of bars are to be fitted across, approximately where shown by the dotted outlines. These bars are notched into the sides as shown in detail (E). Fit them across, but not permanently as yet.

Stretcher Bar

Between the lower end rails a stretcher bar (F) is to be fitted. This is cut to the length given in the cutting list and should be laid across the rails. Mark off on it the distance between the rails, and from there to each end reduce the width to 3ins. as at (G) in Fig. 2. In the centre of the rails cut out a slot $\frac{1}{2}$ in. by 3ins. for these reduced ends to fit in. A square hole is cut in these extended ends, the outward sides of which should be cut through slightly sloping, as a

All correspondence should be addressed to The Editor, Hobbies Weekly, Dereham, Norfolk.

wedge is driven in the holes to force the ends of the bench firmly against the bar and stiffen the bench. It is, perhaps, needless to mention here that the slots in the cross rails are best cut out before being screwed to the legs, also that the sides must be detached from the legs before the stretcher bar can be fitted across.

The cheek of the vice is shown in Fig. 3. This should be cut from a stout

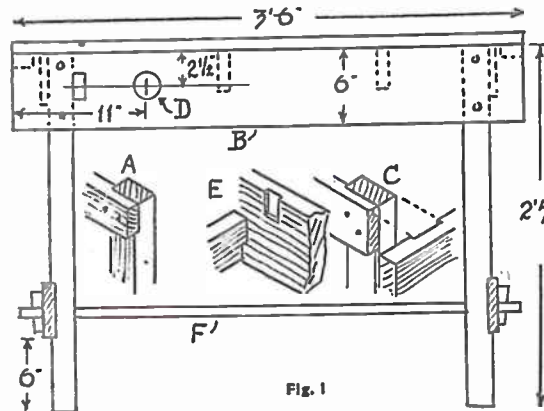


Fig. 1

piece of timber. A line is drawn across the centre, and where shown a 2in. diameter hole bored for the bench screw. The slide is then cut, and one end reduced a 1/4in. all round for a distance equal to the thickness of the cheek for a tenon. As this guide must project from the cheek at true right angles, be careful to saw the shoulders of the tenon square all round.

To find the actual spot for the mortise in the cheek, it will be safer not to trust to measurement, but to fix the cheek to the side of the bench with its screw, and then, with a sharp pencil through the guide hole in the side, to mark its position on the cheek. The shape of the mortise can then be put in, 1/4in. inside the marked spot, and cut out. Save work here by first boring three 1/4in. holes through in line. This will leave little for the chisel to remove. Glue the guide in,

and leave for the glue to harden. Then test the cheek in position and see the guide moves in and out freely. In that portion of the bench screw, which that portion of the bench, which moves in the cheek, a groove will be observed, and in line with this drill a 1/4in. hole through from the bottom edge as shown by the dotted lines in Fig. 3. Tap in a piece of 1/4in. iron or wood rod to enter the groove and thus keep the cheek and screw together, so that they

move simultaneously. Where the guide moves over the leg of the bench, nail a 1in. square strip of wood 3ins. long, above and below it to the leg, and cover both with a piece of board as at (H) in Fig. 2, to box the guide in, as it were. A paste of blacklead and tallow, well rubbed in, and also on the bench screw, will greatly facilitate an easy action of the vice. Also to the inside of the screw block, which is, of course, screwed to the back of side piece (B) beforehand. Now nail the crossbars across the sides. Cut the wood to length forming the bench top. If you can get tongued and grooved boards for this all the better, otherwise the boards should be glued edge to edge. If the latter, cramp them up on the floor, not the bench, or they may stick to the end cross rails. Fix the top on with nails or screws to the sides and crossbars only, not the

Triple Signals—(Continued from page 211)

A ladder composed of two strips of wood roughly 9 1/2ins. long by 1/2in. wide by 1/2in. thick with match-sticks set 1/2in. apart reaches from the base-board to 1/2in. square opening in the front of the platform. This may be anchored to the base-board by cutting a couple of slots in its upper surface to take the ends of the side arms of the ladder and gluing the latter in position. The other end is easily secured by gluing the upper portion of the side arms to the sides of the aperture through which they pass. Fig. 1 is illustrative of the resulting effect.

A rail of ordinary pins set 1in. apart round the edge of the platform and connected with a length of thread completes the structural work. It now only remains for you to add any refinements which appeal to you, as, for instance, a couple of holes cut in the lamp-shield of each of the signal arms. These could then be covered with red and green cellophane. It is through these appropriately coloured shields that the lamps of real signals shine at night to indicate whether the road ahead is clear or otherwise. Incidentally, the track is

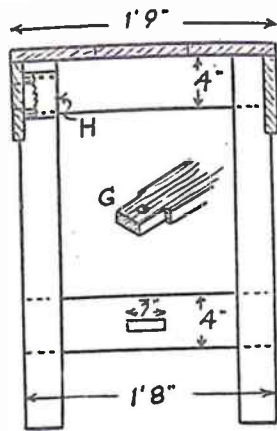


Fig. 2

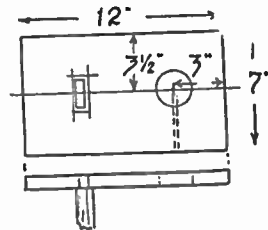


Fig. 3

ends, then, with the removal of the bolts and stretcher bar, the bench can be dismantled at will. A batten should be screwed at each end to the bench top, underneath, to complete the job. Such refinements as a bench stop, etc., can be added as a matter of course. (203)

- CUTTING LIST**
- Legs (4)—2ft. 5ins. by 3ins. by 2ins.
 - Rails (4)—1ft. 8ins. by 4ins. by 1in.
 - Sides (B) (2)—3ft. 6ins. by 6ins. by 1in.
 - Stretcher (F)—3ft. 6ins. by 4ins. by 1in.
 - Top bars (2)—1ft. 7ins. by 3ins. by 1in.
 - Bench top (3)—3ft. 6ins. by 7ins. by 1in.
 - End battens (2)—1ft. 7ins. by 2ins. by 1in.
 - Vice cheek—1ft. by 7ins. by 1 1/2ins.
 - Vice guide—1ft. 2ins. by 2ins. by 1in.
- Bench screw—2ins. and eight 1/4in. by 5in. iron bolts.

always called 'the road' by good railwaymen.

Paint the uprights, the platform edges and supports, and the edges of the base-board white. The upper surfaces of the base-board and platform, and the ladder are best done in black. The signal arms—with the exception of a white band 1/2in. wide and 1/4in. in from the end (Fig. 6)—must be in a bright red.

To operate the signals, raise the appropriate lever.

Here's joy to your signalling. (188)

How to make model TRIPLE SIGNALS

THE train-lovers of these isles are probably the most fortunately placed of any in the entire world. Few live so far from the great centres that they are unable to get their fill of this absorbing hobby; and one has only to stand on the platform of any of our main line stations to have the whole wonderful and complex organization under review.

To the majority, there can be little doubt that the signalling system presents the most fascinating study. Boys of all ages from 8 to 80 invariably go for those huge multiple signals which grace the track approaches to so many stations. And, if this is the case with you, the quickest way to have one operating on your home railway is to follow these instructions describing the construction of the triple signal depicted in the accompanying illustrations.

glasspaper smooth. The result should appear as shown in Fig. 2.

Complete the base-board by gluing two feet 6ins. long by 1/2in. wide by 1/2in. thick across the ends on the underside face (Fig. 1). Then, into the central hole, insert the main upright 14 1/2ins. long by 1/2in. square and chamfered at the top (Fig. 3). Secure with glue.

Upper Platform

The upper platform (Fig. 4) is also 12ins. long by 6ins. wide by 1/2in. thick. Cut the three holes 1/2in. square, spaced as shown along the centre-line, straight through the thickness of the wood. The other hole 1/2in. square, centrally along the length and 1 1/2ins. in from the front edge, must also be cut at this stage. Again clean up with glasspaper.

Fig. 5 shows the two additional uprights, which should be prepared from 5in. lengths of 1/2in. square wood and

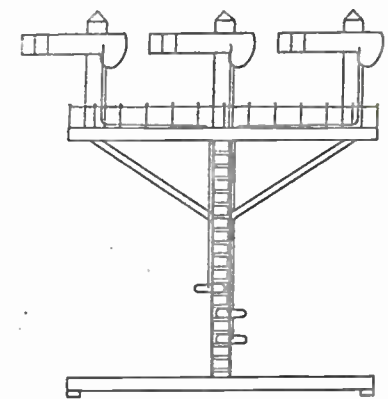


Fig. 1

with radius 1/4in. and centre 1/2in. down from the top side and 3 1/2ins. in from the closed end, closes the gap between the first arc and the bottom parallel (Fig. 6). Cut three off.

Nail the three arms in position on the uprights and insert a length of stiff wire in the hole provided in each for the operating mechanism. Bend over the

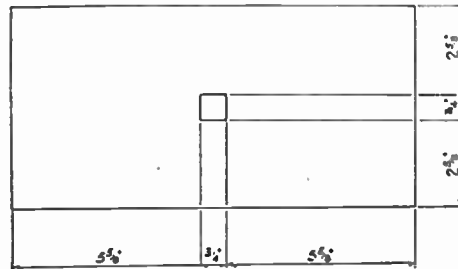


Fig. 2

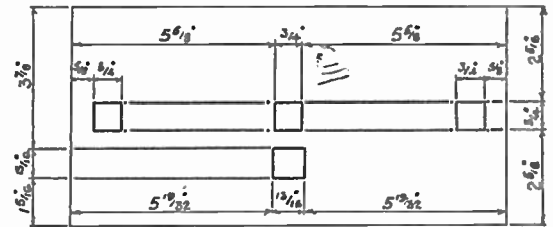


Fig. 4



Fig. 3



Fig. 5

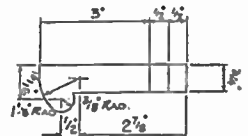


Fig. 6

The acquisition of the few, simple tools and material necessary for the purpose should present no difficulty to an enterprising boy. They comprise a saw, chisel, file, drill, pliers, pencil, ruler, compass, sheet of medium glasspaper, discarded soap box, short length of stiff wire, empty cocoa tin, few scraps of red and green cellophane, used matches, nails, pins, reel of stout thread, glue and paint.

Well, now, if you have collected these items around you, we can make a start on the base-board. This consists of a piece of wood 12ins. long by 6ins. wide by 1/2in. thick. Cut a hole straight through the centre 1/2in. square and thoroughly

glued in position in the end holes of the platform. Glue the platform in position on the main upright 9 1/2ins. above the base-board. To ensure that the platform is quite rigid, two supports approximately 5 1/2ins. long by 1/2in. wide by 1/2in. thick—suitably angled at each end—must now be glued in position between the underside of the platform and the sides of the main upright (Fig. 1).

On the opened-out cocoa tin, draw a line 4ins. long. Drop a vertical 1/2in. long at one end and line in a parallel to the first roughly 3ins. long. At a point centrally between the parallels and 2 1/2ins. in from the closed end, inscribe an arc with radius 1 1/2ins. A second arc,

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Making a Gothic-style CLOCK CASE

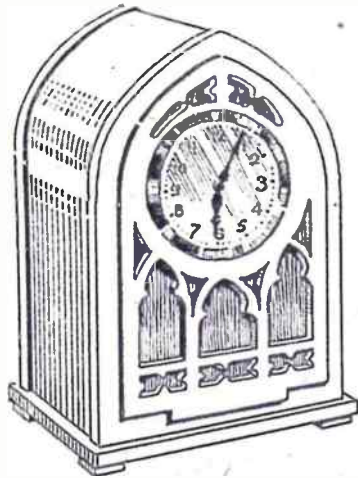


Fig. 1—The case in use

THERE are some readers who, doubtless, possess a small clock for which they would like to make a new case. Or it may so happen that an old case has become worn and dirty, while the movement itself is quite good and worthy of a new case.

We give here a suggestion for a Gothic case, a style very seldom used but one of beauty and character.

Church Window Effect

As will be seen from the illustration Fig. 1, the finished article somewhat resembles a church window, this effect being got by a fretted overlay simply glued to a hollow case. It will be understood from a glance at the full-size patterns on cover III of this issue that the case can accommodate a clock movement with a full diameter of 2 3/4 ins., this size fitting exactly in the hole in the front fretted panel.

The drum of the movement—that portion containing the works—will, of course, pass through the hole (shown as 2 1/4 ins.), in the front and back members of the case, and will be held firmly by the metal back plate and the small knurled nuts. If a smaller movement is used, then the inner circle must be measured for, set out and cut, the flange on the front of the movement again, of course, resting on the front of the case. A clear idea of the make-up of the case can be got from the sectional view Fig. 2.

The lower base of the case consists of piece (A) and two pieces (B), which must be carefully cut to mitre together as shown. Piece (A) is 5 1/2 ins. long by about 1 in. wide, pieces (B) are 3 ins. long and are again 1 in. wide.

The back edges of pieces (B) are cut square, while the front ones are cut to an

angle of 45 degrees to suit the ends of rail (A), which are similarly treated. On top of the base (A) is second base piece (C), this measuring 5 1/2 ins. long and 2 1/2 ins. wide. Take care to cut the corners square by setting them out with either a set-square or a try-square. Glue the piece to the lower base, keeping the back edge flush with the back edges of pieces (B).

The Floor

The floor of the case, piece (D), is next cut and this again is a plain piece of wood measuring 5 ins. by 2 1/2 ins. wide. Do not glue this to the base piece (C) yet, as the clock case itself must be built up upon it and screws run up into the front and back pieces (F).

Full-size patterns for this article are on page 223

All the pieces so far mentioned are of wood 1/2 in. thick. The front and back of the case, pieces (E) in diagram Fig. 2, are also of 1/2 in. wood, and cut to the outline given full size on the pattern sheet. The dotted lines just inside this outline denote where the inner frames (F) will be glued. These frames carry the bendable plywood sides (I). An outline tracing of the pieces (E) should be made and these outlines transferred to the wood by means of carbon paper. The hole for the drum of the clock will, of course, be cut in both the back and the front, paying regard at the time to the diameter of the particular movement used.

Having cut the two pieces (E), proceed to cut four pieces as (F) on the pattern sheet, cleaning off the cut edges carefully so as not to split the wood. Glue them to the front and back as seen in Fig. 2 and put them under pressure until the glue has thoroughly hardened. From the pattern sheet, next cut the top crossbar (G), noting how it is to fit into the recesses formed at the junction of the pieces (F). If a piece of 1 in. stuff is not available for piece (G), then two thicknesses of 1/2 in. wood may be glued together.

To connect the front and back of the case at each side at the base, rails (H) are introduced. These rails should be 1 1/2 ins. long and about 1 1/2 ins. wide and they are glued between the front and back frames (F) as seen in Fig. 2. The whole upper case can now be fixed to the base (D) with glue and screws. To stiffen the

fixing between the case and floor (D), some short lengths of triangular filler may be glued in the angles as seen in Fig. 2. The sides (I) of the case consist of thin pliable plywood, each piece being cut about 8 1/2 ins. long by the width shown on the pattern sheet.

Clean up the cut edges after using the fretsaw. If desired, the plywood can be cut with a pair of ordinary scissors, the use of which ensures a neat and clean cut. Brush glue thinly and evenly on the edges of the frames (F) and press the plywood in place. After both sides are on and a neat junction has been made at the extreme top, some pieces of clean paper or rag should be laid round the apex and stout twine or string carried right round the case edgewise and tied tightly to hold all in place until the glue has hardened.

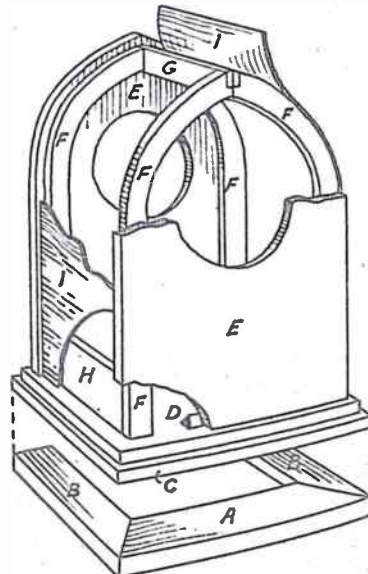


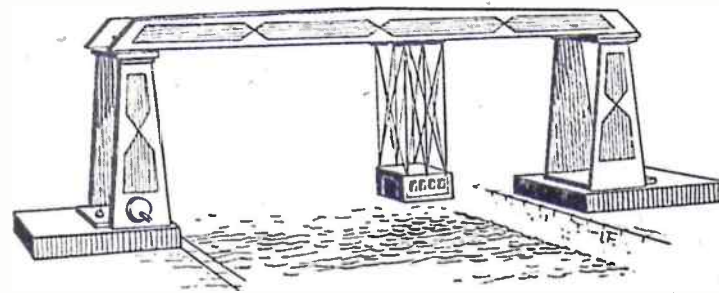
Fig. 2—Constructional details

The base of the case can be glued and screwed on, and the surfaces cleaned up with fine glasspaper. It now remains to cut and fix the overlay on the front. The pattern given here may be glued to the 1/2 in. wood, or a copy made direct on to the wood by means of carbon paper, for which would give a good clear line for cutting. This latter method, too, does not necessitate the cleaning off of the paper after cutting.

Use a fine fretsaw for all cutting here.

(Continued foot of page 214)

A child would enjoy owning this TOY TRANSPORTER BRIDGE



THIS is an attractive working toy to make up, and the illustration shows its appearance when completed. The construction is not difficult. Before we deal with construction, however, it would be advisable to describe the toy and its working parts.

The size overall is, length 29 ins., height 9 1/2 ins. and width 3 ins. The

'people' from one 'river bank' to the other.

The first section to make will be the ground platforms, and in Fig. 1 we show how simple they are to construct. There is a main top cut square-cornered, to which is attached an open frame formed from two sides (B), each 6 ins. by 3 in. Glue these parts together and drive in a few fine nails to stiffen the job. Next make the piers, each of which has two pieces shaped to the outline shown as (D) in Fig. 2.

Draw one out as a pattern on to a piece of paper to the measurements given, using a main centre line, shown dotted in the diagram, for accuracy in the cutting out. Lay this pattern on the wood and prick in the four external points which are afterwards connected up as pencil lines ready for cutting with the fretsaw. Next make the base plate

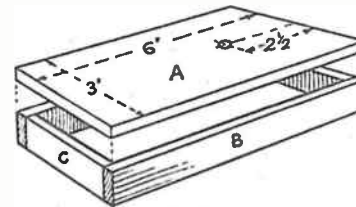


Fig. 1

length of the toy is governed by the length or span of the bridge which, in this case, is 20 ins. This may be considerably less, if desired, or if wood of sufficient length is unobtainable for this part. There are six independent units that can be made up, consisting of the two ground platforms, the two uprights or piers, the main cross bridge and the ferry car and its traveller which slides on runners located on the inside of the girders of the bridge.

Method of Assembly.

In assembling the toy, small bolts with nuts are suggested so that the whole can be taken apart and packed in a flat box for convenience in storage. Wood 1/2 in. thick is used throughout, with 1/2 in. square section stripwood for the runners of the Car. The two pulley wheels required are cut with the fretsaw from 1/2 in. wood and the grooves cut down with a rat-tail file or a triangular file.

When finished, the toy should please the youngsters, who may pass many hours of fun transferring 'goods' and

(I), which must be 3 ins. long by 2 ins. wide, and glue the uprights to it, the back edge projecting 1/2 in. beyond the back edges of the two piers. In Fig. 3 is shown the position of piece (I) and one of the sides of the pier, and the top (A).

The Top Member

The top member (E) of each pier is now made, and each piece is 3 ins. long by 1 1/2 ins. wide. Set out on the pieces, the position (D), shown dotted in the diagram in Fig. 4. The top of the piers must later be glued here. Also mark out the oblong opening which must be cut to allow the pulley belt to pass downwards to the lower pulley. This opening is shown as being 3/4 in. long and 1/2 in. wide in Fig. 4.

Next, set out pieces (G) to the sizes shown in Fig. 4. Lay piece (E) on this, keeping an equal margin all round as shown, and mark round the opening in pencil so that the latter is repeated and cut on piece (G). Also bore the bolt hole through the two pieces ready for assembly. The pieces (E) can now be glued to the tops of the piers and one or two fret pins added for strength. Lay pieces (G) aside for fixing to the ends of the bridge later on.

The bridge consists of the two girder

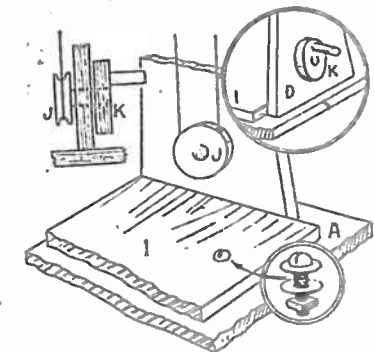


Fig. 3

pieces (F). These may be to the length shown in Fig. 4, or shorter if economy of wood is to be considered. Make a 1/2 in. hole at each end, then glue and screw the girders to the pieces (G), keeping them 2 ins. apart. If the longer length of girder is used, a stiffening piece should be fixed across the centre from side to side as seen in Fig. 4.

The bridge unit is now almost complete and ready for bolting to the pier tops (E), short bolts with washers and nuts being used for the lower attach-

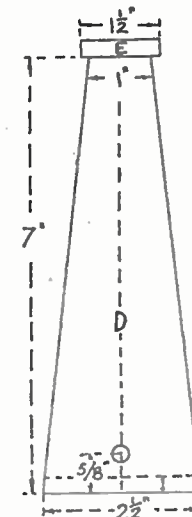


Fig. 2

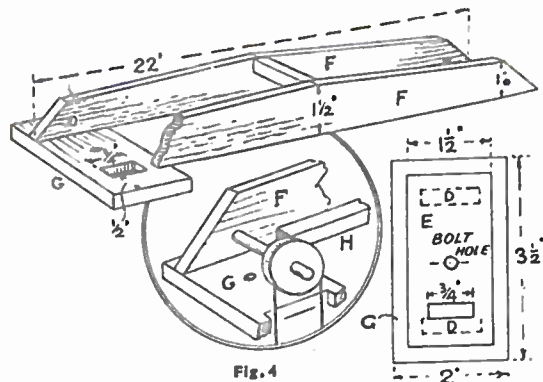


Fig. 4

ment as seen in Fig. 3. Two pieces of $\frac{1}{2}$ in. diameter rod, each 2 ins. long, will be pushed through the holes in the ends of the girders and on one of these is glued a pulley to come inside one of the pliers as seen in the circled diagram in Fig. 4. The rod must work perfectly free in the hole. On the other end of the rod, two discs of wood with holes in their centres are glued on again inside the pier to keep the rods steady and in place. Here again the rod must work freely.

Now get two lengths of $\frac{1}{2}$ in. square stripwood as (H) and glue them one each to the inside surface of the girders, and flush with the lower edge. These form the runners for the traveller supporting the car. These runners are clearly shown in the cross section in the circled enlargement in Fig. 5 and also in Fig. 4. The bridge girders are now ready for final bolting on.

The Traveller

The traveller, shown in Fig. 5, is made next, piece (L) being $\frac{1}{2}$ in. long by $1\frac{1}{2}$ ins. wide, to the lower side of which is glued, on edge, the two guides (M). When these latter are fixed to (L) the whole must slide easily and smoothly between and on the runners (H). The side pieces (M) are $\frac{1}{2}$ in. wide and have ends cut to an angle of 45 degrees, and in each piece are driven three roundheaded screws, spaced as shown to take the cords or wires supporting the car.

The illustration in Fig. 5 shows the completed traveller with screw eyes run in at each end to take the cord which propels it backward and forward. A

good impression of the make-up and the finished appearance of the car or cabin is given in Fig. 6. Two pieces as (N) and (O) are required, measuring 2 ins. long by $\frac{1}{2}$ in. wide, and two pieces $1\frac{1}{2}$ ins. by $\frac{1}{2}$ in. for the ends (P). All these are carefully marked, cut square and cleaned up and glued together in the formation shown. When the glue has hardened, all surfaces are rubbed clean on a sheet of glasspaper, and painted up appropriately. An idea of this finish can be gained from the sketch.

Drive in six screws, three each side, as shown, to take the cords or wires which hang down from the traveller above. There are two cords from each of the two side screws, and three from the two centre ones running upward to engage the screws above. Then, to prevent side swinging movement there are two cords from each pair of end screws. These are crossed as shown and fixed to similar screws above.

It now remains to clean up all the

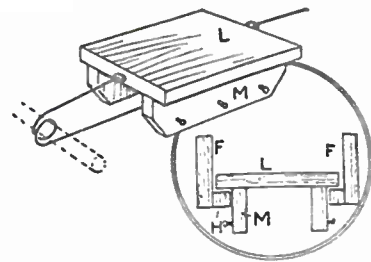


Fig. 5

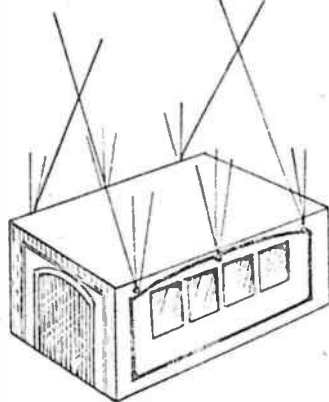


Fig. 6

parts and surfaces and paint them. Bolt the pliers to the side platforms and fix the bridge to the pliers as shown in Fig. 3. Now run a piece of round rod about $\frac{1}{2}$ in. long through the hole in the lower part of the pier and glue in on the inside of this latter the pulley wheel (J) shown in Fig. 3. Then, on the outside end of the rod, glue the plain disc and handle (K) shown, allowing space between the disc and the side (D), and the handle disc (K) and the side for free turning when the inside connecting band is fitted over the two pulleys.

Finally connect up the two end rods of the bridge by winding a cord round each and tying the ends to the eyes on the ends of the traveller. An indication of the method is given in Fig. 5, the rods being shown dotted to allow the cord to be clearly seen. It will be seen that the traveller and its suspended cabin can be moved either way by turning the handle. (195)

Clock Case—(Continued from page 212)

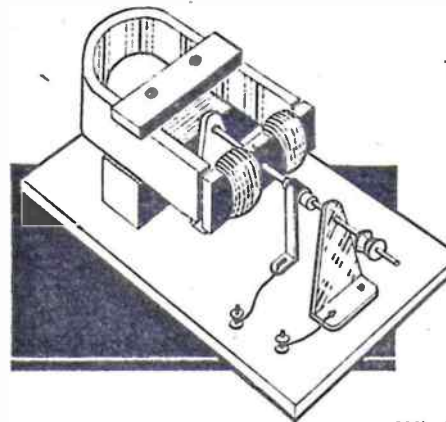
as the curves and the points and corners must be clean and regular. Check up the position of the overlay on the front, either by making fine pencil lines or by making four or five pin-pricks in the wood. Then, after coating the back of the overlay thinly with glue, lay it

accurately to the lines or to the pin pricks, which latter should not be noticeable if neatly made.

We suggest oak as being highly suitable for such a case as this, and as regards finish, a rubbing up with raw

linseed oil would be most appropriate. The four little square feet to go on under the base of the clock, add much to the finished appearance and can be cut about $\frac{1}{2}$ in. square from odd pieces of wood. (196)

Efficiency is the hall-mark of this WORKING DYNAMO



tubing is suitable. It is a push fit on an insulating piece, which is in turn pushed upon the axle. This piece may be made from wood, several layers of gummed tape, a sleeve from a radio-battery plug or spade, or anything similar.

The brush is cut from thin brass or tin and will be screwed down to the baseboard so that it bears on the metal ring.

Winding the Armature

The iron armature has a central hole for the axle. This is shown at (C) and soldering is the easiest method of making a sound joint between axle and armature.

To wind the armature, take some wire of about 26 or 28 S.W.G. (pre-

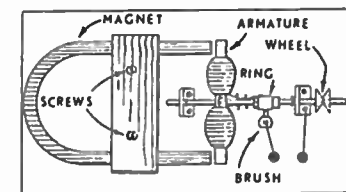


Fig. 1

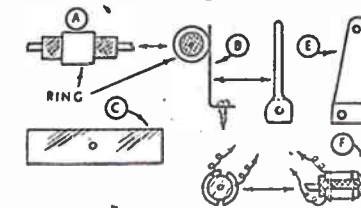


Fig. 2

If a fairly strong magnet is used this dynamo is quite efficient and will light one or two torch bulbs if the spindle is spun between the fingers. The model maker should be able to drive it with a steam engine or other source of power, or by hand from a large wheel. With a little modification in fitting up, it might be used on a cycle for lighting. Here, a flat wheel about $\frac{1}{2}$ in. in diameter should bear against the side of one of the tyres.

In any case it should be interesting to use, and it is possible to make it operate as a motor, as will be described.

The Magnet

Electrical stores stock horseshoe magnets in a variety of sizes and big powerful ones are not at all dear. Alternatively, a magnet may be to hand, or one may be obtained for a shilling or so from a motor scrap dealer, out of a broken magneto. The more powerful the magnet, the greater will the output of the dynamo be, but even comparatively small magnets can be used successfully. One about 2 ins. between the poles is, perhaps, the most convenient size, but this is in no way critical.

A thin flat piece of soft iron is required, the same size as the magnet poles, so that it will lie across them. This forms the armature shown in Fig. 1. Such a piece is supplied with some magnets. It is called a 'keeper' and is left across the poles when the magnet is stored. Actually, any piece of iron may be used, and the ends, which will come opposite the magnet poles, should be filed flat and level. If the iron is hard, place it in the fire for an hour or so to get red hot and soften.

Commutator and Brush

The commutator is a metal slip-ring which enables the current to be taken from the winding, and is shown at (A) in Fig. 2. Any small short piece of metal

ferably cotton covered—but enamelled wire will do) and join one end to the axle. Now wind as many turns as possible on one end of the armature, keeping the wire tight and even. When one end is full, take the wire across to the other end and wind on a similar number of turns. Secure the free end of the wire with thread and join it on to the metal slip ring.

This is shown in Fig. 1 and space must be left at the ends of the armature so that the windings do not foul the magnet poles when the axle is turned.

Other Fitments

Two brackets are made from stout material (E) in Fig. 2. They are just high enough to enable the armature to turn

without fouling the baseboard. The axle is passed through these and washers or bushes soldered or screwed on so that the axle cannot move from side to side. Arrange the brush (B) so that it bears on the ring, securing with a wood-screw.

The magnet is now mounted so that its poles are exactly opposite the armature ends. To arrange this, a small block of wood is placed under the magnet. A strip of wood and two long screws hold the magnet down.

Two terminals can be added for connections, and a small wheel. One lead is taken from an axle bearing.

The magnet should now be moved with the screws slightly loosened so that a small space only exists between armature and magnet. Actually, the smaller this gap, the more efficient the dynamo will be. Tighten the screws when the magnet is right.

If a bulb is connected and the axle turned rapidly, the bulb should light. The lower current consumption the bulb is, the more easily will it light. If low-consumption bulbs are used, the dynamo will light four or five bulbs easily if the magnet is fairly strong and the armature driven at a good speed.

No dimensions have been given because all these will to some extent depend upon the size of the magnet used and no difficulty should arise. To hold the windings secure they may be painted with ordinary thick varnish.

Using as a Motor

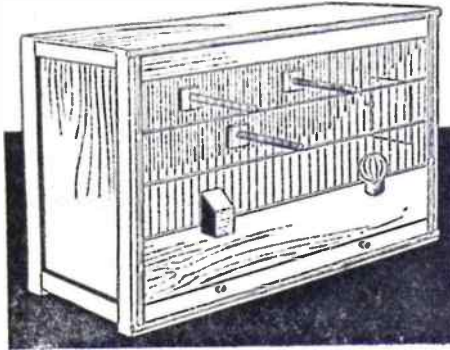
As shown, the dynamo would only run from alternating current. So that it may run from a battery (direct current) the following modifications must be made.

Make a second brush and fit this the other side the slip ring. Take the second terminal to this brush, instead of to the axle bearing. Now cut the slip ring in half lengthways and secure the two halves to the insulated centre piece by binding with cotton. Disconnect the one end of the armature winding from the axle and connect it to the free half of the slip ring. (F) in Fig. 2 makes this clear.

The slip ring should be turned so that the cuts are level with the armature poles. Finally, if to be used as a motor only, thicker wire will be better—something of about 24 S.W.G. (201)

*A Little Space to Wish You
a Lot of Success and
Pleasure in The New Year*

Here is an easily-made BIRD CAGE



cage and renders cleaning out an easy matter, is shown in part in Fig. 4. It is a sheet of plywood with triangular fillet glued across the front and along both ends. The tray front is glued and nailed to this, and a pair of small wood knobs fixed to it.

Perches

The lowest perch, to enable the birds to reach their food and water vessels, is a length of $\frac{1}{2}$ in. dowel rod fitted across behind cross piece (B).

It is trimmed at each end to fit into two fretwood sockets as shown, and should fit firmly and not wobble, yet not so tight as not to be easily lifted out for

cleaning. Its exact position is not critical. If placed about where shown in Fig. 3, it will be near enough.

A Readymade Front

It is suggested that a readymade front be bought—this would save a lot of trouble. The cage will take a standard size of 30ins. by 12ins., and one of this size can be bought quite cheaply.

Where a local bird shop is not available, one can be bought by post from addresses seen in any bird-fancier's list or even in periodicals. These readymade wire fronts are fitted with a gate and openings for the food and water containers.

(Continued foot of page 217)

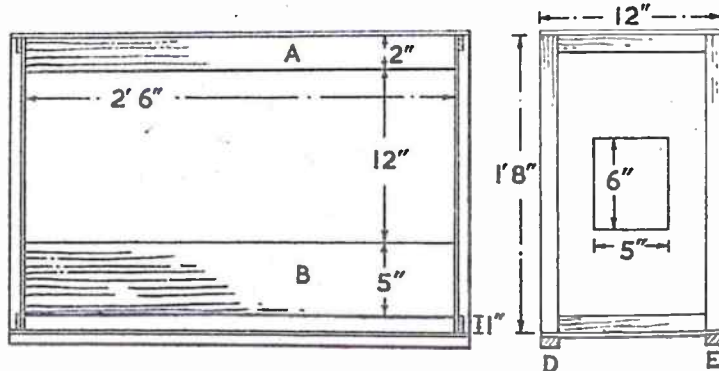


Fig. 1

Fig. 2

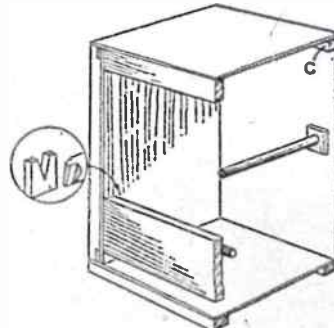


Fig. 3

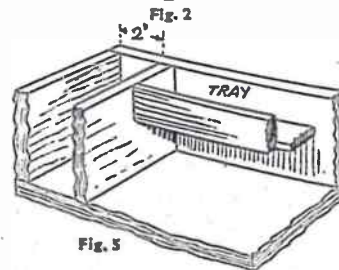


Fig. 5

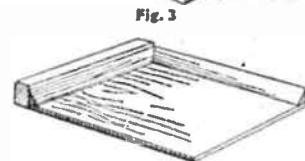


Fig. 4

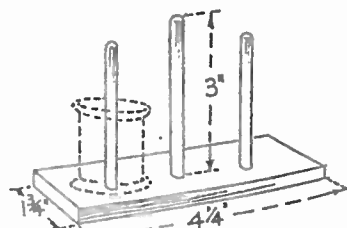


Fig. 6

THIS large-size cage suitable for breeding budgerigars, can be easily made at half the cost of a readymade article. Plywood enters largely into its construction so the business of jointing boards together to make up the required width, is avoided.

Full dimensions are given in Figs. 1 and 2. First make up the side frames, the half-lapped joint being used as shown at the angles. So that the end grain of the joint can afterwards be covered by an applied moulding, let it be on the inside edge, the plywood being glued to the inner surface. Cut the plywood sides to size, glue the frames and fix the plywood with a few small nails or fretwork pins.

The Door

In one of the sides cut out a door opening to the dimensions shown in Fig. 2, reinsert the piece and fit the hinges, and provide a wire catch for fastening purposes.

The sides are now joined together by cross pieces (A), (B) and (C), these being securely nailed through the frames. Leave a clear space of $\frac{1}{2}$ in. for the tray between cross piece (B) and the bottom.

The top and bottom of the cage are cut to the full outside dimensions—i.e. the interior length of 2ft. 6ins. plus the thicknesses of the sides, and screwed to the side frames. Bars (D) and (E) are nailed to the sides underneath, and the bottom is screwed to them at two or three places between.

The back is now cut to the same length as the top and bottom and to the full height of the cage from bottom bars to top, it is then screwed to the side frames, cross piece (C) and bar (E). Fig. 3 shows the general construction of the cage to make this clear.

A half-round moulding is glued and pinned along the front edges of the top and bottom, and vertically to cover the edges of the plywood sides. These pieces of moulding are neatly jointed as shown in the general view.

The tray which fills the bottom of the

How to lay A CONCRETE CRAZY-PATH

CONCRETE paths are usually made in such a way as to present this naturally drab material in its worst light. There is, of course, no need for this to be so, as a concrete path can be made with an appearance comparable with that of a well-laid crazy-path composed of individual stones. The sketch shows something of the effect which may be achieved without any undue expenditure of money or effort.

Construction

The method employed in making a path of the kind described in this article is much the same as that employed in making a concrete path of the more usual form. The excavation of soil to accommodate the path and the ramming and levelling of the sub-soil to form the foundation follows the normal method and calls for little comment except to mention that the sub-soil should be flat, true to level and well rammed and consolidated.

The first departure from the normal method occurs when the shuttering to support the concrete is set up. The top edges of the shuttering boards should be true to level in the length but with a slight fall (say, $\frac{1}{2}$ in. to each 1ft. of width) to one side or the other to assist drainage in wet weather.

The next job consists of providing the irregular shape to the top edges of the shuttering so that the path edge may take a more natural appearance. This presents no difficulty and is done by nailing odd scraps of wood of suitable shape to the inside edges of the shuttering boards.

Laying the Path

A thickness of 4ins. will make a strong

Bird Cage—(Continued from page 216)

The three perches seen in the general view are lengths of $\frac{1}{2}$ in. round rod, cut the full depth of the cage. A small saw-kerf is cut at one end to fit over the wires, the other end fits into fretwood socket pieces as shown. Glue these sockets to the back of the cage, and see that their position is correct so that the perches rest upon the cross bars of the wires. It is suggested that to the corners of the cage, stout brass angle plates be added to stiffen the whole thing up.

The woodwork should be finally cleaned up with glasspaper. The inside should be sized and coated with white or the palest blue distemper, or it can be enamelled white. When buying paint or enamel for the interior of a bird cage,

and durable path. The lower part may consist of broken and well-rammed brick, clinker, or ballast bound by adding a liberal mixture of sand and Portland Cement—say, 3 parts to 1.

The upper part of the path should be not less than 2ins. in thickness and consist of a mixture of three parts of good quality sharp sand to one part of Portland Cement. The mixture should be punned during laying to eliminate any air bubbles which might otherwise form and is finished by running a plank edge along the top edge of the shuttering in the usual way.

When the mixture has been laid for from six to eight hours it will have set sufficiently hard to permit the cutting of the crazy 'edging' in the surface. The cuts should be about $\frac{1}{2}$ in. deep and be mildly irregular in width. To obtain the best effect, the cuts should begin at one or other of the 'breaks' in the path edge and only cross the path by a circuitous route—long straight lines should be avoided as much as possible.

Finishing

Twenty-four hours after laying, the path will be ready for finishing, namely, by painting some of the 'stones' with a cement wash made from a mixture of Portland Cement and Cement Fondu.

Fondu is the black cement used by drain-layers for jointing purposes. It

may be somewhat difficult to obtain in small quantities, but it is worth trying for and can often be obtained from a builder's yard. 7lbs. to 14lbs. is adequate for most paths.

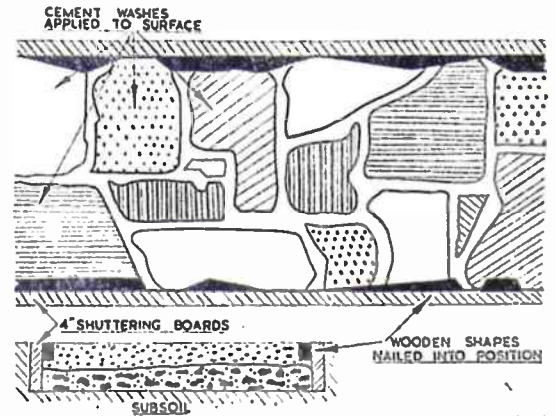
may be somewhat difficult to obtain in small quantities, but it is worth trying for and can often be obtained from a builder's yard. 7lbs. to 14lbs. is adequate for most paths.

Mixing

The materials are first mixed in a dry state: the proportions being adjusted according to the depth of colour desired. Water is added until the mass has a consistency similar to that of putty. The mixture is then allowed to stand for about five minutes after which it can be thinned to a consistency of fluid cream. It is then ready for use and can be applied with a 2in. paint brush.

Darker Washes

Washes should be applied several tones darker than the shade desired as the colours soon weather and lose their initial and somewhat unnatural brightness. (127)



the purpose for which it is required should be stated. The outside of the cage

may be enamelled, black being generally adopted here. (208)

CUTTING LIST

4 side frames—1ft. 8ins. long by 1in. wide by $\frac{3}{4}$ in. thick.	Plywood top and bottom—2ft. 7 $\frac{1}{2}$ ins. long by 12ins. wide by $\frac{3}{4}$ in. thick.
4 side frames—1ft. long by 1in. wide by $\frac{3}{4}$ in. thick.	Back—2ft. 7 $\frac{1}{2}$ ins. long by 21ins. wide by $\frac{3}{4}$ in. thick.
Piece (A)—2ft. 6ins. long by 2ins. wide by $\frac{3}{4}$ in. thick.	Sides (2)—1ft. 8ins. long by 12ins. wide by $\frac{3}{4}$ in. thick.
Piece (B)—2ft. 6ins. long by 5ins. wide by $\frac{3}{4}$ in. thick.	Tray—2ft. 6ins. long by 11 $\frac{1}{2}$ ins. wide by $\frac{3}{4}$ in. thick.
Piece (C)—2ft. 6ins. long by 1in. wide by $\frac{3}{4}$ in. thick.	
Piece (D)—2ft. 7 $\frac{1}{2}$ ins. long by 1in. wide by $\frac{3}{4}$ in. thick.	
Piece (E)—2ft. 7 $\frac{1}{2}$ ins. long by 1in. wide by $\frac{3}{4}$ in. thick.	
Tray front—2ft. 6ins. long by 1in. wide by $\frac{3}{4}$ in. thick.	

INCIDENTALS

Two 3ft. lengths $\frac{1}{2}$ in. round rod.
9ft. $\frac{3}{4}$ in. half-round moulding.
Two wood knobs and 5ft. $\frac{1}{2}$ in. triangular fillet.

Hints for those entering PHOTOGRAPHIC COMPETITIONS

PHOTOGRAPHIC competitions return each year with no loss of popularity. Here are a few hints that will help to put your snaps on the winning list, should you feel like trying any.

First, be quite sure what the competition editor wants. At one time competition requirements seemed wider—being on the generalized basis of 'my best snap'. Now there is a greater tendency to ask for snaps to be submitted under various heads like 'Animal Pictures', 'Humour', 'Child Studies' and the like.

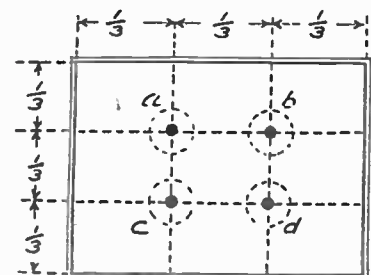


Fig. 1—The rule of thirds. This is the way you imagine the picture divided up

But whatever the group, the broad idea underlying all contests is that it is 'appeal' rather than perfect technique that is being looked for. 'Appeal' is not easy to define, but it can be illustrated thus:—Two competitors take a skiff lying in a pretty stretch of river. In the first case the boat is empty, but in the second the photographer has got someone with a 'day on the river' look about them to sit in it. The first picture is perhaps the better from a technical point of view, but the second gets the prize.

The reason is simple. Both pictures certainly show the river and skiff, but in the first the craft looks 'lost'. This rather unpleasant feeling, however, is killed in the second by the introduction of the figure. With the addition, the picture has developed 'human interest', lost its dreariness and gained 'appeal', even though the person in the boat is not the main subject.

People are not always essential to success, but in nine cases out of ten the introduction of a figure will give just that extra degree of interest to landscapes, etc. that is necessary to lift them out of the general run and produce the desired quality. Thus, the village cross may be quite artistic, but it will be all the better if someone is standing to one side

and looking at it.

A person in a picture must always be doing something—this is an important rule—and as 'looking' is doing something the rule is satisfied here. Furthermore by the direction of the gaze, the person in this case is drawing attention to the main subject. On no account must the 'human interest' of a picture be looking straight at the camera.

To obey the law of 'doing something'—if you take a paddling pool, the youngsters in it must obviously be paddling, not just having their picture taken. Or perhaps the snap is of stepping stones. Here any person included should be actually using the stones or examining them.

Natural Action Essential

Natural action is essential and to this end it is often best to snap when your subject does not expect it.

Although mere technical excellence will never win a prize, a would-be competitor should study composition, inasmuch as it helps 'appeal'.

A big amount has been written about composition but fortunately it is not

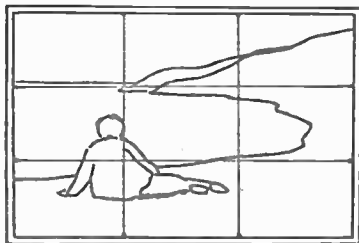


Fig. 2—The correct position for a figure in a general scene—on a thirds intersection

necessary to go very deeply into the subject to get hold of a few rules which definitely do help to better pictures. The effect of good composition is to make a picture subtly satisfying to the eye. Pictures that are poorly composed leave one with a feeling that there is something wrong somewhere.

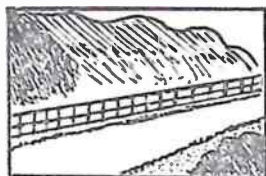
One of the simplest rules to remember is the 'Rule of Thirds'—and it is really wonderful how, if followed, this does improve even the most ordinary subject. The rule is that if the picture is imagined divided into three strips vertically by two lines, and three strips horizontally by two lines (see Fig. 1), then items of major interest should fall on or near where the lines cross—or if the item is extended, along one of the lines. This does not mean that all the lines and in-

tersections must be supplied with items, but that the major item in a picture must be satisfying composition be placed at one of these 'strong points'.

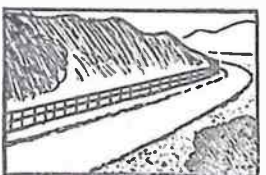
An example of an extended interest is the horizon in a sea snap. As this divides the expanse of sea and sky it draws the eye, thus becoming important, and so it should be placed along or near the lower or upper horizontal thirds line.

To show what a difference this correct placing brings about, try trimming down some old sea snaps you may have, where perhaps the horizon now cuts straight across the centre: you will be amazed at the improvement.

This gives us another definite rule for our figure (as well as other items), for it means that if we are bringing a person



A



B

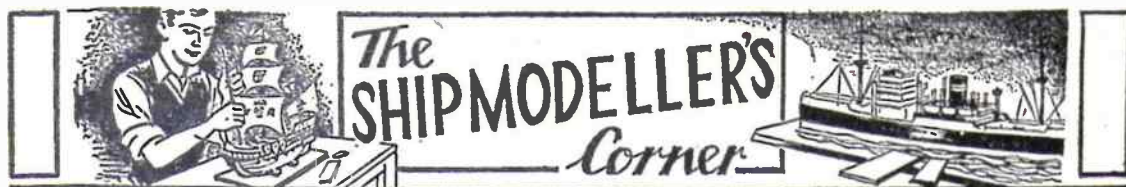
Fig. 3—Showing what is meant by 'leading the eye back into the picture'. The end of the road in (B) does this, for it switches the eye from the border towards the middle again

into the picture he should, if fairly big, be set on a thirds intersection.

Some competition sections, of course, do not allow of figures—as for example 'still life' or animals, but the 'rule of thirds' can be worked to throughout with advantage.

There are also a few other general rules about composition which it is well to always obey. Thus the 'lines' of a picture should always be carrying the eye back in from the border. A road may go across a picture from edge to edge, but it will be all the more satisfactory if the end in the distance turns back in towards the middle. For the same reason

(Continued foot of page 219)



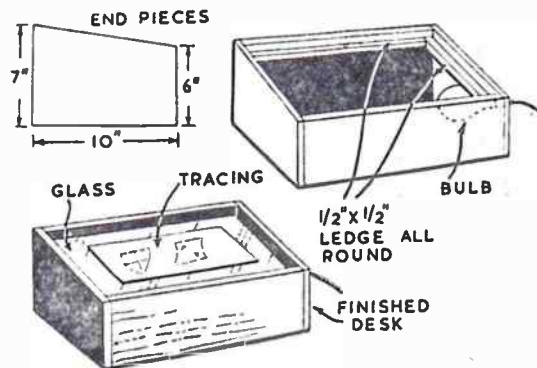
FROM time to time readers write to us about their difficulties, and one which frequently crops up is the problem of how those of us who, for one reason or another, lack the artistic ability to copy the intricate Heraldic designs so often needed for painting the devices on sails and flags, and even in some cases on the hull itself, can copy them accurately.

All of us cannot be artists, in the strict sense of the word, but we all like to complete our models ourselves. There is no need for the shipmodeller to spoil good craftsmanship by the finish of his Heraldic painting. All we need is a

A Shipmodeller's Tracing Desk

by 'Whipstaff'

First of all obtain a small picture frame, complete with glass. Most probably you have one lying about, or it can be picked up for a few pence at a junk store. The size of your picture frame will decide the measurements for



How the article is made

simple home-made tracing desk to enable us to transfer our designs to the parchment or other material, and an effective desk is quite easy to make.

be followed in making your desk. The one described in this article was for a picture frame approximately 11 ins. by 9 ins.

Photographic Competitions—(Continued from page 218)

in a crowd scene the outside person should always be looking into the picture and not out of it, while with a figure brought into a landscape the person must be to one side and looking into the scene, though this means he will be back on to the camera.

Indeed, quite a lot can be done by an inferred line of gaze, even though the face cannot be seen, to draw attention inward and to the main items.

With action pictures, always try to leave a fair space in front of the moving subject, otherwise one is left with an unpleasant feeling that there is nowhere for the subject to move to.

In theory a small print has just as much chance of winning a prize as a big one,

but there is always something about a bigger print that a little one loses. Send in the biggest entries you can, therefore, but a small print can be given a rather more imposing appearance by neatly mounting on a rectangle of card. This, for some reason, always makes a picture seem larger, and the flatness produced by the mount helps. Only do this with the small prints—big ones can stand on their own merits.

The worker who enlarges his negatives here has a big pull, but the contact worker can make the best of his method by seeing to it that the picture space is really well filled and that no trimming is necessary. Still, better to trim and mount rather than send in a badly bal-

Make two end pieces as in Fig. 1, nicely smooth them with glasspaper and join together with a back piece 12 ins. by 7 ins. and a front piece 12 ins. by 6 ins., thus making a four-sided box-like affair with a sloping top.

The wood used in this case was 1/2 in. thick, but any suitable timber you have available could be used equally well. A rail of 1/2 in. by 1/2 in. stripwood is glued and pinned in position on each of the four sides, inside the box and 1/2 in. down from the top. Upon this rests your picture frame and glass, secured in position either by gluing and pinning to the rail, or by small corner pieces at each corner.

In one end piece drill a hole with a 1/2 in. drill to take the flex, and mount on the inside of this piece an electric light bulb holder. Add to the other end of the flex a small adaptor to plug into your electric light socket, bayonet type being the most usual.

All you need to do now is insert an electric bulb; 25 watt is sufficient—place your drawing on the glass, parchment on top of the drawing, plug into the electric light and switch on. You will find you can now trace your design, however complicated, on to your sail or flag, afterwards filling in with the appropriate colours.

If you intend to use this desk on a polished table and not a work bench, it is advisable to add a bottom piece of plywood and, possibly, suitable green baize, in order to protect the polished surface from the heat of the lamp, and from scratching. (144)

anced effort. And in this connection, keep your pictures simple—do not try to include too much. A certain photographic firm is at present showing snaps in its advertisements. Take a look at these and you will see that they are all of a single item which well fills the area.

And finally, while it is certain that good technique alone never won a photographic competition, try to send in the most perfect print possible—that is one that is developed to just the right depth, and on suitable paper. Spot out any pinholes made by dust and in general give the print an appearance of being carefully prepared. It all helps, for the judges are but human beings and a good impression is the battle half won. (180)



Blocks From Sawdust

I HAVE a quantity of sawdust and have been endeavouring to make wooden blocks about 6ins. square and 1in. thick from sawdust and glue. So far I failed to make a mixture which sets. Perhaps you may know a formula for making a solid from sawdust. (R.B.—Birmingham).

THE use of any water soluble binder such as glue is unsatisfactory, as the wood dust absorbs and retains the moisture, being sealed from the air by the hardening of the exterior surfaces. Possibly you could attain the result you desire by using Portland cement (which sets by absorption of water) or possibly by the use of a resinous material, or a solution of shellac and methylated spirits. You might also obtain reasonable results by making thin layers (1/2 in. thick or so) which would more readily dry, and then cementing the layers together under pressure.

Re-Covering a Table

I WISH to re-cover the top of a writing table with leatherette or material of a similar nature. The present covering is inlaid and has been badly torn in places, showing the wood beneath. Please advise me of the best type of covering to use, the

best glue for the job and any special points to observe. (R.F.G.—Peckham Rye). A SMOOTH surface Rexine or American cloth is a good substitute to use in place of leather. Clean off the old stuff and loose glue. Stretch a sheet of brown paper over the re-covered area of the desk, and rub heel ball across the edges; this will give the exact size of the new covering. Cut out the material to this size, a little full to allow of final trimming. Fasten down to the desk top with drawing pins, and with a sharp knife and straightedge, trim to the exact size. Remove pins one side, turn back half the cloth and apply hot thin glue to the wood beneath. Pull the cloth back and rub well down, removing squeezed-out glue promptly with a clean rag, dipped in hot water. Then remove rest of pins and glue down the other half of the cloth.

Patchy Problem

I HAVE made a wardrobe and stained it ready for french polishing, but it is all patchy. I have been told it is the glue coming through the veneer. I have tried Van Dyke Crystals solution, but it is just the same. Can you solve my problem? (A.T.—Daybrook).

THE probability is that you have used the glue too generously and it has worked through the veneer. We fear there is not much you can do about this, but you could try the following. Rub down with fine glasspaper, dust off and apply a household bleach over the stained patches. Wash off with vinegar and then water. When dry, apply a combined stain and varnish, two coats, and if satisfactory, finish off with the polish rubber, using it lightly to smooth and gloss the surface.

Connecting A Pick-up

I HAVE a 5-volt mains superhet receiver fitted with pickup sockets, and would like to connect up to my gramophone to play records. Would you tell me how to do this, please? (W.R.—Aberdeen).

AS your set already has pickup sockets, connections will be very easy. You will need a gramophone pickup which will need to be screwed down in place of the tone-arm and soundbox at present used in the gramophone. Many types of such pickups can be obtained, and how much you pay is a matter for personal preference. This item may be obtained from any radio shop or postal stores. It is only necessary to take the two leads from the pickup to your pickup sockets. In some cases less background hum may be obtained with the leads connected in a particular way, so reverse them, if necessary and note which way round is best. If long leads are to be used between gramophone and set, some hum may be introduced. This can be overcome by using screened cable instead of ordinary flex.

MISCELLANEOUS ADVERTISEMENTS

The advertisements are inserted at the rate of 4d. per word prepaid. Name and address are counted, but initials or groups, such as E.P.S. or £1/11/6 are accepted as one word. Postal Order and Stamps must accompany the order and advertisements will be inserted in the earliest issue. Announcements of framework goods or those shown in Hobbies Handbook are not accepted. The charge for use of a Box No. is 1/- extra. Orders can be sent either to Hobbies Weekly, Advert. Dept., Dereham, Norfolk, or Temple House, Tallis St., London, E.C.4.

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QUALITY printing at cheaper prices. Estimates free. Proofs by post.—Henery & Brown, 99 Sutton Street, Liverpool, 13.

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20 BRITISH Colonials free with approvals. Postage—W. E. Tucker, 6 Higher Church St., Barnstaple, Devon.

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(Continued on page 220)

Miscellaneous Advertisements—(Continued from page 221)

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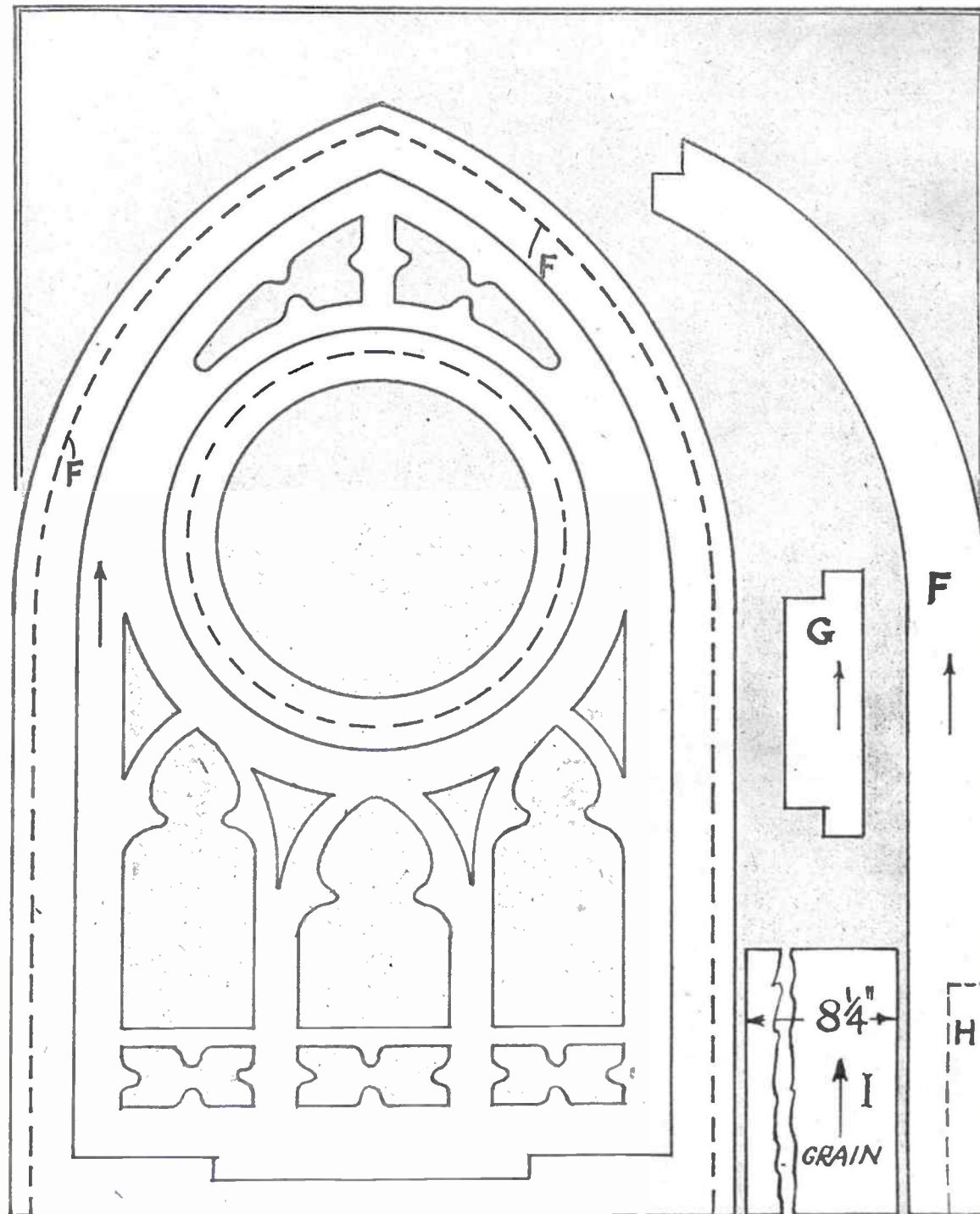
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