

Hobbies

WEEKLY

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January 4th, 1950

Price Fourpence

Vol. 109 No. 2827

HOW THE HANDYMAN CAN MAKE A CHILD'S COT

HERE is a very useful article to make for the home, one that does not need a lot of wood and is quite within the scope of the woodworker. These cots are still rather expensive to purchase and it is really worth while to make one for oneself or a friend, ready when the need arises. Hardwood, like oak and beech, are good woods to employ in construction, but a

serviceable article can be made from good quality deal, as it can be stained to look like a better wood afterwards.

The Metal Fittings

Some ready-made fittings can be bought now, such as are necessary for the drop side of the cot, but will be touched on at the end of the article, then readers can choose for themselves whether to purchase them, or make do with the

substitutes mentioned, which can be fixed up at home.

The two ends of the cot are made up first. Fig. 1 shows how these are put together. The legs are of $1\frac{1}{2}$ in. square wood, the rails 1 in. by $1\frac{1}{2}$ ins., and the dowel rods, joining the rails, $\frac{3}{8}$ in. diameter or $\frac{1}{2}$ in. if a stronger article is desired.

The rails are tenoned into the legs, as at (A), the tenons being 1 in. long, and not going right through the legs. Make these a close fit, and set the mortises in the centre so that the rails also lie central, leaving $\frac{1}{4}$ in. of leg each side of the rails. The tops of the legs are shaped up as at (B).

Rail Spacing

The dowel rails are spaced at 4 in. centres, so it is only necessary to divide the rails into which they fit, into 4 in. spaces. Bore the holes for these dowel rails right through. Fit the horizontal rails in the legs, but do not glue them in yet awhile. Place the dowel rod rails, all cut to the same length, in the top rail and let them rest on the holes in the bottom rail. With a pot of thin hot glue ready, take the rails in turn, glue about 1 in. of the bottom end of each and glue the top ends, sticking out above the rails. Then press each in position, and with a rag, moistened in hot water, wipe off any glue squeezed out. Leave until the glue is set hard.

The rails can now be removed from the legs, and a shaving taken off the top rail to level off any bits of the dowel rails that may be sticking up. Finish off this part by gluing a $\frac{1}{2}$ in. by 1 in. strip of wood over to hide the ends of the rods. This strip looks neater if its edges are bevelled off, as shown at (C) in Fig. 3. The rails can



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now be glued into the legs, and the joints pressed well home.

A home-made mattress can be put together with $1\frac{1}{2}$ in. by $1\frac{1}{2}$ in. wood, to the dimensions given in Fig. 2. A strip across the centre is nailed in, to relieve the strain of webbing. This frame is fixed across the legs with iron bolts,

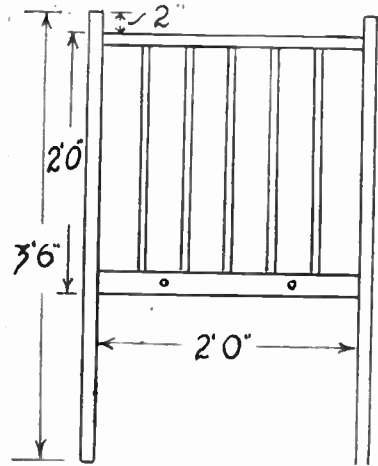


Fig. 1—View and details of one end

suitable holes being bored for them in rails and ends of mattress frame.

The frame is then webbed, two strands lengthwise and four across, the webbing being strained taut and tacked to the top edges. Over the webbing a covering of strong canvas is also tacked. A soft overlay is laid upon this, of course, a suitable one being easily purchased, as the cot is designed a standard size.

The Sides

The sides of the cot comprise two horizontal rails, connected together with the dowel rods before mentioned sizes of timber as for the ends. Dimensions of the sides are given at Fig. 3. The dowel rails are fixed at 4 in. centres just the same as the ends of the cot. The side which will be the rear and fixed side of the cot, as distinct from the drop side, is provided with a metal bracket at each end of the horizontal rails. These can be just the common furniture brackets, the 2 in. size, such as can be bought at hardware shops.

Screw these to the ends of the rails, as at (D) and saw about $\frac{3}{16}$ in. off the arms, which will be attached to the legs of the cot. Reamer out the screw hole, as may be necessary, to fit a $\frac{3}{16}$ in. iron bolt. Now

fit the side across to the legs, holes for the bolts being naturally bored in the legs for the purpose. Fit them for the rail, the top one, to be 2 ins. down from the tops of the legs.

To fit the drop side, a pair of steel rods will be required, 39 ins. long, of $\frac{1}{4}$ in. to $\frac{3}{16}$ in. diameter. These are threaded at top

brackets are also supplied. These fit on the metal rods, and are themselves screwed to the ends of the drop side. It will be necessary to saw a little off each end for the brackets to be in the correct position to fit the rods, but this will be obvious at once. A pair of catches are also included for holding the drop side up.

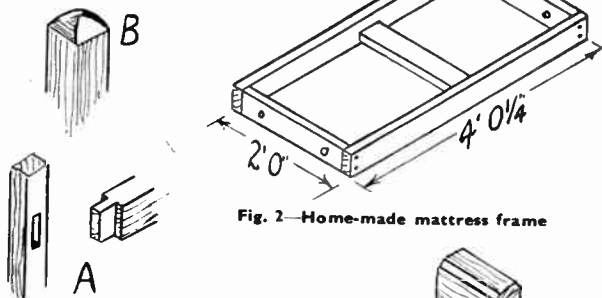


Fig. 2—Home-made mattress frame

and bottom for a nut. The rods are held in screw eyes, driven in the legs at top and bottom. Arrange these for the side, when fitted on the rods, to rise level with the end rails. If a line 2 ins. down from the top is drawn across each of the front legs, the top screw eye should be driven in just above it.

Fit the rod in with a nut, as at Fig. 4 (enlarged at E), and drive the lower screw in at just the height up from the floor to allow room for the nut to secure it. Holes for the rods are bored in the rails at each end, so that they can slide up and down on them.

Side Fittings

To keep the drop side up, when the cot is in use, a cheap cupboard bolt can be fixed each end. Readers who may prefer to buy the fittings ready-made, will find that the fixing is an easy enough matter.

The fittings usually comprise a pair of metal rods, with brackets for screwing them to the legs fixed on. Four sliding

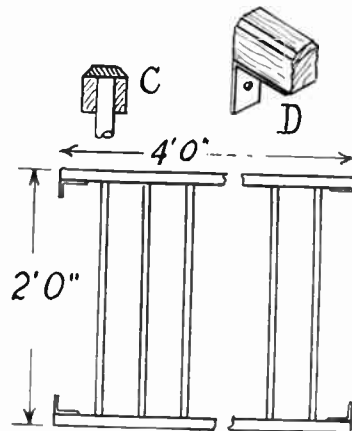


Fig. 3—Rail and fitting for sides

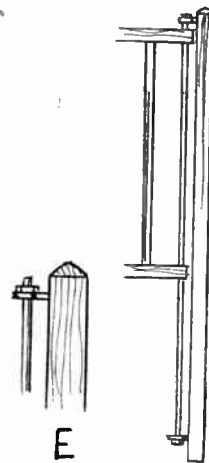


Fig. 4—Side locking detail

suitable cast brackets to fit them are supplied with the mattress. The brackets are screwed to the ends of the cot.

It will be wise here to purchase these (if desired, of course) first and amend the length of the cot sides, if necessary, to fit across. Probably little amendment will be required, as these fittings are mostly of standard size.

It will be seen that the cot is easily taken to pieces for storage or travel, by simply taking out the retaining bolts. The woodwork will look best if nicely stained oak or walnut colour, and given a coat of clear varnish. Alternatively a coat of enamel can be given, but this will be a much longer job.

Earthing a Set

I HAVE built a portable 3-valve receiver, and am using an eliminator. The set works without an aerial or earth, but I have read that mains operated sets need an earth for safety reasons, etc. As my eliminator runs off the mains, does this mean my set will have to have an earth? (R.G.—Carlton).

AS the voltage delivered by an eliminator for a battery set is not

high compared with that present in mains receivers, there should be no danger. But with any apparatus connected to the mains, it is unwise to touch bare leads or connections.

If your eliminator is of the type where one mains lead is connected to the H.T. minus output point, there is some danger of shocks, but this cannot be avoided as such eliminators must not be used with receivers which are earthed,

as this would earth one side of the mains supply.

If, however, the eliminator has a high tension mains transformer incorporated, the mains supply is then isolated, and an earth can be used on the receiver, which would remove possibility of shocks when touching the accumulator leads, or similar points wired to H.T. minus. The possibility of shocks from H.T. positive connexions must always remain.

Bright colouring and a quaint picture make a novel TABLE MAT HOLDER

As can be seen from the illustration, this table mat holder gives a nice touch of colour and humour to any sideboard. When the mats are removed, the horse and rider show up against a sky-blue background. One does not have to be a skilled artist to make the drawing.

Apart from the fact that there is more fun in doing a grotesque horse and jockey, any discrepancies in designing that the non-artist reader may make will not be noticed as they would in an attempt at an accurate rendering of a horse.

Before starting on the actual rack or holder, the mats themselves should be made or obtained. Sets of these, in cork or a rubber compound can be obtained at the stores, or the reader can cut them from sheet cork, etc. They can also be cut from waterproof plywood.

Matter of Size

Sizes vary; in fact some sets consist of two or three sizes. Some are circular but others are square or oblong with the corners cut off. Such straight-line edge mats will be easier for the reader to cut, assuming he is making his own mats.

The present design is intended for mats 6ins. in diameter but will take mats up to 8ins. If large mats are used the design could, with advantage, be enlarged. This is very easily done by making the squares $1\frac{1}{2}$ ins. or $1\frac{1}{4}$ ins. instead of the usual 1in.

Get all the mats together, as this will enable you to get the depth of the holder. All the mats should just go in without having too tight or too loose a fit.

The pattern should be first drawn on paper ruled in 1in. (or larger) squares. There are actually two pieces, though for economy in space, they are shown superimposed.

One consists of the background (sky). This starts from the bottom left corner and goes straight

up, as shown by arrow (Q), and right round the top and down the other side. The other piece consists of the horse and rider plus a strip of grass. This starts from the bottom left corner, but immediately turns round, as in arrow (P).

It is as well to get point (Z) (in the arm-pit) and with this as a centre, describe part of a circle, 6ins. diameter (the diameter of your mats, presumably). This will enable you to spot points (X) and (Y), the purpose of which will be explained shortly.

Note that the 'grass' is thicker near the horse's hooves. This is to provide extra material at this otherwise weak spot. The wood, even if plywood, might break across here if left too thin.

Now transfer the design to the wood. Plywood is necessary and of, say, $\frac{3}{8}$ in. thickness, though a $\frac{1}{2}$ in. piece would do quite well for the back. Have the outside grain of the plywood going vertically for the front piece. Of course, only the outline of the front piece is cut. The other details are painted on afterwards.

The Base

The base is a piece of solid wood, $\frac{3}{8}$ in. thick, 6ins. long, and of suitable width to take the set of mats, as already explained. The front and the back are screwed strongly to this base as nails might easily pull out under a strain. Before assembling, however, paint the back of the front piece with eggshell black, just as cut-out calendars are painted and paint the face of the back piece sky blue. Clean off any 'whiskers' from the wood before any painting is attempted.

Small holes are made at points (X) and (Y) and nails driven right through.

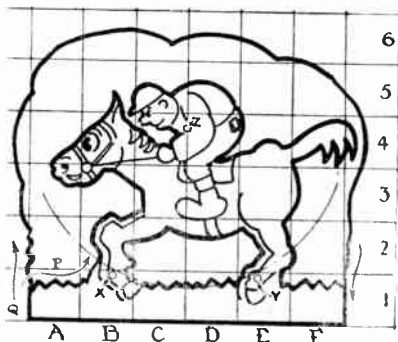


These nails will be slightly above the floor level and prevent the circular mats from rolling out. For straight-edged mats, however, these nails are not necessary. The ends of the nails are, of course, cut off flush, and the punched-in heads filled with plastic wood.

Colouring

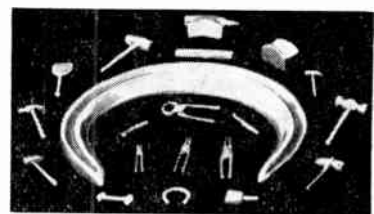
The horse and jockey are painted with bright enamels, doing a bit at a time to avoid the colours running one into another. You can please yourself about colours, but the following is a suggestion: horse, light brown; saddle, etc., dark brown; jockey's boots (lower part) and horse's hooves, black; jockey's breeches, yellow; his shirt, red with white spots; his cap, red; the grass, green with white or yellow spots for daisies, etc. The face and hands are, of course, pink.

As a finishing touch, the model may have a piece of felt or baize glued firmly to the underside.



A Miniature Set of Farrier's Tools

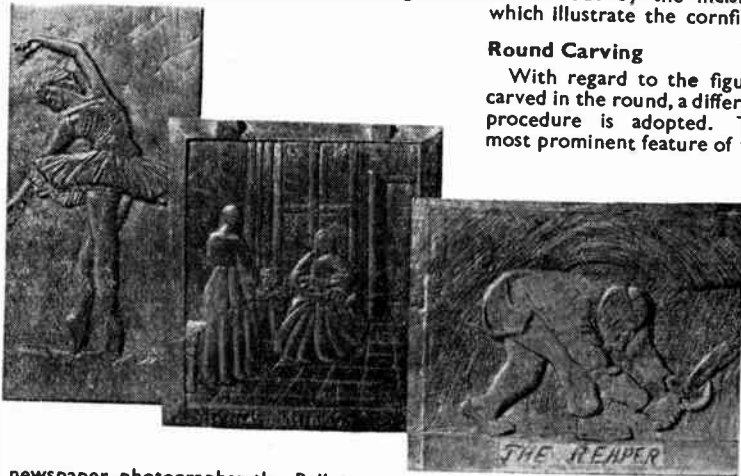
THIS amazing set of 20 tiny tools necessary for making and fixing a horse's shoe was made by a 48-year old craftsman—Mr. E. Boole of 27 Raiton Rd., Brixton, S.E.24. The tools are only about 1 in. long, but correct in shape and proportion to each other. And they were made from silver paper used in cigarette packets. Melting the paper was tricky because the container has to be white hot, so if it is not satisfactory the bottom drops out and the valuable contents are lost! The perfect little tools were made by hand, in 12 months, and were sent to us in an old pocket watch case—which will give you some idea of their size. The larger horseshoe took about 600 pieces of silver paper. Mr. Boole was naturally interested in horses, because he served 21 years in the Cavalry, and took up the hobby when on service in India. If you know anyone interested, Mr. Boole is prepared to sell this novel set.



Practical hints from a reader who became interested in CARVING IN WOOD

The photograph here illustrates what can be done by any amateur who is interested in carving. The reader who sent them, Mr. E. Peachey of Leicester, was entirely self-taught and uses any odd pieces of wood to hand. Those results shown here are in mahogany, pear-wood, box-wood and deal, and thinking some instructions on the subject would be of interest to other readers who might like to take up the hobby, we asked Mr. Peachey to explain the process for their benefit. Here is what he tells you.—

HAVE been indulging in Wood-carving as a hobby for very many years, teaching myself from books from public libraries, and gaining experience with practise. With regard to the reliefs, if you are good at drawing you should never be at a loss for a design. Unfortunately, my free-hand drawing is not very good, and I am inclined to slip up on proportion. I take my ideas from black and white illustrations, woodcuts, embroidery patterns



and newspaper photographs; the Ballet Dancer in relief is a result of the latter.

Measure your photograph for size on a piece of wood approximately $\frac{3}{4}$ in. thick—cut down if necessary, smooth surface with fine glasspaper and clean. Place a sheet of carbon paper on the surface, then the design, and pin down with drawing pins. Trace the detail of the pattern, and then detach. Go over the whole design with a tracer chisel, marking out each item, then carve round the design with a firmer chisel, taking away the background with a gouge.

Procedure

Be careful to gouge away from figure or figures, by resting your hand on the centre piece and turning the wood round as you progress—level off and start on the design. The prominent parts must be

left in high relief, whereas the drapery, etc., that recedes into the background, may be cut away with a gouge, the shape of which is the most suitable to show the features in question to the best advantage.

In the case of the Dancer, the drapery is very much in the foreground and is the determining note in this relief. Every ripple of the skirt gives emphasis—brings out the light and shade, and a background of V chisel cuts shows the figure at even greater advantage. A smooth surface is left where the flood-light strikes the figure, with V chisel marks for the shadow.

The same principle is used for the Dutch Interior. The voluminous skirts of the occupants of the room are brought out to advantage by the tiles on the floor, which are illustrated by V chisel marks. Again in The Reaper the figure is thrown out by the incisions which illustrate the cornfield.

Round Carving

With regard to the figures carved in the round, a different procedure is adopted. The most prominent feature of the

The spectacled face was really an experiment to find out exactly how far one can go with boxwood, which is a fine close-grained wood and I recom-



mend this wood if obtainable. The seated figure is common deal, a good, cheap and soft wood to experiment with, but not suitable for a lasting piece of wood-sculpture.

The lettering is a quotation from Omar Khayyam—"Tis all a chequer-board of nights and days" (it has not come out very well in the photograph) and has a checker-board background to grooved lettering.

Subjects to Attempt

In conclusion I should like to say the majority of woodcarving has been determined by ecclesiastical and ancient subjects, and although these are very colourful, I prefer to portray something entirely different. Should this meet the eye of an interested reader who, unlike myself, excels in drawing and design, just consider how well Verdi's quartette from Rigoletto would appear on a relief—the hunchback with hand upraised invoking rage and vengeance, the slight form of Gilda's with restraining hand, the Duke whose amorous braggadocio would come out so well, and the coquetish sister of the brigand, with head thrown back in a characteristic manner—truly a variety of expression.

In this short article I have only dwelt on the examples of my work shown in these photographs, but there is a vast field to cover in woodcarving.

*The Editor
wishes all his
readers a Happy
New Year*

Full size patterns on page 223 help in making this ACROBAT TOY

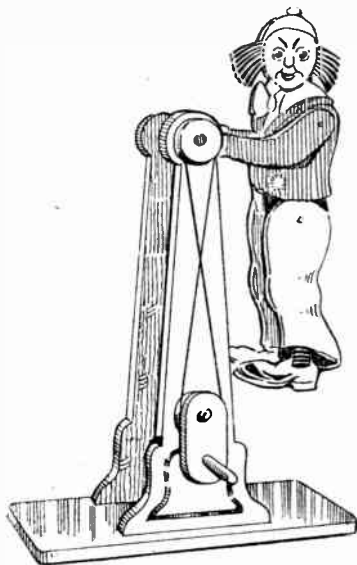


Fig. 1—The toy in action

WE believe the toy given here this week will meet with approval by all our workers, young and old alike. There is nothing like a working toy to amuse the youngsters, and here is one that is simple to make and paint, and just the thing to give away as a birthday or a Christmas gift. Of course, we must at the outset say that there is much in the actual painting and finish of a toy such as this to attract attention. Plenty of time and patience must be expended if it is to be a first-class toy.

Full Patterns

The fretworker should delight in making it, as the various parts are simple in outline. And, what is more, we have been able to give full-size patterns of all the most important parts. Looking at Fig. 1 we see the completed toy in action, and note that the figure of the clown clutches a horizontal bar which revolves between two uprights.

At one end of the horizontal bar there is fixed a pulley wheel round which passes an elastic or string belt and continues to another pulley further

down. On this second pulley is glued a crank and handle so by turning it, the horizontal bar is brought into motion and in turn carries over the figure which performs all kinds of curious antics in his circular travels.

The Base and Uprights

Commence the work of making the toy by outlining the base shown in Fig. 2. All measurements are given here including those for setting out the two mortises to take the uprights. The base, be it noted, is made sufficiently wide to allow of the left-hand fingers of the operator to hold it rigidly in place while the figure is in motion and the crank in action.

Wood $\frac{1}{2}$ in. thick will do for the base and for the uprights also. Round off the corners of the base piece and clean the two surfaces with glasspaper. Now make the uprights, the pattern for one of these being given at (B) on the pattern sheet.

If the worker does not wish to destroy his copy of *Hobbies* by cutting the sheet and sticking the paper down, he might prefer to make a simple outline tracing of the upright and either stick this down to the wood or transfer the outline with carbon paper. The second upright is made by drawing round the cut-out one after the latter has been cleaned with fine glasspaper. Check the length of the tenons on the uprights with the mortises in the base before actually cutting them so as to ensure a tight fit. Then apply the glue to the tenons and press them in place.

Figure Parts

The five separate parts of the figure, shown full-size on the pattern page, are next cut. Here again the parts may be traced and stuck to or transferred to the wood, leaving the patterns as a guide for colouring, and for future use. Wood $\frac{3}{16}$ in. must be used for the figure and the rough edges after cutting should be carefully cleaned. Note carefully the pivoting holes on the patterns, as much depends on the proper working of the parts for their true placing.

The arms and legs are pivoted to the body by means of short lengths of stout wire threaded through the holes and bent up neatly on the outsides. The

painting of the figure should be done before the parts are connected up, for sake of convenience in handling. A piece of $\frac{3}{16}$ in. diameter rod will now be wanted, cut to the length given at (F) on the pattern sheet.

To one end of this is glued a disc of $\frac{3}{16}$ in. or $\frac{1}{4}$ in. wood as (C) on the pattern sheet, and in the detail, Fig. 3. Pass the rod through one of the uprights and then thread on the hands of the figure, using a touch of glue here to fix them securely to the rod.

Pulley Wheel

Then, on the outer end of the rod, glue on a pulley—D on the pattern sheet. An ordinary $\frac{1}{4}$ in. disc of wood is used and the deep groove round it cut in with a rat-tail file. Or a vee groove can be made with a triangular file as desired. The rod must work quite freely but not loosely in the holes of the uprights.

Another pulley is now made similar to that shown at (D) but with a smaller hole in its centre to admit the passage of

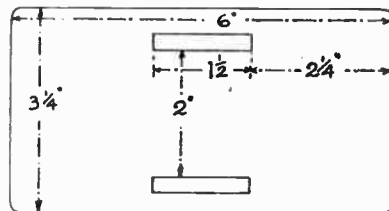


Fig. 2—Details of the base

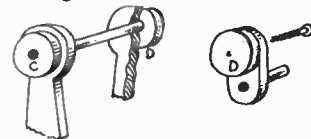


Fig. 3—Disc and spindle

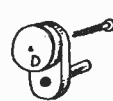


Fig. 4—Handle arrangements

a long round-head screw. To this pulley is glued the crank (E) made up of the piece shown in the pattern sheet with a piece of $\frac{3}{16}$ in. rod put through as a handle. Fig. 4 shows the complete unit ready to screw loosely to the upright.

A disc of wood should be cut and glued to the inside of the upright to receive the end of the screw which should not be less than $\frac{3}{16}$ in. long with round-head.

Assembly

It only remains now to clean certain parts of the toy and to connect up the pulley of the working figure with that below with a belt as previously suggested. The picture of the finished toy gives ample suggestion for painting in bright colours with markings, features, etc., in black or dark brown. Poster paint or ordinary paint can be used, care being taken that it does not run into holes or pivot points to affect the mechanism of turning.

How not to use a Fretsaw!

WHAT things our readers do get up to, for sure! And how they do use a fretsaw! One of our young friends tells me his delight in his work and an incident when he first used his fret-frame. 'I was', he says 'idly sawing away at a piece of wood, practising cutting straight lines and curves when I found, to my horror, I had fretted a not-so-neat

pattern in the kitchen table top! Now my grandmother's table has strange glued lines running around one corner, holding the thing together'. Just shows you what a Hobbies fretsaw blade can cut, doesn't it. I must not tell you the reader's name, in case his grandmother also is a follower of our pages!

The Editor

The first of two helpful articles on HOME UPHOLSTERY

MANY readers will find that a knowledge of upholstery is a useful thing, especially when a worn piece of furniture requires attention.

Such articles as chairs and music stools, can be attempted, however, even by the tyro, if he follows the instructions given below carefully, and experience will be gained which will be helpful when tackling bigger articles.

The easiest upholstery job is a chair of the springless type and this is a safe article to commence on. For the work a few simple tools are required, a strainer for tightening the webbing, a long double-eyed upholsterer's needle, and a curved needle. These, with the common household hammer and pincers, will be all that is needed for a start.

The Strainer

The strainer can be made at home. It is sketched in Fig. 1, and is a piece of hardwood, some $\frac{1}{2}$ in. or more in thickness, cut to the shape shown in the diagram. At some 3 ins. from the pointed end cut out a slot for the webbing, $2\frac{1}{2}$ ins. long and $\frac{1}{2}$ in. wide.

The width of the slot should be widened out to $\frac{3}{4}$ in. underneath, and a wedge-shaped piece of hardwood shaped to fit it, as at (A). Attach the wedge to the strainer with a length of cord to prevent loss.

The springless chairs are usually of two types, fixed or loose seats. The instructions apply equally well to both. First strip off all the old upholstery, as none of it can be replaced satisfactorily, unless it is the stuffing. The latter can be teased out with the fingers and will serve, with the addition of a little fresh material, for restuffing. Knock out all the old tacks, dust off, and all is ready for re-webbing, the first part of the job.

Strands Number

The number of strands required will depend somewhat on the size of the seat, usually two from back to front, and two or three across, will be sufficient. This webbing takes all the weight of the sitter, so it must be strained as taut as possible. This is where the home-made strainer becomes of importance. Proceed as follows.

Tack the webbing to the frame with three tacks, leaving enough webbing, say, $\frac{3}{4}$ in. from the tacks for doubling over. Double this over the tacks and drive in two more through the double thickness. Poke the webbing through the slot in the strainer, slip the wedge in—this will prevent the webbing slipping out under stress.

Now place the strainer, with its sharpened end against the chair edge, at the angle shown in Fig. 2, and press it downwards to tighten the webbing as much as possible. Keep it tight, while

tacking the first three tacks. Then cut off at $\frac{3}{4}$ in. away from the tacks, double over and tack again.

Repeat this for every strand, remembering to interweave the cross strands, as at Fig. 3. If you have tightened the webbing fully, it should yield little on pressure of the hands. The seat is now covered with a single layer of canvas, on which the stuffing material is to be laid. Use a good quality material here, at least a fairly close woven kind, that will stand some wear. As it is hidden from view, a strong sacking material might serve. But it must be strong.

The Canvas

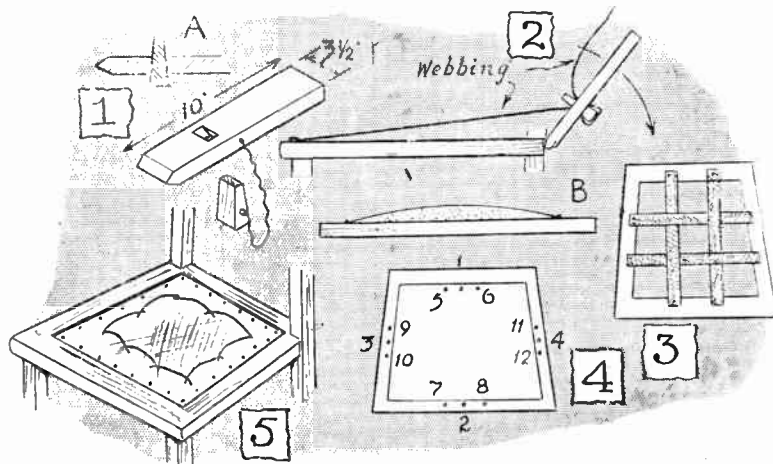
The canvas must be cut large enough to allow a $\frac{1}{2}$ in. all round to be doubled over, otherwise the strain of tightening it may cause it to break away from the tacks. The tightening must be done with the fingers, the webbing strainer being useless for this part. To get an

The stuffing material should then be pushed in handfuls under the loops, and when enough has been so treated, a further quantity should be spread over the whole and pressed to a shapely curve, as at (B), Fig. 4, with the hand. Over this the undercovering, if used, should be carefully tacked, or if no undercovering is employed, a sheet of cotton wool should be laid over before the final covering.

The cotton wool helps to level out any slight irregularities in the stuffing and makes for a smoother seat. The undercovering is usually a cheap calico or other similar material, but as the term 'cheap' is now distinctly a misnomer, unless the reader has some handy, it would be as well, perhaps, to do without it.

For Springless Seats

The padding or stuffing material, not mentioned before, for a springless seat should, for preference, be horsehair. It



equal tension all over the seat, adopt the following method, referring to Fig. 4.

Drive a tack at (1), pull tight as possible and tack at (2), then at (3), pull tight and tack at (4). Now repeat this in the order shown, (5) and (6), (7) and (8), and so on, and continue until only the corners are left. The result should be a covering as tight almost as a drum, and creaseless. This method should also be followed when covering the stuffing with the upholstery material.

Needle and Twine

Now, with the upholstery needle, and some strong twine, sew a series of loops over the canvas covering. The object of these is to retain the stuffing in its place when repeatedly sat upon. Keep all the loops at a uniform slackness, a piece of wood poked between the canvas and twine, when making each loop, will help here. Arrange the loops at about the position shown in Fig. 5.

has a springy quality, not possessed by other stuffing substances, and helps the seat to retain its shape. If not available or too expensive, then a good quality flock may be employed. The cotton wool (this is inexpensive) should be used over flock if at all possible.

The final covering material should be cut roughly to the size required, and be tacked on as already described. The surplus should be trimmed off close to the tacks with a sharp knife. Cover the tacks with a banding or gimp. Banding, which can usually be bought to match the material, is employed for American cloth, Rexine, and such-like stuffs. Tacks are not used for fastening it down, they would look unsightly, instead the fancy brass or copper chair nails are substituted.

Covering with tapestry, velvet, and similar material, a gimp is used to bind with.

(To be Continued)

A number of valuable small points to remember in RADIO CONSTRUCTION

It appears that many wireless constructors would welcome guidance on a number of small points which often arise when a receiver is built, and which may not be described in detail because space does not permit this. Therefore beginners, in particular, should find the following details helpful, no matter what kind of amplifier or receiver they are constructing.

Valveholder Mounting

Valveholders are either of the type intended to screw on a baseboard, and have sockets and terminals on top, or the type where the sockets project below.

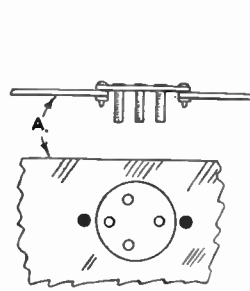


Fig. 1—Mounting components on baseboard and chassis

The latter type will normally be mounted on a chassis, as shown at (A) in Fig. 1. The valve will be inserted from the top and all wiring will be underneath. This arrangement proves more tidy and convenient in larger receivers.

The chassis may be of metal or plywood. A hole sufficiently large to clear the valveholder sockets is necessary. (This will usually be 1 in. or so in diameter, depending upon the type of holder). Such holes may be cut with a suitable fretsaw, but a hole or washer-cutter is better. This has a small blade which can be set to any radius and it is used in an ordinary brace.

Metal Chassis

With a metal chassis it is essential there be a reasonable clearance between the metal and all holder sockets and tags. It is best to mount the holder on top of the chassis if the latter is made from plywood, otherwise the valve pins may not fit properly into the sockets.

Baseboard type holders should be secured by means of round-headed screws, as shown at (B). This also applies to small fixed condensers and other parts with bakelite or moulded bases. If countersunk-headed screws are used, as shown at (C), the holder will quite probably be broken when the screw is driven tight.

Valves and holders are made so they will only fit together in one certain position. Because of this it is only necessary to follow the wiring diagram

of the set being made to assure connections will be correct.

Variable Condensers

Small reduction drives which fit on the condenser spindle are quite often used, and these appear to offer a problem as regards mounting. The simplest method is to use a component-mounting bracket to which the condenser (D) is fitted. A long bolt can then be used to steady the projecting lug of the drive, which must not be allowed to rotate. The whole can be mounted so the knob is conveniently situated on the panel.

If the condenser is mounted directly on the panel, a suitable hole must be drilled (this will usually need to be $\frac{3}{16}$ in. in diameter). The bush is passed through and the nut screwed on, holding the part, as shown

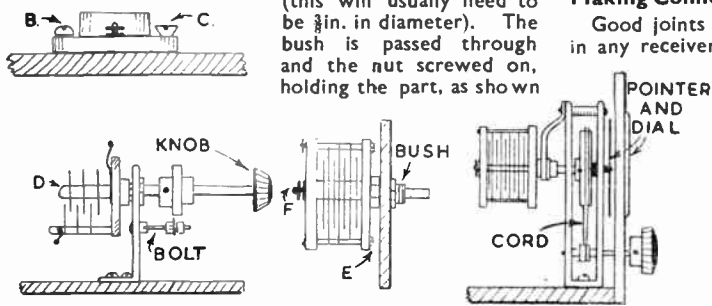


Fig. 2—Side view of panel mounting parts

at (F), Fig. 2. With a metal panel a small space (E) must exist between the bolts or rivets holding the fixed plates and the panel or the condenser will be shorted. A washer may be added on the inside to accomplish this, which is also desirable with wooden panels to assure the condenser is not distorted by pressure on these points.

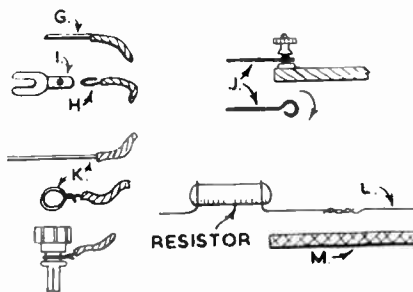


Fig. 3—Making proper connections

If the bush of the condenser is not wired directly to earth (as it should be, if possible) a wooden panel must be used, or an insulated bush added to prevent contact between axle and metal panel. A condenser in series with the aerial will require treatment in this way, as will that used with some reaction circuits where the moving plates are connected to the reaction coil.

Reduction Dials

Numerous types of reduction dials are available, and some fit directly on the

front of the panel, replacing a knob, so the condenser is fixed as already mentioned.

Others go behind the panel, and a hole of suitable shape will need to be sawn out to accommodate the dial. These drives often have a bracket to hold the condenser, as shown in Fig. 2. It is only necessary to set the dial pointer at zero, open the condenser vanes fully, then tighten the screw securing the condenser spindle.

The drive may be obtained by cord or spring plates and, although a spot of oil at other points is helpful, these should be kept dry.

Making Connections

Good joints throughout are essential in any receiver. To fix spade-ends for accumulator connections, bare about $\frac{1}{16}$ in. of flex, as shown at (G) in Fig. 3. Then twist tightly and double back, insert in the spade, and tighten up the small screw (I). The doubled end (H) should be held firmly, or crackles, etc., may arise.

Some battery plugs are treated in the same way. Others require an inch or so of flex to be bared, and the strands formed into a loop, as shown at (K). Again, other plugs have a slot through which the wire is passed, or a small hole, and whatever method is used assure the wire is perfectly tight.

Many small parts have terminals and a small loop should be made in the connecting wire. Electrician's pliers are

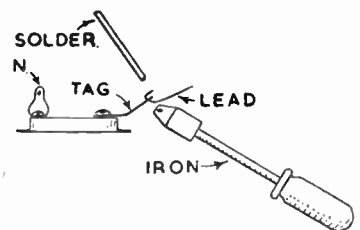


Fig. 4—Soldered joints

very convenient for all work of this nature. If the loop is made in the same direction as the terminal screws down it will not be forced open when tightening up, as often happens when the loop is reversed (see (J)).

Many resistors and wire-ended condensers have quite short leads. If these will not reach, a length of thin wire should be twisted on (L) in Fig. 3, the joint soldered, and insulated sleeving (M) slipped over.

Tinned-copper wire is much the best, because it solders very easily and also

(Continued foot of page 216)

The housewife will be delighted if you arrange these handy KITCHEN FITMENTS

FEW houses of any type seldom have sufficient cupboard space to satisfy the housewife and yet the space is actually there to be used. It is just the question of making something out of the ordinary to fit into that space. It is also a fact that in many cases the goods which go in any set space can easily go into half of the height or depth by careful arrangement. Here are some suggestions.

Corner Space

What about those corners? Have a glance at the space in the corner, shown in Fig. 1. Obviously an ideal piece of cupboard room to make. In that detail

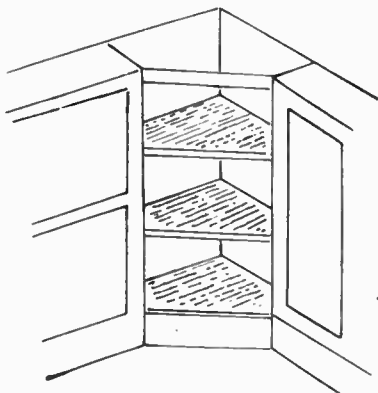


Fig. 1—A corner converted to shelving



Fig. 6—Some under-shelf tin-holders

this has been converted into a small angular cupboard, but nevertheless, it is very useful.

Should the two cupboards or other fitments which form this space be highly polished affairs one need not damage them. Just build a light wooden frame, as seen in Fig. 2, from light 1 in. square wood prepared and stained before assembly. Now these two stands will fit in and the two outside cupboards and the wall corner will hold the whole lot firm.

Panels or hardboard is now off permit

and plentiful. This is very tough and just the thing for doors and shelves. It is mostly 6ft. by 3ft., and sometimes larger, which enables you to get large cupboard doors out in one piece. One side is very effective and when polished or stained makes a very clean, slick finish. It does look very modern in trend but needs a good 1½ in. square framework to support it.

Making Cupboard Space

A space so often left absolutely unused is the space under the sink. A fitment there must be carefully considered, as no obstruction must be made in view of the position of the waste pipe.



Fig. 2—Shelf framework

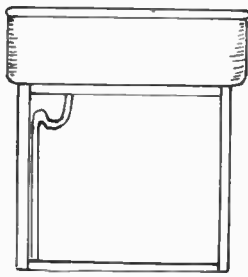


Fig. 3—The usual under sink vacancy

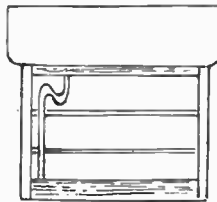


Fig. 4—Shelf filling

However, generally speaking it can be used. Apart from its storage purpose, too, it does make the sink look a little more attractive.

As shown in sketch Fig. 3, the sides are fitted to two uprights made of 1½ in. square material with a cross section of wood on the floor. Another piece crosses at the top. Try using screws in preference to nails so the sink does not get disturbed or chipped in any way. Note that the base is built up from the floor because there may be a certain amount of dampness on the floor under

the sink. Floor and shelves should be made to take out (see Fig. 4). A flat type of door, hinged, can be added. This type of storage will take stains, polishes and small cleaning items.

Crockery Holder

There is seldom room for all the crockery. If you find a suitable space then proceed to work out how many shelves you need. Build the shelves to suit the goods in this way. Bottles and jars can go at the top. They are not always in use. See how tall these are. Make the top shelf to just take them. Jugs are mostly next in use. Probably you have three sizes. Here again you

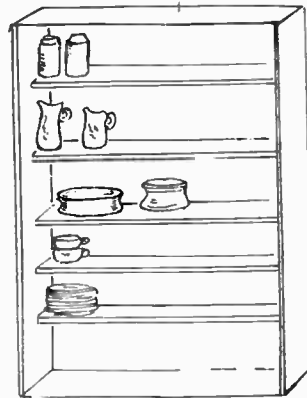


Fig. 5—Shelving for crockery

can save space. Half-inch clearance is quite enough. Some useful shelving is shown in Fig. 5.

Soup tureens could come next. These are heavy and best housed mid-way, not too high and not too low. In any case they are not used so much as cups, plates and saucers. Cups can stand in each other and thus save space again. If you keep the shelves for the large plates close to each other you will prevent too much weight being put on any one shelf.

Even trays, bread boards, etc., can be housed right out of the way by being given slots fitted under any shelf where there is space, as can be seen in Fig. 6, and arranged according to your own needs and opportunities.

Remember to make all joints strong to take the weight of the heavy contents.

Radio Construction—(Continued from page 215)

makes good terminal joints, whereas copper wire oxidizes rapidly and is difficult to solder in this state. Thick wire is awkward. Wire of about 20 S.W.G. is amply stout for all ordinary receivers and easy to handle.

If the wire is insulated the insulation should be stripped off at the ends, taking care not to fracture the wire itself. In small sets much time can be saved by using bare wire, and insulated sleeving can be slipped over this where desired. For all battery leads flex is used.

Though many constructors avoid soldering, this can be much easier and quicker than forming terminal connections, and with some components soldering is essential as only tags or leads are fitted.

Actually, soldering is easy if the iron is really hot—it should melt the solder immediately the latter is touched on the iron. The points to be soldered should also be clean, and for radio construction one of the well-known cored solders is best. With such solders, it is only

necessary to bring iron and solder simultaneously into contact with the joint, when the solder should run round the latter.

Iron and solder should be removed at once so as not to overheat the component internally. This is shown in Fig. 4, and often the tags have a hole (N), through which leads may be passed before soldering. Do not place solder on the hot iron and transfer this to the joint, or the fluxitive qualities of the cored solder will be wasted.

A novel piece of simple engineering is to make A TIN CAN TURBINE

DESPITE its simplicity, the little model here described will yield hours of instructive amusement to the budding engineer, and being the forerunner of the modern turbine, may well form a starting point for more ambitious efforts. If carefully made and finished, it would also form an ideal present for any mechanically-minded youngster.

The only materials required are three empty tin cans, a nail and a small square of wood, while the tools needed are a hammer, pliers, soldering-iron and tin snips or a pair of old scissors.

The Boiler

One of the tins forms the boiler, and this must be strong, watertight and provided with a well-fitting flanged lid. An empty Golden Syrup or Nescafe tin are ideal. A fairly large tinned fruit or jam container, opened up and flattened, provides material for the rest of the model. A blacking tin with a hole punched upwards in the lid and supplied with a short wick of thick string makes a suitable spirit lamp. As the edges of all the cut tin will be sharp and tend to curl, they should, before shaping, be ironed out smooth and flat with the hammer.

Begin by drawing a paper disc which

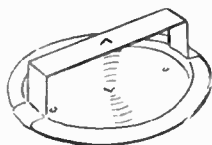


Fig. 1—Boiler lid and top bearing



Fig. 2—Rotor on spindle

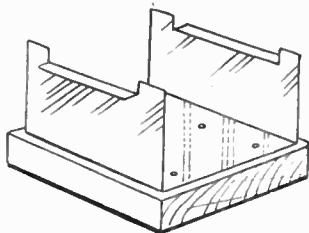


Fig. 3—Firebox fixed to base



Fig. 4—The lamp

will fit snugly down into the boiler lid. Before cutting out draw a line across the diameter and make a dot at each end $\frac{1}{2}$ in. inside the circle. These dots mark the positions of the two steam ports, and the compass point indicates where the dent should be made for the bottom bearing.

Dents and Holes

Remember that only a dent must be punched here for if the lid is actually pierced, the bearing will be useless. Practice first on a spare piece of tin, a blunt nail requiring only a very light hammer-tap to produce a satisfactory dent.

After this, with the aid of a gramophone needle held in sharp-nosed pliers, pierce the two small holes for the ports. Once again light taps only are needed,

for if these holes are made too large, the requisite steam pressure will not be obtained. The ports should appear as mere pin points when the lid is held to the light. The detail at Fig. 1 shows this upper component.

Spindle

For the rotor spindle select a fairly stout 1 in. nail. Cut off its head and with a triangular file carefully work up each end to as sharp a point as possible. Make the top bearing by cutting a tin strip $\frac{1}{2}$ in. wide and long enough to span the lid. Each end should be bent down at a right-angle, and be either clipped round or soldered to the edge of the lid.

A small upwards dent must be punched in the middle of this cross piece for the top spindle point, and this part so positioned when fixed that both dents are vertically in line to ensure the spindle standing quite upright. The spindle should, of course, be free to revolve but without any appreciable shake, any adjustment needed being made by gently bending the cross piece either up or down.

The Rotor

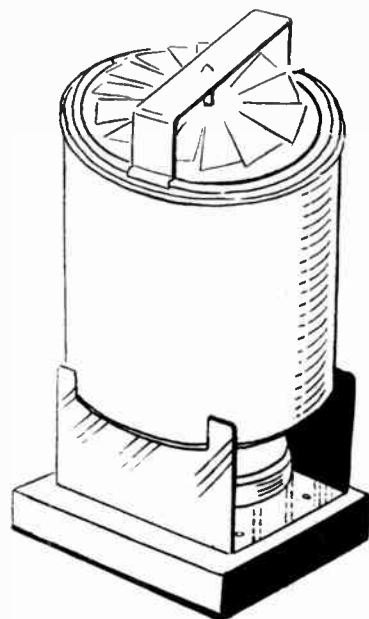
The rotor can now be made (Fig. 2) and as it will spin between the top bearing uprights, its diameter must be slightly less than the distance between them. Draw a circle of the required diameter, and an inner circle of half that size from the same compass point.

With a protractor or setsquare, divide the circle into 12 equal segments of

30 degrees, then gum the paper on to a flat piece of tin.

When dry, cut out the blank disc and punch a tight-fitting spindle hole through the centre. Now cut radially along the twelve pencilled lines as far as the inner circle to form the rotor blades. During this operation it will be found that the blades are being automatically twisted to a certain extent, and afterwards they require further twisting to an angle approximating 45 degrees with the sharp-nosed pliers.

The paper pattern can now be soaked off and the rotor pushed on to its spindle. Holding it lightly between finger and thumb, spin the assembly by gently blowing against the blades to test for truth. When correct secure the disc to the spindle with a touch of solder. Now carefully introduce the



complete rotor into its bearings and test that it spins quite freely.

The only remaining part is the firebox (Fig. 3), and this is made from a piece of tin slightly wider than the boiler and long enough to bend up into a flat channel with sides about $1\frac{1}{2}$ ins. high. Stand the boiler on these upturned sides and make $\frac{1}{2}$ in. downward cuts at the four points crossed by its circular base.

Wooden Base

Afterwards bend out the middle portions of each side so the boiler can finally bed down between the four remaining corner lugs. Tacking the fire-box floor to a slightly larger wooden base completes construction, and the turbine can now be tested. The lamp is the tin with a wick, as seen in Fig. 4.

Half fill the boiler with water and the lamp with methylated spirit, and light up. In a few minutes steam should be hissing through the ports and the little rotor buzzing merrily round. Having passed its running tests, the model should be emptied, dried off and cleaned ready to be enamelled. A black fire-box and rotor with a green boiler and top bearing will make the model really smart and attractive.

JUNIOR ENGINEERS

THOSE interested in amateur metal work will be glad to know about the Juneero Annual just published. It is a helpful little book and contains a design for a Bulldozer model to make, and particulars of a national competition with £150 in prizes. Readers interested should write to Juneero Ltd., Stirling Corner, Boreham Wood, Herts., sending 1/2 for a copy.

The concluding article of helpful hints on building MODEL GALLEONS

In our previous article (December 7th), we gave a number of hints for the model maker who is undertaking these model galleons, and has proceeded to the completion of the hull. It is, perhaps, essential again to stress the importance of patience in this work. There is a great fascination in the building of these historic models, but at the same time one cannot attempt to hurry the work or expect to get it finished in a comparatively few hours.

Much depends on what you want in the finished model. Many of them are simplified replicas of the old-time ships, and easily recognised as such, but they contain very little detail or additions such as would be needed to satisfy the real student of ship building and history.

Easy for Beginners

The beginner is not advised to undertake the very elaborate models which can be built, but rather to try his prentice hand at a comparatively simple piece of work. The larger the model

it will mean a considerable amount of research in various books on the subject, in order to become acquainted with the type, style and position of the various parts.

Remember, too, in this connection that the ships themselves altered through the years. Even in what are generally termed galleons, there is a range of difference owing to the century covered by this period.

Historical Accuracy

On this point, as an example, deadeyes are generally used rounded with a hole through the centre, and a groove round the edge. The accurate model maker would find this incorrect because in the 15th century these deadeyes were heart shaped, scored at the upper end for the lanyard. By the 16th century, however, although their shape was retained the same, three holes were incorporated in them for lashing, and they were secured to the hull by chains.

It may be, too, that you can only obtain these deadeyes for your model in a certain size. Make sure, then, that they are in the proper proportion to the rest of the model. If you have large ones, they will look very clumsy on a small hull, and vice versa. Even the diameter of the

and need only add a note about how essential it is to fix the hull tight whilst this painting is being operated.

It is worth building a rough jig or cradle on the bench into which the hull can be fitted. It is held upside down whilst the main part is being covered, and then when that is dry, the part is reversed so the deck can receive attention. These decks in most cases should be left in a natural state, oak stained to give a weatherbeaten effect.

The deck planking is easily indicated by drawing on long parallel lines from bow to stern. You can scribe the lines down first with the point of a knife, and then run a hard pencil line into them. Have the width of the deck planking in some relation to the actual width of the model.

Deck Lining

Most beginners make these lines too wide apart, so that in reality the deck planking would be absurdly wide. On reasonably small hulls they could be about $\frac{1}{16}$ in. or $\frac{1}{8}$ in. apart. A good plan is to pencil on some of the planking first, to see how it looks, then you can alter its actual width when finally adding it to the deck itself. The inside of the bulwarks can be painted a dark brown or red, and any doors or gratings given their necessary lining in indian ink.

If you want to get a dull effect after bright paints have been used, give the whole thing a coat of eggshell varnish. This will take the gloss off entirely, but should not be used over gold paint itself. For general use, poster paint is the best, although it does tend to bring up the grain. You may prefer enamel thinned down slightly, but cellulose is not entirely satisfactory. It dries very

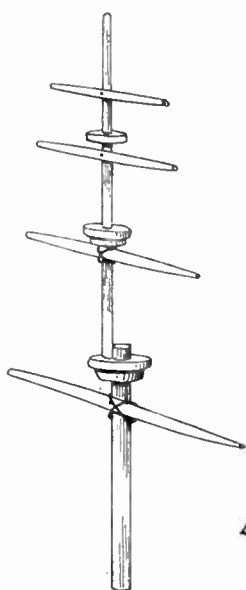


Fig. 1—Mast and spars

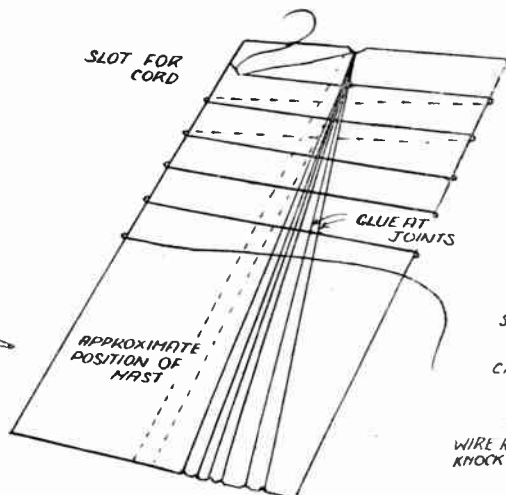


Fig. 2—How to make the shrouds

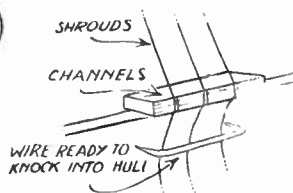


Fig. 3—Channel details

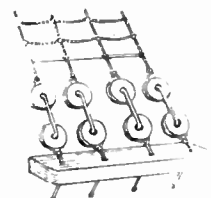


Fig. 4—Foot of shroud fixing

being made, the easier the parts are to handle. At the same time, you must remember that a large model should have many more detailed parts to it than would a smaller piece of work.

The deck of a large model, for instance, would look bare with just one or two hatches and gratings. It would have to have additional ropes, companions, sampson posts, etc. Again, the model maker must decide whether he wants everything strictly accurate according to historical records, or whether something nearly right will meet the case.

If absolute accuracy is required, then

line used for rigging should be adjusted to the actual model in hand.

Fishing line is quite suitable for this, as being strong and fine. Do not, in any case, attempt to complete your model with ordinary coarse string, particularly in various thicknesses.

Painting the Hull

Now let us return to the hull which we have completed according to the previous instructions. It should be carefully painted before the masts, sails and lines are added. We spoke of the actual painting in the previous article,

quickly, which is not always a good thing.

A fine brush must be used, and it is essential to keep the hand steady, particularly when attempting to do fine line work. Have a block of wood or something handy on which you can rest the wrist or the forearm whilst the actual fine work is being done.

The masts, sails and rigging are, of course, a complete job in themselves. When you have finished the hull, you must expect to spend just as long over the sail-work to get it satisfactory. The process involves the erection and fixing

of the masts, to which are added the spars—the cross pieces.

The sails of parchment paper are added next, and then the running lines which are those by which the sails themselves would be hauled or shortened or handled. Finally there is the standing rigging which consists of the shrouds and those lines holding the main mast and other parts rigidly to the hull itself.

Taper Masts

Each portion of the mast should taper gradually upwards, and where the sections join, a capping piece is provided to take the top of one and the bottom of the other. The tapering of the masts can be done with glasspaper, and if you fit it into a hand drill it can be revolved speedily whilst working the paper along the length of the section involved. A capping to the extreme top of the mast is added, if you desire to finish the whole thing off neatly. Be sure, however, that this little round piece of wood does not look large and clumsy.

The cross spars should taper towards each end. They can be fitted at right-angles to the mast by making a slight groove in both parts so the two bed together before gluing. A tiny pin point should be driven through both, to ensure rigidity, and a single turn of fine thread added to hold the whole thing (see Fig. 1). These tiny pins can be frequently used for joining parts, but in every case remember to bore a hole first. This can be done with a strong needle held in pliers, and twisted as it is sinking to make the hole. Glue should be used very sparingly, and no unsightly blobs left.

The Sails

The sails are cut to the patterns required, and then should be made to curve as though one were blowing them out. This 'bellying' effect is easily obtained. Lay the sail paper flat on the table, and hold a steel ruler or some similar object flat upon it. Grip one edge of the sail and pull it from underneath the edge of the ruler, with a gradual lifting movement. You can try it first with a small piece laid flat under the blade of a bread knife. By drawing the paper out smartly, the curved effect is obtained, and with the parchment or sail paper used, this curve remains with suitable realism.

Pierce tiny holes in the corners of the sails to take the running lines, and thread on the top of the sail along the spars. A spot of glue here is helpful, or you can even carry a special tab left on the sail around the spar to form a gluing piece.

Deck Fixings

Those lines which run down to the deck should be neatly finished off with a tiny eyelet. Put these into the deck close behind the bulwarks, and tie off the lines neatly. The eyelets are obtainable quite small in brass, or you may prefer to make your own little staples of bent pins or wire driven into the deck itself. For this purpose, small sharp-nosed pliers are helpful. Indeed, they are

helpful on many occasions in model making. They are, however, essential to grip the little staples and force them into the wood without bending.

Deadeyes or pulley blocks are one of the problems of the model maker, but fortunately more and more of these are now available in varying sizes. If, however, you cannot obtain them, they are not difficult to make. They do, however, require patience and care if you are having to make several dozen for your model. Do not attempt to make each one individually.

Home-made Pulley Blocks

Take a length of rod or dowelling and mark on it a series of circles each the width apart of the thickness of the proposed block. Between these pencil lines, a tiny file is used to form a groove

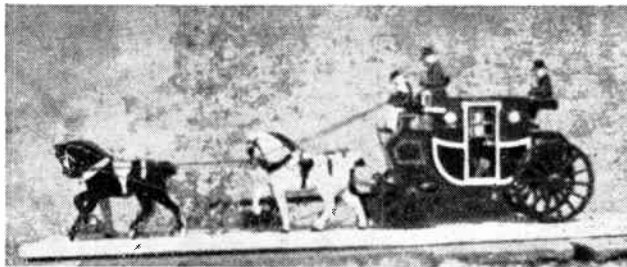
added, being quite taut and with an even tension throughout.

It is advisable at the bottom end to fit on a piece of wire to maintain the lines at their correct spacing. Add a very slight touch of glue where all cords cross, and when this has set, cut away the card and the spare parts of cord. The top end where all lines go together, must be finished off with a knot so they do not pull out. Leave also some length of line at the bottom to allow for fitting to the hull.

One method of fitting these lines to the hull is shown in the detail at Fig. 3, and the final result is shown at Fig. 4. The channels are a piece of wood glued on edge to the hull, projecting far enough to carry the shrouds outboard over the bulwarks themselves. The ends of the lines run through tiny

A First Attempt at 74!

Never too old to start! Mr. C. W. Cunningham, Elveston House, Greenway, Som., made this model of a Stage Coach from our design, at his first attempt. Not bad at 74 years of age is it? Now he is making the model of H.M.S. Bounty. Well done, sir!



round the dowel rod. If possible, drill a small hole into the dowel from the end as far as possible. Now with a very fine saw, cut the rod through at the pencil marks.

Each resulting piece is finally given a rubbing with glasspaper to round the edges. You can do this by putting the block on to a tapered stick to form a hold whilst papering. If, of course, you are going in for the heart-shaped blocks previously mentioned, then the rod will have to be triangular rather than round, and three holes bored through in position.

The blocks are principally used at the ends of the shrouds which formed the ladder leading from the bulwarks to the mast. These shrouds extend from a single width at the top to, perhaps, four or six lines at the bottom, and have cross runs (the ratlines) evenly spaced upwards. Making these, again, must be carried out with care if a satisfactory result is to be obtained. One way of doing it is shown in the detail herewith—Fig. 2.

Forming Shrouds

A piece of fairly stiff card has a cut made in it at one end, then at the other end the same number of cuts as it is proposed to have lines. The card need not be so wide as shown, which is merely for illustrating purposes. One end of the cord is fitted in a slot, and then carried round from one end to another as indicated. The cross lines are then

grooves in the channel edge, and are then pulled tight to the hull with a little wire staple as shown. This wire is bent at each end and sharpened to a point so it can be forced into the wood of the hull itself.

Where running lines are passed round the pulley blocks, they can be glued in position, and if two lines pass over each other, a spot of glue will help to fit them satisfactorily together. Take care in adding all these lines to see that the tension is maintained throughout satisfactorily.

Fixing the Masts

The masts should be let into the deck in the first place, and when their various sections are added, the whole thing should be rigid. The standing lines should then be carried to their various parts in the hull. Take care not to pull one lot tight and so loosen another lot. Keep them all just sufficiently taut to appear strong and supporting. Lines between masts or running from sails need not be so taut, and a study of the usual picture of the finished model will help in this respect.

Naturally it is impossible to get all the actual lines to these ships because of the size of the model. Those which are fitted, however, should appear to be a part of the whole thing, and neither be too obtrusive for size or quantity, nor too unseen to play their part in the finished model. All such details help to make a finer piece of work.

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South of The Equator

A FEW weeks ago we discussed some of the marvels which are shown on the stamps issued by countries situated north of the equator. We had to divide the world into at least two parts because there were so many marvels to show. This week we hope to tackle the subject south of the equator. Naturally things which are strange and interesting to us here in England are commonplace to those who live in the country picturing them.

Suppose we look at the first illustration. It is one of the stamps from the colony Brunei which lies in the centre of the north-west coast of the island of Borneo, between Sarawak and the State of North Borneo. Brunei is only 4,000 square miles in area, and is under the



Lake dwellings of Brunei

rule of a Native Sultan with a British Resident as adviser.

The chief town is Brunei on the river of the same name. The stamp gives an illustration of the old town which was actually built over the water of the river. The new town is now on the mainland.

This appears to us a most extraordinary kind of town, and the houses almost as curious as the tree houses which are shown on the 1½d. value of the 1932 issue from Papua. The pile dwellings remind us of what we think the houses around Glastonbury must have been in the lake village which was discovered near there.

African Views

On the African stamps there are some views which should strike us as worthy of note. We have the Victoria Falls shown on the stamps of Rhodesia—falls on the River Zambesi discovered in 1855 by David Livingstone. These falls are a mile wide and higher than the Niagara and now supply some of the electric power for the Rand industries. As most of you will have views of these falls we shall not show them now.

The Belgian Congo has some very pretty pictures, but unfortunately, they are rather small, the border round taking up so much of the space. However, after 1932 the design of the stamp was changed and now the border is

reduced. This allows a bigger and better picture, though it is doubtful if the designs are as interesting as some of the former.

Southern America

The southern part of the American Continent bristles with interest from the Falkland Islands north until the equator is reached. The Republic of Chile shows the Desert of Atacama which the South American Handbook describes as:—'A land of merciless sunshine devoid of vegetation; living conditions in the mining towns are most difficult, the necessities of life having to be imported.



Argentine Peace Statue

Towns bear an air of tragedy and decay—the desert conceals vast mineral wealth and promises better days'. This desert is shown on the 5c. of the 1936 set.

A Mountain Statue

Just across the Andes is the Argentine Republic, and travelling via the La Cumbre Pass one can view the statue shown on the second stamp 'Christ of the Andes'. This statue was erected to cement the friendship between the two nations as the tablet at the base states 'Sooner shall these mountains crumble into dust than the peoples of Argentina and Chile break the peace which at the feet of Christ the Redeemer they have sworn to maintain'.

The stamp was issued in 1934 in connection with the 32nd International Eucharistic Congress. Argentina and Brazil both issue stamps showing one of the waterfalls which was mentioned in these columns a little while ago, the Iguazu Falls.

A Strange Lake

Similarly two of the South American Republics, Bolivia and Peru both give illustrations of another world marvel—Lake Titicaca. The Peruvian stamp is shown here because it indicates to some extent the size of the lake by the presence of the steamer. No steamer is likely to be on a very small lake. Actually

this is over 4,500 square miles, being 138 miles long and half that width. But the remarkable thing is that the lake is no less than 12,500 feet above sea level. We may also see some of the famous volcanoes on the Peruvian stamps.

Two countries have issued maps of the River Amazon. Brazil issued one in 1943 which was quite an up-to-date map showing the chief tributaries. The other was issued by Spain in 1938, but this is a very old map and shows the River Amazon as it was at the time of Iglesias whose expedition went up the River Amazon. This is rather more interesting as a curio than as a map.

Now, crossing the Pacific to New Zealand, one of the most attractive



High above sea level



The duck-billed platypus

stamps that awaits us is the 1½d. of the 1935 set showing a Maori woman dipping a bucket into a hot spring. These hot springs must be most fascinating. There is the story that it is possible to have a fishing line in one lake and then having caught a trout to turn round and hang it in boiling water to cook. By the way, the stamp just mentioned is quite a useful one; it is not valuable at present, but it has possibilities.

A Curious Animal

Our last illustration is of that curious animal the duck-billed platypus, which appears on the 9d. stamp of the 1938 issue of Australia. The young are hatched from eggs, but they are suckled by milk from the mother. They are adapted to a semi-aquatic life, having webbed feet which also have strong claws for burrowing. Their beak is like that of a duck—hence the name.

Usually two eggs are laid and they are joined side by side, being laid in a nest, made of grass and leaves, about a foot below the surface with a tunnel leading to it which may be as long as 60ft., though 24ft. is a more general length.

That should be sufficient to indicate that the southern hemisphere has its curiosities which stamps reveal and invite us to visit. Soon we hope the amount of money one can spend will be enough to enable one to see some of these sights of the stamp album.

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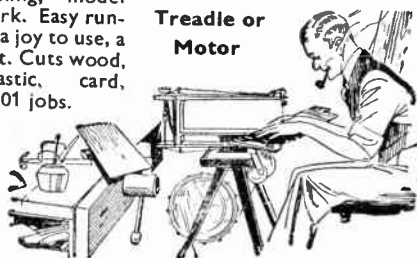
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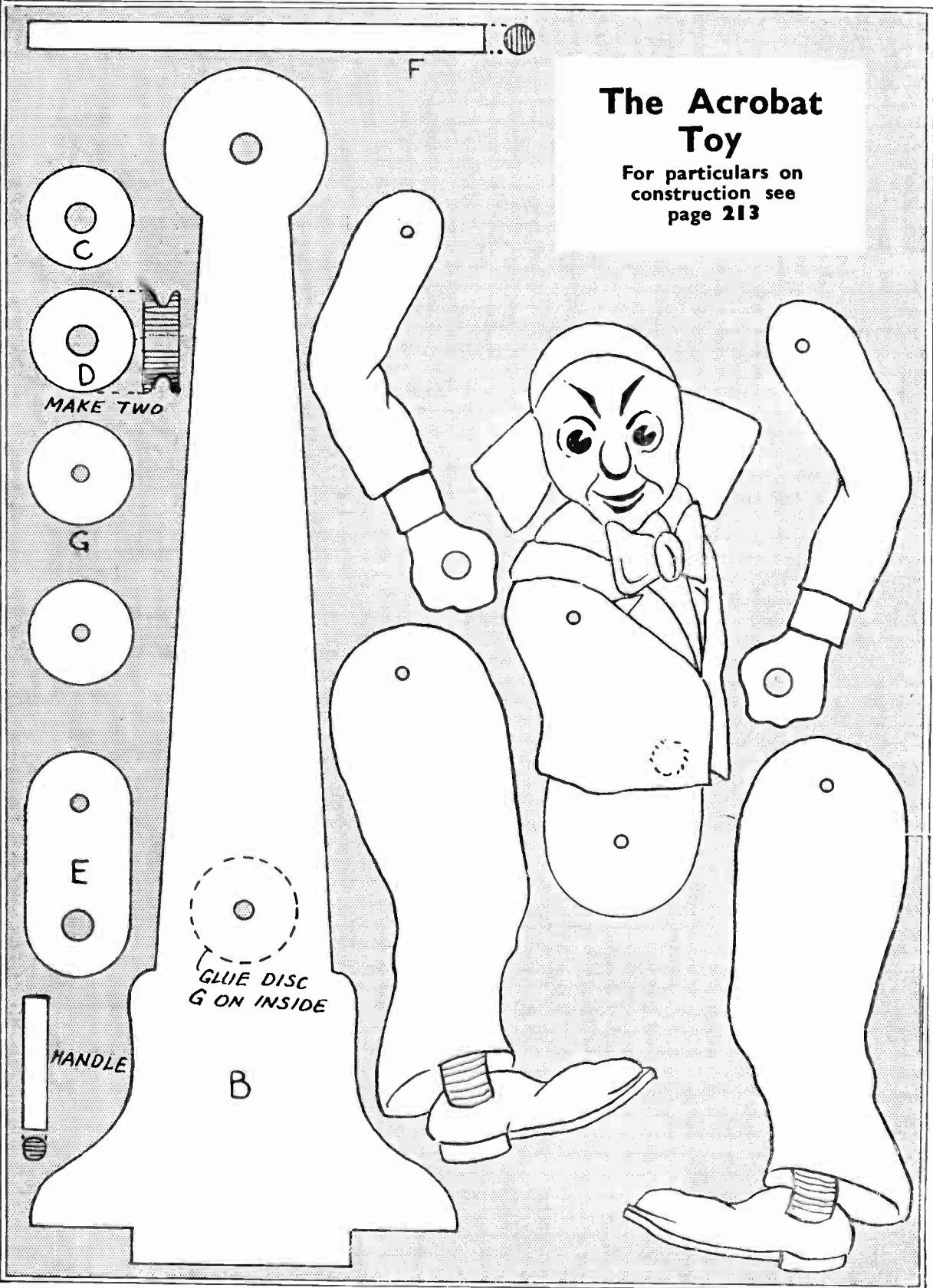
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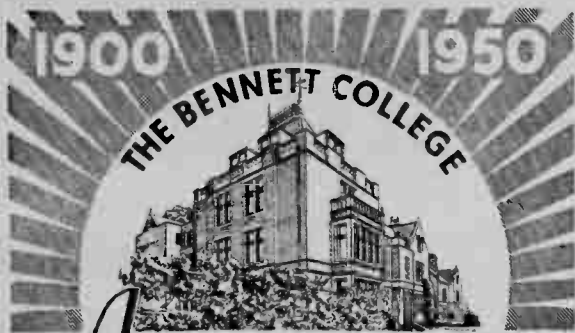
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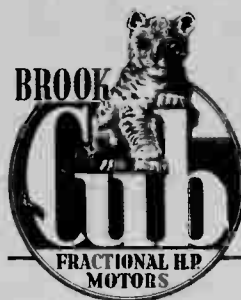
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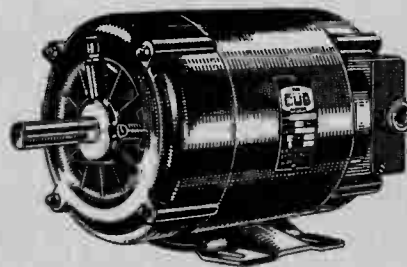
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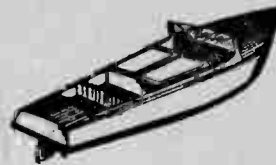
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Hobbies

WEEKLY

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The illustrations in Fig. 1 show the desk in the two positions, closed and open. The height overall of the article is 30in., and the width about 19½in. The desk flap when let down makes a total depth of 13in.

Compact

It would here be advisable, perhaps, to explain the simple means of forming the writing space. This is really the front held to the floor of the desk by a pair of hinges, thus allowing it to tip up. The main top of the desk is hinged to the back of it and having a projecting lip glued along at the front underneath. This automatically holds the front of the desk securely when raised.

The simple outline diagram in Fig. 2 gives clearly the movement of the two parts in question, and also includes many measurements useful when setting out the parts. Some good pieces of deal would answer well for the desk if a better quality wood such as American whitewood is unobtainable. Boards ¾in. thick are suggested for use throughout.

Main Frame

For the main sides (A) we want two pieces 30in. long by 9in. wide. The two main cross pieces (B) and (C), which hold the sides together, are 19½in. long, (B) being 4½in. wide and (C) 7¾in. wide.

Both these pieces are fitted into the sides by the open mortise and tenon joint, shown in detail in the constructional diagram, Fig. 3.

It will be found that this simple but strong joint can well be cut with the small tenon saw or the fretsaw. The mortises are, of course, cut with the latter tool and will be cut first before the tenons so the latter can each be marked off accurately to insure a perfect fit.



Fig. 1—The handy desk in open and closed position

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

When the tenons have been glued into the uprights some dowel pins may be driven in to strengthen the joint (see Fig. 3) where the shelf (C) is to run into the upright (A).

The back rail (E) fits between the two sides and is held by dowel pins driven through afterwards. Or the pins may be

length measurement is given for these, and a thicker piece of wood could be got for these than $\frac{3}{8}$ in. Then the dowel pins which hold them have a better fixing. See Fig. 3 for the method of fixing the dowels. Some workers may desire the simpler method of screwing. The falling front (D) should next be

then be held against floor (C) and the screws put in to hold the front securely in place.

When the front is folded down it should appear as the dotted lines shown in Fig. 2.

The main top board, being 11 in. wide may be made of two widths of wood glued together. This joint may be further strengthened if two or more dowel pins could be glued in. The board is then 11 in. wide by 18 in. long and both its long edges should be rounded off neatly.

Recesses should be cut in the back rail (E) to take both flaps of the hinges. Then hold the top board in an upright position against rail (E) and mark on it where the recesses come. Next lay the top board in its final position and pencil a line on the underside along the edge of rail (E). This gives the proper position in which to place and fix the hinges.

It only remains now to screw the flaps of the hinges into the recesses. Clean up all surfaces of the finished desk with coarse and fine glasspaper. A coat or two of clear varnish makes a good finish, or ordinary paint or enamel would, perhaps, be better if deal or such like soft wood has been used.

A length of chain or a piece of strong webbing or tape may be put on to hold the lid at any required angle.

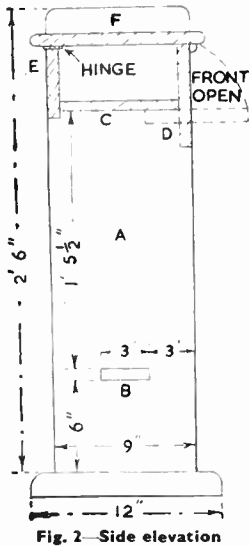


Fig. 2—Side elevation

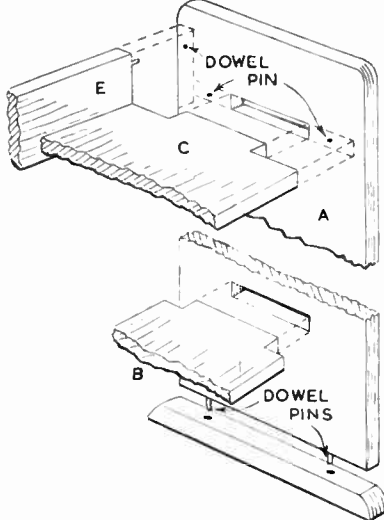


Fig. 3—Details of shelf and foot joints

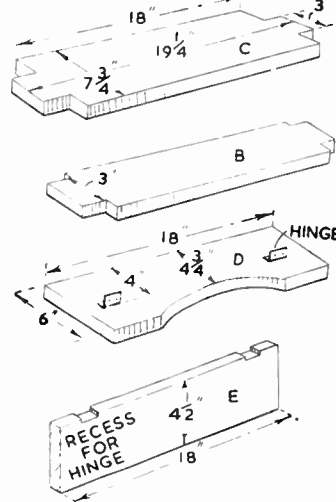


Fig. 4—Parts of the falling front portion

Inserted in the rail (E) and the uprights (A) afterwards driven on. For simplicity, however, we suggest that the pins be driven through into the rail after (B) and (C) have been secured.

Be sure and bore holes with the twist bit and dip the dowels into glue before driving them home. Put screws through rail (E) into the floor (C).

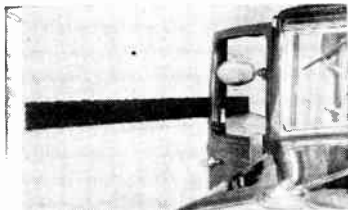
At this juncture the feet rails to the uprights (A) might be fixed on. The

prepared, and this piece, with the other cross rails, is shown in Fig. 4. Note the simple shaping to the lower edge of this rail. In getting the correct position for placing the hinges hold the prepared and finished rail (D) in its ultimate position with its top edge level with rail (E).

Mark in pencil where the underside of rail or floor (C) comes at the back of rail (D) and then fix on the hinges as shown at (D) in Fig. 4. The front may

Battens on Walls Prevent Damage

THESE photographs show instances of how useful wooden battens fixed to walls can be in preventing damage.



That in Fig. 1 is in a garage where a chimney breast projects into it, making it narrower at one place. When the car door is opened it will be damaged unless this batten, which is padded with cloth, is interposed to form a cushion. A simple but effective expedient.

Fig. 2 is where a cycle has to be continually rested against a certain spot on a wall. A neatly moulded batten (on the wall) prevents the otherwise unavoidable breaking away of the paint

and plaster. Painted to match the surrounding woodwork, it is quite unobtrusive.

In the bathroom the idea also proves a valuable wall saver. It prevents damage from the stool, which has to remain in one place. Then over the



bath, where the soap tray and bath seat are often in contact with the wall, this also applies, unless the batten is interposed.

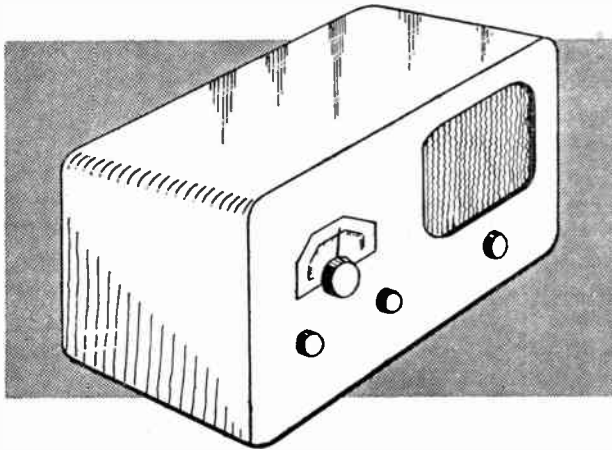
The idea has even been extended further in Fig. 3 to a drawing room wall where the proximity of an easy chair

has rubbed an unsightly line on the wall-paper, eventually tearing it away. A neat batten here has hidden this and prevented it increasing. Some may resent the intrusion of such an item into the drawing room but it is far less unsightly than the wear previously seen. In these days redecoration is often difficult and anything which helps to defer it is excusable. It will be seen that, when painted to match the wallpaper, its



presence is not too obvious. Naturally, it should be neatly fitted and painted. A finishing coat of Hard Gloss paint is advisable to withstand wear.

An interesting, compact and efficient MIDGET 3-VALVE RADIO



THE radio constructor who wishes to make a compact but efficient three valve receiver should find this design of particular interest. If some care is given to the cabinet-work, the completed set will look well, and the cabinet is actually made on very straightforward lines, in accordance with popular modern designs. The receiver itself uses three valves, thus assuring good volume even if the aerial used is short and poor, or no earth is available.

Circuit Details

The circuit in Fig. 1 shows three triode valves with a volume control used in conjunction with the second. The switch is a double-pole double-throw one with central off position. This, therefore, switches the set off, and provides long wave reception when turned one way, and medium wave reception when turned the other.

This allows the control knobs to be matched up more easily, though separate switches may be used for on/off and wavechange switching, if desired, thus increasing the number of controls to five. Alternatively, it is possible to obtain volume controls with internal switch.

The small knob under the speaker fret will then act as on/off and volume control. For the latter purpose the circuit proves very satisfactory because volume is adjustable from zero to maximum without any possibility of oscillation or other undesired effects and even the strongest local stations may be kept absolutely under control.

Quality Reproduction

Quality of reproduction is good and volume fully up to standard. Despite this, some latitude in the components used is permissible, and if near values are to hand, these can be tried. Beginning at the aerial, the .0001 mfd. condenser is used to increase selectivity (sharpness of

should not be modified unnecessarily. The 2 megohm leak is also generally best. If to hand, a small high frequency choke may be used instead of the 5,000 ohm resistor.

For the .01 condenser a mica component is desirable; leakage here will cause distortion due to the high tension reaching the second valve grid. For the volume control, components between .25 and 1 megohm may be used, but .5 megohm is suggested as best if this part is to be bought.

Speaker

Any coupling transformer with a ratio of between 1:3 and 1:5 is suitable, but a cheap component will make itself felt in reduced efficiency.

For the speaker, a 4½ in. or 5 in. model will be suitable, and a corner is cut off the receiver base-board (Fig. 2) to leave space for this. If a largerspeaker is used, the dimensions of the cabinet will require modification,

tuning). With a very short or small indoor aerial it can be omitted; other values up to about .0003 mfd. may also be used, but larger values will flatten tuning.

For reaction, a .0003 mfd. condenser is shown, but a .0005 mfd. component can be used if to hand. For the grid condenser a value of .0002 mfd. is shown, and this value

but all other details may remain unchanged.

The speaker should be of the permanent magnet moving coil type, and must have the usual speaker matching transformer, which will be connected to terminal (P) on the right-hand valve-holder, and to High Tension positive.

Before cutting out the wood for the cabinet, it is wise to assure that the speaker and other parts actually to be used will fit in easily.

Wiring Up

A complete wiring plan is given in Fig. 2. All the parts should be fixed securely and all connections should be well made with insulated wire. The constructor who has not previously made a receiver and wishes for proper reception from the moment of switching on should follow the diagram carefully and check afterwards to assure all leads are as indicated.

The controls should be placed in the

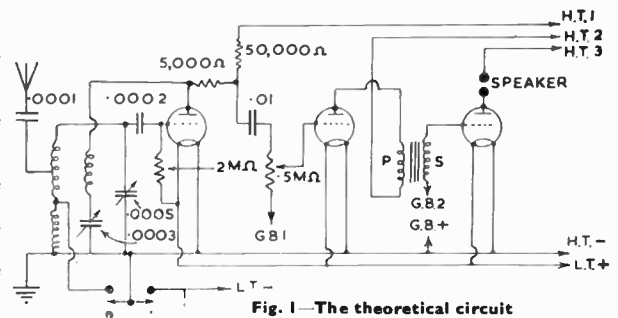


Fig. 1—The theoretical circuit

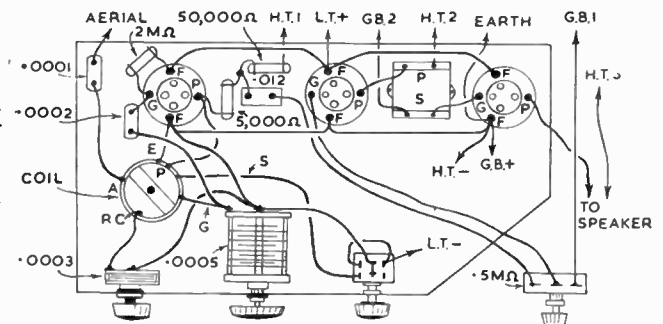


Fig. 2—A complete wiring plan

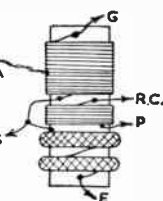


Fig. 3—The tuning coil windings

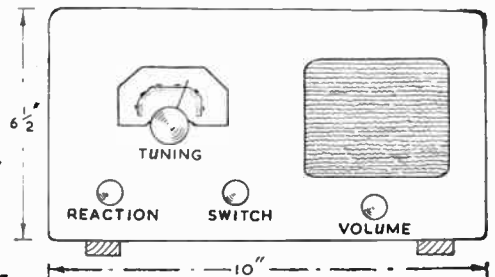


Fig. 4—Front view of the cabinet

positions shown and wired up. Afterwards the baseboard is pushed in at the back of the cabinet, when the control bushes will pass through holes in the cabinet front. Securing nuts are then added, and control knobs, as shown in Fig. 4.

Use lengths of flex for battery leads. These will afterwards be taken to suitable batteries. H.T.1 goes to about 72 to 90 volts; H.T.2 to between 90 and 120 volts, and H.T.3 to 120 volts. For G.B.1 about 1.5 to 4.5 volts grid bias will be required, and for G.B.2, 4.5 to 9 volts, depending upon valves. Choose the highest value of grid bias which does not cause distortion.

Valves to Use

There is no reason why any 2-volt triodes to hand should not be used, trying them in each holder to see which is best. For the left-hand holder a detector valve is best, such as the HL2 or its equivalents.

For the central holder, a low-frequency amplifying valve is recommended, such as the PM1LF. For output (right-hand holder) use a power or small-power valve. However, many types of valves will give excellent results, provided they

are in proper order and satisfactory.

Constructors wishing to wind their own coils should follow Fig. 3. The tube is 1½ ins. in diameter. The ends of the windings are lettered to agree with Fig. 2, and are as follows: (G) to grid condenser; (A) to aerial condenser; (S) to switch; (E) to earth (H.T. negative); (P) to detector plate; (RC) to reaction condenser. All turns must be wound in the same direction.

Between points (G) and (S) wind on 84 turns of 32 S.W.G. enamelled wire, with the aerial tapping (A) made 30 turns from the lower end. Leave ½ in. space and wind on 70 turns between (RC) and (P). As near the bottom of this winding as possible, commence to wind the two piles shown, each having 100 turns and ending at (E).

If to hand, wire of slightly different gauge may be used. The diameter of the tube can also be modified, but smaller tubes will require more turns, and vice versa. The finished coil is a push fit on a strip screwed to the baseboard.

Cabinet Details

The cabinet is 5½ ins. deep, so the pieces used for top, bottom and sides should be this width. The top piece

should be 10 ins. long. Each side piece will be 6½ ins. long, and the bottom (fitting inside so that the joints are not visible) will be 9½ ins. long, presuming ¾ in. thick wood is used throughout. These parts should fit truly and the corners are rounded after the front, cut from 3-ply, has been fixed in position.

Variations

If thoroughly glasspapered, the cabinet will look well when given a coating of light varnish. Two strips, rounded at the front, form 'feet'. A piece of silk or similar material is stretched over the speaker cut-out behind. Many different types of reduction drives and tuning dials can be obtained, and if one of these is to hand the panel may be cut out accordingly. Alternatively, some tuning condensers have internal reduction drives, or a fairly large knob, with pointer, may be fitted directly to the component.

For the other controls, ordinary small knobs are required. These may be with or without pointers, as desired. The speaker is screwed to the rear of the cabinet front and short screws should be used so that they do not penetrate right through.

Points to go over when you undertake to RENOVATE THE CYCLE

PERHAPS a few words about the bicycle itself will not be out of place here. Naturally, you will not dream of going on tour again without first seeing to it that the machine, that is to carry you and your luggage, is in first-class condition. Winter evenings may be well spent in overhauling it.

It may require 'tuning-up' and renovating generally; maybe you will want it to look as good as new. If you are mechanically-minded it is no difficult task to strip your bicycle, removing everything that is removable—wheels, chain, handle-bars, brakes, etc. It is seldom really essential to remove front forks or back stays.

Clean thoroughly all the hubs and bearings with paraffin; allow them to dry well, and then wipe with a soft rag. By the way, when stripping a cycle, watch out that you do not lose any bolts, nuts, etc.; they have a habit of rolling around and hiding behind chair legs or under anything where there is sufficient space.

No Lost Nuts

It is amazing what antics a small nut can get doing! Therefore, spread a sheet of brown paper or newspaper—or an old piece of sacking—on the floor of the shed or room in which you are working, in order to trap any small parts that may become detached and are ready to set you on a merry hunt.

Put all the small loose parts in a box, so nothing is missing when the time

comes to re-assemble the machine.

Soak the chain in paraffin—an old tin will do to put the chain in, and cover with the oil. Afterwards take out the chain and remove all grit and dirt freed by the paraffin, using a small brush. When thoroughly cleaned, hang the chain up to drain. Before replacing it, treat with a lubricant of some kind, scrupulously wiping off all surplus, which, after all, will only attract more dust and grit again.

Plated Parts

Plated metal parts can be cleaned by any one of the usual preparations sold for such a purpose. Apply with a soft rag; rub vigorously, and polish off with a clean cloth or duster. A slight smearing of vaseline over the bright parts will help to preserve your work. If replating is necessary, this can only be done by the makers, and might mean a long spell of waiting, as most cycle firms have plenty of work on hand just now.

It is no great feat to redecorate your bicycle, however, and this will smarten it up for the tour in prospect. You can remove old enamel with a blow-lamp. Care should be exercised when burning the enamel around the top and bottom of the head, and the bottom bracket, in case the intense heat may lower the temper of the hardened steel bearing cups fixed in these parts of the machine.

If the old enamel is in pretty fair condition, however, you can go ahead without any blow-lamp. Just clean the

frame well, and see all is free of grit and dust. Bare patches should then be covered with a smearing of enamel and allowed to dry.

Then proceed with the job by rubbing down the whole with a little pumice-stone powder moistened, using a clean bit of rag. Dry thoroughly, and then apply the new enamel with a flat brush, working it as evenly as possible. A second coat may be necessary for a really good finish, but make sure the first coat is well dried and hard before you carry this out.

When handling the job, all lifting and moving should be done with wooden pegs into the down tube and the head of the frame. Avoid touching the frame with your hands until the enamel is set thoroughly hard.

Order of Re-Assembly

Re-assemble the machine by replacing the wheels first, with the tyres half-inflated. Be very careful about adjustments of brakes, three-speed gear, etc. Wheels must be so adjusted that they are in correct alignment, perfectly in track and quite straight. There should be no side play. Adjust the chain to the right tension, neither too tight nor too slack. When the machine is assembled again, give all bearings a spot of oil, and spin the wheels to work it in. Some cyclists lightly pack the bearings with a little grease; this especially refers to the pedals, which should be dismantled and packed with grease before re-assembling.

Full size patterns on page 238 for these model railway LINESIDE ACCESSORIES

THERE are few things which give greater satisfaction and realism on a model railway—however small—for the amount of time spent on their construction, than simple lineside structures. These include such items as platelayers' huts of various types, contractors' huts, coal-yard offices and smaller types of goods sheds—such as those found in small country stations.

The construction of these little buildings—either in 'O' or 'OO' gauge is neither costly nor difficult, for cardboard or thin wood scraps may be used for the basic material and the only tools required are an old safety-razor blade, a straight-edge and a tube of Seccotine. The process of construction is perfectly simple, and should present no difficulties to even the beginner.

Two Main Points

In all model-building construction there are two main things to bear well in mind, viz., proper proportions—in respect to the scale to which the model is being built, and absolute squareness—everywhere, and at all times. Nothing looks worse on a layout than a 'drunken' model building, and the addition of any amount of super-detail will never completely disguise either a crooked or disproportionate structure.

Let us take for example the little Fog Hut shown in Fig. 1. This is quite a standard structure on almost all regions of British Railways, and although minor

modifications do exist, it will be found that the general proportions are the same. Any alterations in detail can be found quite easily by having a look at a hut on the local branch, wherever that might be.



A typical Platelayer's Hut

matematically placed about a layout, at junction signals and along 'country' branches near signals, will enhance the general appearance of the railway scene beyond belief.

Platelayer's Hut

Another ubiquitous lineside structure, which appears in scores of different types and sizes is the Platelayer's Hut. This is a permanent structure in every case, and should be placed at quite remote points from each other on a layout.

The shape differs very considerably according to the railway region and the per-group company by whom they were built. Some of the ultra-modern ones are constructed of reinforced concrete precastings, but from a spectacular point of view it will be found best to model the more 'rustic' types. In prototype practice these are built from old sleepers, with a tarred roof; very small, badly-glazed windows, and a door that boasts nothing more than a hasp and padlock in the way of details!

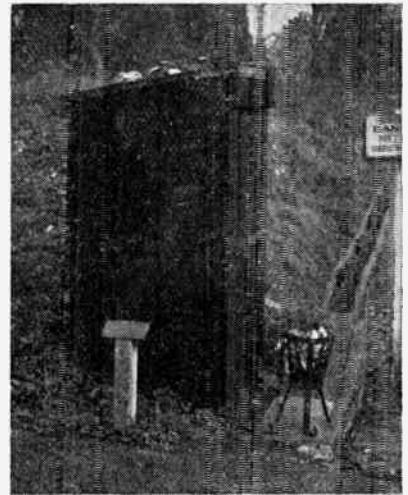
Fig. 2 shows the average dimensions of one such building, as well as the general disposition of door, brick chimney-stack and window. It must be appreciated, however, that there are no rules defining the positioning of any such details. It is a matter for simple deduction on the part of the builder.

The four walls are cut from one piece of card, being bent where shown dotted, the roof overhailing the sides and ends by about a scale 6in. The chimney-stack is made from a piece of scrap-wood being a scale 2ft. square. It is usually mounted against the rear wall, and the 'brick' portion should be made slightly higher than the front edge of the roof. The chimney-pot (on the real thing, usually a drainpipe) should be a scale 6in. in diameter (i.e., 2mm. in 'OO' scale or 3½mm. in 'O' gauge).

The hut should be finished off with a coat of flat matt black for the walls, brick-paper for the stack, yellow ochre for the chimney-pot. The roof is painted shiny black with silver sand sprinkled over it before it is dry. The door can be made to stand ajar by cutting round three sides of the opening and creasing and bending the door on the third side.

No base or 'bottom' is necessary, and the window may be subsequently 'glazed' with a piece of clear photographic film if desired, the panes being drawn in with indian ink on the inside of the celluloid.

Next, a Contractor's Hut (Fig. 3) which is a gabled structure easily convertible into a goods-yard Coal-Office. Here again, there is a great amount of freedom of design possible, and a pretty little building will be



A General Fog Hut

produced if care is taken to ensure that certain fundamental proportions are not exceeded.

A Coal Office

The sizes and markings for cutting-out and folding the four walls are shown, as well as the shape of the alternative roofs for use with Contractor's Hut and Coal-Office. If desired, the small corrugated paper from radio valve boxes or chocolate boxes may be used for the roof of either building. In the case of the Coal-Office roof, the firm's name should be written along the roof-board.

The finish of either building can be to taste, but do not make them look too 'new'. Try and get an aged effect by the judicious use of 'dirty' colours. In positioning the chimney, never make the mistake of placing it immediately behind the window, but always to one end or the other of the building; bearing in mind that the stove over which it is supposed to be is always situated against a wall.

General Notes

After being stuck together, and before painting, all the foregoing buildings should be liberally treated to two coats of shellac varnish, which can either be purchased at any ironmonger's shop, or made up by dissolving two ounces of shellac in about twice its bulk of methylated spirits. Use a bottle for the purpose, and keep the varnish from evaporating by fitting a really tight cork to the bottle.

When the varnish has been applied and is hard dry, painting with oil-colours may be carried out without any fear of the structure falling to pieces through the inroads of moisture in the wintertime. Get as realistic effect as possible in all your painting.

The second helpful article for the home handyman on HOME UPHOLSTERY

READERS who have followed the first article on this subject, may now care to carry it a stage further by learning how to upholster a spring seat. This is more difficult but a necessary branch of the work. The tools mentioned in the preceding article will suffice, with the addition of a regulator to manipulate the stuffing. This is a steel tapering rod, one end pointed and one flattened. Its use will be referred to in the article.

The frame of the chair is stripped and webbed, as previously described, but this time the webbing is tacked to the under side of the frame, not the top, to provide room for the springs. For a chair of the dining room pattern, four to five springs are usually enough, the former number being the most convenient.

Webbing and Springs

Arrange the webbing so each spring can 'sit' on the spot where the webbing crosses. A plan view of the seat, Fig. 1, will show this arrangement. If five springs seem necessary, as it may on an extra large seat, tack three strands of webbing from front to rear, the outer strands to converge a trifle towards each other at the back, and fit three springs in front and two at the rear. By converging the webbing, as suggested, the rear springs will then not be too far apart.

Special chair springs are used, these being a bit smaller than those employed for sofas and settees, naturally. If the old springs, taken from the chair, still preserve a reasonable degree of springiness they could be replaced, but if old and weak it is false economy, and new ones should be bought.

Stitch the Springs

The springs are fixed to the webbing with twine, a stitch being sewn through each side of the springs through the webbing. Here the curved needle, mentioned before, will be found invaluable, as it can be pushed through the webbing, under the spring, and will emerge the other side—no need to turn the chair over each time.

Let the stitches be tight over the springs, and do not cut the twine but carry on from one spring to another, and knot firmly at the last stitch of each spring. The springs must now be tied down a little to ease the strain on the canvas.

Fixing to Tacks

To do this drive a tack partly in the frame, top side, opposite a spring, tie the twine to it and drive the tack home to fix the twine. Tie the latter to the spring, pressing it down meanwhile with the hand, then tie it to the opposite spring and finally to a tack opposite the first one. Similar twine ties should be

made across the springs in the opposite direction, and care should be taken to get all at about the same height.

Canvas Covering

Now cut a piece of strong canvas, a trifle larger than the dimensions of the seat, and stretch it over the springs, taking it to the top edges of the frames, as in Fig. 2. Here, of course, the canvas covering is shown only partly over the springs, instead of covering them, so that the springs can be seen beneath, and the tying down just referred to better understood.

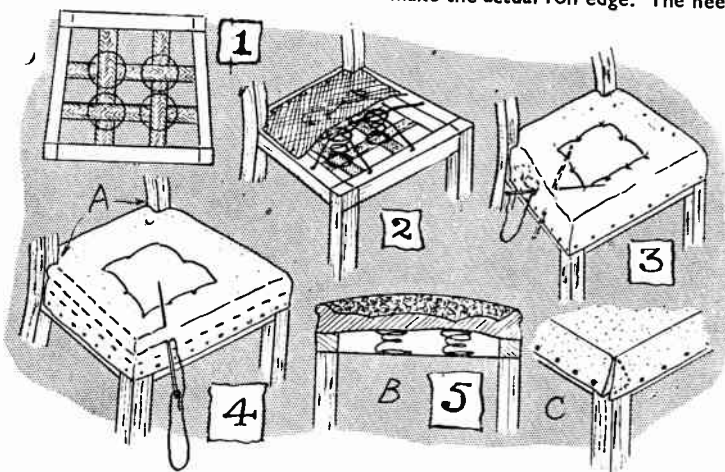
Shift the tops of the springs, as may be necessary, to get them perfectly upright, then, with the curved needle and twine, stitch them in three places each to the canvas. All should now be quite securely in place, and most unlikely to move out of position afterwards.

Thread the needle with a generous length of the twine, and starting from the back corner (at (A) in Fig. 4), at $\frac{1}{4}$ in. above the frame push the needle through at an upward angle of 45 degrees and inclined to the right.

Blind Stitching

Draw through until the eye of the needle is just about to emerge, then, with the eye still below the canvas, twist the needle in to the left and push it back through the canvas for it to come out about 2 ins. away from where it entered. This leaves a loop of twine inside, and when drawn tight it forces the stuffing towards the edge. This blind stitching, shown in Fig. 3, should be carried on all round.

A second row of stitching, this time right through, is now to be carried on, to make the actual roll edge. The needle is



Over this a first layer of stuffing is to be worked. Coconut fibre will suit nicely for this, or if a cheap job is preferred, dry hay. Lay this on, and cover it with loose woven canvas, the quality termed scrim is the best stuff to use.

Tack the canvas down each side of the frame, but leave the corners to allow of fresh material being packed in. Get as much round the sides as to leave the surface level all over. Then, with the long needle and twine, stitch right through to form a square of stitches over the middle of the seat, to keep the central part of the stuffing in place. See Fig. 3.

It may be necessary now to pack some additional stuffing round the sides before the operation of making the 'roll' commences. This roll is worked with stitches and makes the seat shapely so that in use it does not become flattened down at the edges. The job is a simple one and is carried out with the long double-eyed needle made for the purpose. Proceed in this manner

pushed through at the same angle as before, but drawn right through each time, the effect of the line of stitches being to form a round edge all round, as in the detail sketch, Fig. 4.

Even Stuffing

A roll should be roughly the size of the forefinger, and should be quite firm. As the work of stitching this edge proceeds the regulator mentioned should be brought into action to force the stuffing to the edge before it is stitched. The pointed end is inserted in the canvas and the flat end outside rotated with the fingers to work the stuffing where wanted.

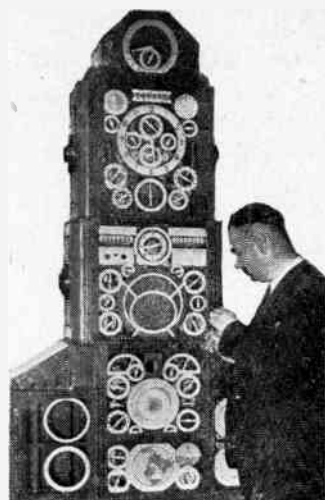
It may be added here that the canvas, which should be snipped at corners (A) in Fig. 4, should be well tucked down against the back, and the flat end of the regulator will be of use for the job. It is also useful in folding the stuff at the front corners of the frame as well.

Over the whole the top stuffing is now

HOBBIES IN PICTURES



WHAT a lovely switchboard to play with! A complete suburban town, with pubs., cinema, shops and railway siding, all controlled by switches for light and power. The builder of the model, whom you see in the picture, is Mr. F. Barrett, of Westbury Rd., Walthamstow, who built it accurately to scale of 4 mm. to 1ft. He has named the town Maryville (after his wife) and hopes to complete another to be Fredricton (after himself). Imagine what a marvellous time one can have regulating a whole town!



THIS fascinating combination of gears represents a four-years' hobby job building a machine which shows the time, day, date, month, year, season, sunset, sunrise, phases of the moon, tides, next eclipse, time anywhere in the world, and astronomical data. The 'Clock' is 8ft. high and was built by a paint-laboratory chemist Mr. Frank Nolan at Becontree, Essex.



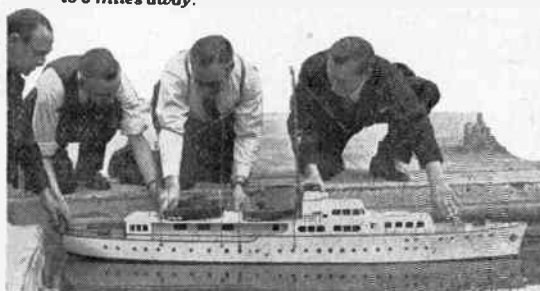
SINCE he returned a few years ago, Mr. H. E. Silk of Loraship Lane, East Dulwich, has devoted almost all his spare time to making models. You see the result above—a fair ground with 26 working models varying from a 6in. high Coconut Shy to a Great Wheel reaching more than 2ft. The roundabout has 36 horses, each carved separately, the 36 chairs on the chairplone each had 18 coats of paint. The fair is equipped with mobile workshop, traction engine, snack bar—complete with tiny cups and saucers and tiny oranges. The work has taken 11 years—but what an exhibition to show for it.



Photo: Burnley Express

A DISPLAY of fretwork which will delight the hearts of our older readers. They will probably remember most of the large beautiful pre-war designs now so impossible to make, owing to shortage of wood. Those shown were made by Mr. W. H. Seymour of Clayton St., Nelson, Lancs. Started 50 years ago and is still as interested at 70 years of age. He used a handframe throughout, and has won over 100 prizes. Next year he hopes to make a picture frame to contain a photograph of himself on his golden wedding anniversary, which occurs shortly. An excellent finale.

THIS 6ft. model is correct to every detail, and steered by remote radio control. No wonder the men are interested! Designed by Mr. Eastaugh (centre kneeling figure)—an attempt will be made to cross the English Channel. It can be controlled from a boat up to 3 miles away.



Keep the merriment going by introducing these CLOWNING PROPERTIES

QUITE a number of readers may have ideas of doing a bit of clowning at amateur shows, garden parties, carnivals, and, in due course, at firms' childrens' parties and so on. Yet all too often, the most brilliant (?) 'gags' these amateurs can think up are the old 'string of sausages' and the imitation red-hot poker.

Let us consider some other, less 'corny' ideas, though the first will be quite a traditional stunt. We have all heard of the term 'slapstick' comedy. The name derives from actual slapsticks. One man whacks another over his posterior, after some mock argument, with a batten of wood. There is a terrific smack. The 'victim' leaps in the air, duly pained.

The Slapstick

This is only a bit of play-acting, however. It is more than likely that he has not even been hit, or if hit, touched but very lightly. The loud crack comes not from the impact of the flat batten on a trousers seat, but from specially made slapsticks (Figs. 1 and 2).

To make, get two pieces of wood, each about 18ins. long and of 1½ins. by ¾in. section, though the actual size does not, within wide limits, matter very much. Cut off about 6ins. of one piece and glue it to the end of the other.

Now get a fairly thick piece of leather; bundles of leather are sold at the stores. The leather is to make a hinge, to secure the loose 12in. piece to the double end. Screws are used, preferably round-headed ones with a washer under the heads. Do not simply nail the leather on. It will soon come off again, as there will be quite a strain on it. Of course, the screws go only through the 12in. piece. This latter can, when hinged, be lifted up.

How to Use

The double end is shaped into a handle as shown, using rasp and glasspaper. After the shaping is done, a couple of screws should be driven through the double handle as the glue alone is probably not sufficient to hold. The screws could not be driven in before the shaping, however, as they might have been in the way. The slapstick is now complete.

To use, pretend to hit someone, keeping the hinged part of the stick to the rear. Bring the stick across as though you intended a hearty whack, but just before it reaches the intended spot, give a sharp backward jerk of the wrist. The hinged part will strike the fixed part with a surprisingly loud crack. A little practice is needed to get the very best results.

Remember—you do not actually hit anyone. Do not use this in a confined space either. As already hinted, this

slapstick gives a tremendously loud crack if properly handled. Some professionals, however, put percussion caps at the inside ends, but we mention this only as a matter of interest.

The Umbrella Joke

The umbrella 'gag' is easy to prepare and work and always gets a laugh. Take a broken-down umbrella and remove the cover. Saw the handle off and throw away the stick part and ribs. Gather up the cover and put a weight in the extreme end (a heavy iron nut, for example). Tie the ends of the 'brolly' to the stick again, or, rather, the end of the shortened handle, just as though the ends were held with an umbrella ring. If the umbrella is held by the handle and the cover kept hanging down, without swinging, it is not easy to detect that it is ribless and stick-less (Fig. 6).

At the psychological moment, the clown takes off his hat (which, of course, is some terrible old wreck) and appears to poke the solid umbrella through the crown (the hat being held opening upwards). The 'brolly', of course, just folds up. If the hat is big enough, the clown can replace it on his head with the

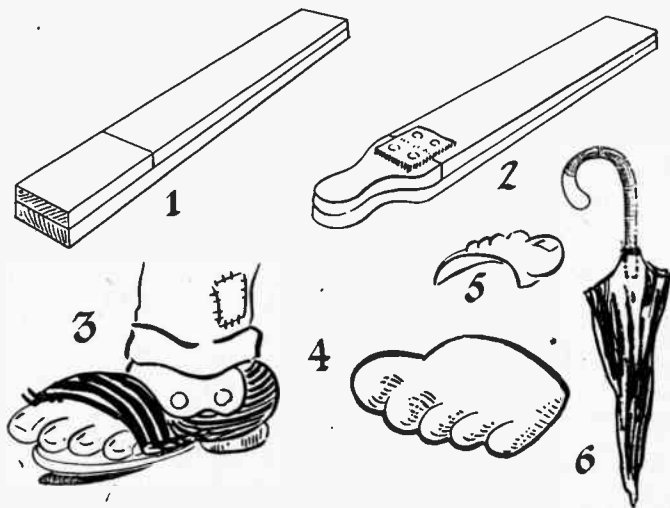
though no boots offered for sale will be in such a condition as that shown in Fig. 3. This wrecking must be done by the amateur clown.

To make the papier mâché toes, a clay model must first be prepared. To economise in clay, the clay can be placed over a wooden foundation. This can be a block of wood about the size and shape of your normal shoe caps. Imagine the shoes chopped clean off at the caps. On this shape, model the toes. Do not try to imitate an art-student making an anatomical study for some academic examination. Make the toes big and bold, and avoid small detail.

Making the 'Toes'

When the model is shaped up (and it must be exaggerated, otherwise you could merely stick your own toes through the old boot), rub some oil over it, and then tear (not cut) some newspaper into pieces roughly 2ins. square. Make up a large bowl of paste—paperhanger's paste is cheap and easily made.

Soak each piece of paper in the paste and apply them all over the top of the model, overlapping slightly, and pressing



umbrella inside, just as Victorian doctors used to carry their stethoscopes inside their top hats.

The Broken Shoe Cap

Another quite good 'gag' is the giant toes peeping out of broken boots (Fig. 3). The toes are only of papier mâché and consist of a hollow portion shaped like that shown in Fig. 4. Fig. 5 shows, on a smaller scale, the fake viewed from behind. Actual old boots are used. These should be the oldest and biggest you can find. A market stall might yield a 'find' in this direction,

them into shape over the curved parts. When you have one layer evenly applied, go over again, this time using a coloured paper (for example, cheap brown paper, a coloured comic paper, etc.).

The idea of using two different kinds of paper is so that one can be sure of building up even layers. If only one kind of paper is used there is no means of knowing if one part is being built up thickly whilst another part is too thin.

Continue building up alternate layers

(Continued foot of page 233)

Make yourself or your friends a present of a LEATHER WRITING CASE

THOSE readers of Hobbies Weekly who like to make their own gifts will find this writing case a very acceptable and useful present. Though the sizes given are those of the writer's own case, they can be altered to suit the reader's own particular needs. The case can be decorated in any way desired—stained, transfers, applique or with a monogram painted on it.

The pockets and pen holders may be varied to suit individual tastes. In choosing leather for the body of the case try and obtain a sheet big enough to do it in one piece although there is no reason why the body should not be of two pieces (even different colours), as they can be jointed down the centre with a covering strip (Fig. 1).

Suitable Glue

The glue used should be of the type that is flexible when dry, so that it will not lose its grip when the leather is bent. Having got the piece for the back, cut to shape carefully and fix the lining chosen. The latter may be of any material desired, or even left out altogether if the leather for the case is attractive enough on the inside. If a loose lining is desired then lightly glue it in place round the edges of the case and put aside to dry. When dry enough to cut, trim carefully.

Next cut a strip of leather $1\frac{1}{2}$ ins. wide

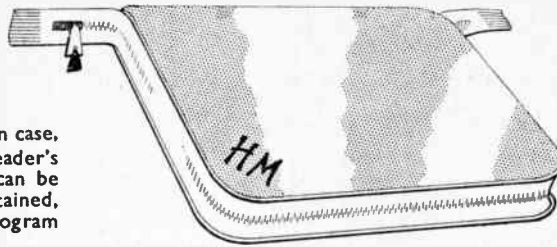


Fig. 1 Main backing of case

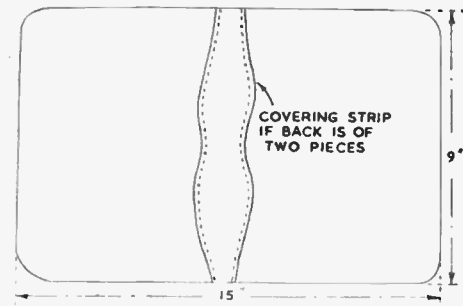


Fig. 2—The strip for the zipp fastener

and 2 ins. longer than the distance round the opening edges of the case, when closed. Obtain a zipp fastener 1 in. longer than the distance round the opening sides, this extra 1 in. being to allow the case to lie flat when opened.

Next, using a safety razor blade, cut a slot in this strip as long as the zipp and about $\frac{1}{8}$ in. wider than the 'teeth' of the zipp (Fig. 2). Do this carefully, otherwise the side of the slot may 'foul' the zipp when in use and anyone who has had to struggle with a jammed zipp will know what that means.

Stitching the Zipp

The zipp is now stitched on to the strip. If any difficulty is found in keeping the zipp and strip slot in correct position, then lightly glue the two together. When allowed to dry the two parts can be stitched together quite easily. The inner fixtures of the case may now be made up and placed into position.

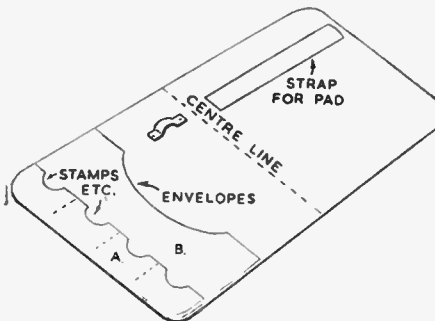


Fig. 3—Inside showing additions

Edges of pockets, etc., that come on to the outer edge of the case are lightly glued. The other parts should be machined stitched into place very neatly (Fig. 3).

There are two methods of fastening the zipp to the body of the case—machine or hand stitching or thonging. When all the parts are dry and ready to assemble, mark the centres of the opening side and also the centre of the zipp strip (Fig. 4). Place the corresponding centre marks together and, using either bulldog clips of small size or large paper clips, ease the strip into position and tack or glue it in place. When thoroughly dry, machine stitch carefully.

Thonging

If thonging is desired various types can be done, two of which are shown in Fig. 5. When starting the thonging the end should be 'whipped' between the first four or five lacings (Fig. 6) and the end fastened off in the same way. To join the leather thong taper the two ends for about 1 in. and glue together. Do not use until set.

Just a word about decorating. If any tooling is to be done, do it on a proper tooling leather (calf, etc.) and slightly dampen the surface before working. It will be found that the leather will respond better to the tooling process.

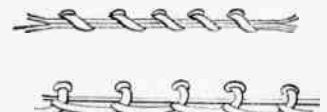


Fig. 5—Two types of thonging



Fig. 6—Lacing at ends

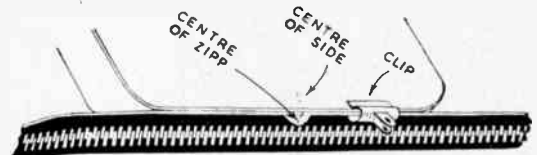


Fig. 4—Fixing the body to the zipp fastener strip

Clowning Properties—(Continued from page 232)

of plain and coloured paper until you have applied about twelve layers, all well pasted. Then leave to dry. Do not attempt to hasten matters by baking in front of a fire, though warmth can be applied after a day or two. When the paper is dry, peel it off the mould or, as usually happens, dig out the mould, and

trim, where necessary with scissors.

Give one or two good coats of size, inside and out, and then paint in flesh colour. This is done by mixing white and yellow with a very little red. The toe nails can be painted a very light blue afterwards.

The whole job is then stitched into

position inside the toe of the real boot. You will need, of course, one mould for each set of toes, right and left.

We have described the making of these giant toes in some detail, as the same principle can be applied to making, for example, false noses and even complete masks.

REPLIES OF INTEREST

Casting Lead Toys

I AM interested in making lead soldiers, farm animals, etc., and I have several moulds for this purpose obtained from advertisers in 'Hobbies Weekly'. Unfortunately, however, when my castings are turned out and left to set, instead of becoming hard as required, they are soft and bend very easily. (L.M.—Sittingbourne)

THE reason for the castings being soft is that you are using practically pure lead. To harden it, you must alloy it—that is, make a mixture with such metals as Antimony or Bismuth.

There are many formula; your choice will be decided by the available heat at your disposal. A fairly hard metal can be had by mixing 50 parts lead with 25 parts antimony and 25 parts tin.

The harder metals should be melted first, and the softer metals added; the whole must be well mixed and the surface scum skimmed off before pouring.

Gum Manufacture

I WOULD like to know of a formula for a glue or gum something like that on the back of postage stamps. In other words a glue which would remain dry until watered. (M.M.—Clifton).

THE manufacture of glues and gums is a fairly elaborate and rather-technical process, quite beyond the scope of the home worker. For your purpose, however, we suggest you use gum arabic, which is soluble in water, is fairly readily obtainable, and is spread evenly over paper, will dry and remain dry until again watered.

Weather Affecting Crystal Sets

IS it true that a crystal set does not give as good a reception in warm weather as it does in cold? If this is so, is there anything one can do about it in warm weather? (P.P.—Stoneferry).

THE warm weather does not itself cause weaker reception, but conditions generally associated with it do. During darkness, atmospheric con-

ditions favour the propagation of wireless waves, so that dark winter evenings give best long-range results. At the same time, an earth in damp soil is more effective than one in dry soil, and these slight differences are more noticeable on a crystal set.

Actually, the loss is very slight, but during very dry weather, it may sometimes prove slightly helpful to water the soil where the earth is situated, especially if in a very dry spot. Apart from this, nothing can be done. The reduction in summer-time volume is generally so small that no practical difference is made.

Electric Harmonica

I HAVE a harmonica which I wish to electrify. Can you give me some help as to what type of microphone I must use, and how to attach it? (P.C.—Edmonton).

TO obtain good volume you will require to use an amplifier with at least two valves. Three would be better, and four would be necessary if really loud results are required for other than domestic purposes. A suitable loudspeaker in cabinet will also be necessary.

The type of microphone used is largely a matter of personal preference. A

DIAL TELEPHONE MONEY BOX

This working model of an automatic dial-type telephone can be made as a money box from this week's pattern sheet. Complete kit of wood and rod from Hobbies Branches for 2/9, or post free for 3/6 from Hobbies Ltd., Dereham, Norfolk.



small carbon microphone will give loudest results, but the quality of reproduction is rather less good than with a ribbon or moving-coil microphone. However, the latter types will need rather more amplification to obtain the same volume as that given by the carbon microphone.

If the microphone is to be attached directly to the instrument, extra volume should be obtained and one of the small button-type microphones should prove most suitable, with two thin flexible leads running from it.

Repainting a Pram

I WISH to repaint a child's pram in cream and obtain a high gloss finish. (C.B.—Crumlin).

TO repaint a child's pram, the first thing is to wash it with 'sugar' soap, and follow by washing with clean water and drying off thoroughly. Then apply a coat of 'undercoating' of a white or light cream colour; leave it to dry and harden, then rub down with pumice powder and water.

Wash and dry thoroughly, then apply a coat of 'synthetic' finish colour. Use an undercoat made by the same makers as the synthetic. There are several good brands on the market—to mention one, Robbialac is quite reliable.

The interior could possibly be cleaned by the use of a carpet soap, or any of the proprietary leather revivers such as Meltonian. The peeling of the chromium plating cannot be cured, it will be necessary to remove the metal parts and have them properly re-chromed.

Gun Barrel Preservative

I HAVE a D.B. shot-gun which lately I find is rusting, except for the top of the barrels although it is kept in a canvas cover. I would be much obliged if you would give me a remedy. (D.M.—Templeogue).

THERE are several makes of rust remover solutions on the market, which you could use to wash out the gun barrels; failing that, a paste made of flour emery powder and oil could be used on an improvised ram-rod with a pad of linen or soft leather on the end, and with it you could polish the base of the barrel, but take care to remove all traces of the powder before using the gun. In any case, very carefully examine the gun before using it, in case the rusting has worked through the metal and weakened it.

Home Upholstery—(Continued from page 230)

to be packed down. Horsehair, flock, or whatever is to be used, should be pressed well down with the palm of the hand until it rises at the centre of the seat to a gentle curve, as at the cross section of the completed seat (B), Fig. 5. It should then be covered with a layer of cotton wool, preparatory to receiving its final outer covering.

It will be as well to measure across the seat, both ways, to get the approximate dimensions of the cover, then to cut it a

little larger to allow for trimming. Lay it over and tack at the back. Draw down, and tack to the front, pressing the stuff down with the hand each time. Add more tacks all round until the corners are nearly reached. At the front corners the covering is neatly folded as at (C), Fig. 5, before tacking. At the back corners (A), a small square is cut from each to clear the back legs, then the rest is neatly pressed down between the stuffing and wood, and drawn tightly

down before tacking to the frame at sides and back. The result should be a smooth shapely seat, which will spring to a creaseless curve again when the sitter rises off it.

Finish this time by trimming any surplus material off near the tacks, and nailing a banding or gimp round to hide the line of tacks and the raw edges of the cover. Turn the chair to one side and tack a covering of canvas over the bottom.

Save the household time and worry by making A TIME-TABLE HOLDER



In a great many homes, a bus or train time-table is to be found. It has been said, truly, that the country bus has revolutionized village life more than any other invention or development. The town suburban dweller is often very dependent on the local activities of British Railways. In a small hotel, a set of local time-tables is a sign of good service and efficiency to guests.

But all too often such time-tables are always in the way when not needed, and never to be found when 'I think there's a train in ten minutes time, but where on earth did you put that time-table?' Why not have a container for it? The colourful and attractive little rack for time-tables is very easily made, in one evening, of odd scraps of wood.

The two sketches (of the complete article and of the make-up) show the idea so clearly that not a great deal of detailed explanation is required. It will be understood, of course, that time-tables vary in size. A typical time-table, now on the writer's desk, measures 4in. wide and 7in. deep, but others may be larger or smaller. Thus, definite dimensions cannot be given to cover all possible time-tables.

Local Needs

Obtain copies of those circulating in the district and plan the rack to suit the largest. Assume, too, that space will later be needed for extra time-tables. If the rack is made too generously, however, there is a tendency for it to be cluttered up with out-of-date time-tables.

The back, front and bottom can be cut from $\frac{3}{8}$ in. plywood but the two sides are solid, of $\frac{1}{2}$ in. or more thickness so that they afford good grip for the small panel pins used in assembly.

The chief concern will be for a suitable design to decorate the front. Except by very long odds, this will not be exactly like that illustrated. By keeping one's

eyes open, it may be possible to find a drawing of a bus (or motor coach) on a poster, etc., which may be cut out and used, just as it is. Mount it on the wood with thin glue, and afterwards, give a coat of clear paper varnish.

Suitable Front Picture

Failing a full-size picture, it will be quite easy to find some illustration of a bus and enlarge this, by squaring or with a pantograph, first on to paper and then, when worked up, traced down to the wood and painted in with enamels.

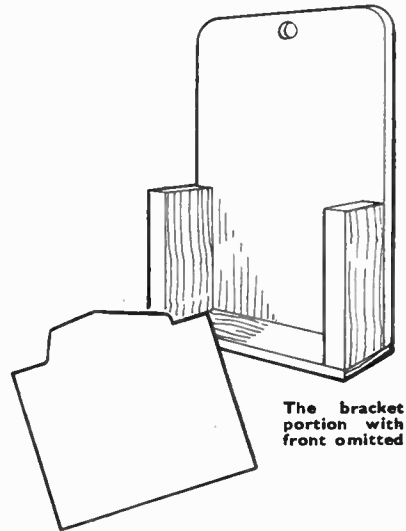
A picture of a train would, of course, be useful in appropriate circumstances, whilst those who like a joke might be able to find, somehow, a picture of a tramp (as in old volumes of *Punch*) or of a hiker thumbing a lift.

There is no need, as far as the utility of the article is concerned, to have a decorated front, but this adds to the attractiveness and, besides, most workers greatly enjoy the decorating stage. Before the decoration is done, the rack is painted all over.

It will be observed that, in the particular example illustrated, the front has a shaped top where the roof of the bus is carried round. This is effective, but in

some cases there could be a plain straight-across top and the picture pasted on lower down.

A hole bored at the top enables the rack to be hung up.



The bracket portion with front omitted

Pictures our Readers Send—

THE picture of the three lads was sent by B. Colman of Presentation College, Cobh, Co Cork, who started fretwork with the boys in January this year. They are now very keen, and



he says "the progress they have made, thanks to your patterns, has surprised everybody". Below you have that ever-popular novelty—the ship in a bottle. This was built, as a result of our article, by J. Arnold of Church Place, Moffat, Scotland, and he is delighted with the result. During his seven years in the army he missed Hobbies very much, but has become enthusiastic again since being "demobbed". He says "I have made eleven old-time ships and don't need to tell you the hours of enjoyment entailed in making them".



In these times of bustle and haste, it's a grand relaxation to build these beautiful ships and see each one completed.

There will be occasions when it is worth knowing these HOME CEMENTS

Acid-proof Cement and Tank-lining

AN acid-proof cement which is also very useful for lining the inside of tanks destined to store acid can be made from 9 parts of plaster of Paris, 3 parts of litharge, 75 parts of pitch and 15 parts of beeswax. Ochre can be added as a body if desired.

Petrol-proof Cement

PARAFFIN and graphite mixed into a thick paste and applied to sheet asbestos forms a fine jointing to stand either petrol or petrol fumes. The asbestos sheeting may, of course, be cut to any desired shape, forming a truly intimate contact at high or low temperatures.

Hydraulic Main Cement

ACEMENT for high-pressure water mains may be made from litharge 10 parts, plaster of Paris 4 parts, yellow ochre $\frac{1}{2}$ part and ordinary red lead 2 parts—all by weight. The mixture should be used in a putty-like consistency, and finely cut $\frac{1}{16}$ in. lengths of sisal or hemp fibre may be incorporated into the mass if desired.

Threaded Pipe-joint Cement

CLEAN-CUT pipe joints may be rendered water-, gas- and air-tight by smearing them with a thin paste made from boiled linseed oil and red lead.

Microscope Cell Cements

ACEMENT for affixing rims to make microscope cells for containing fluid must be adhesive, elastic and capable of standing temperature changes. Such a cement may be made by dissolving clean shellac in beechwood creosote with the aid of gentle heat to form a thick syrupy solution. This cement should be used as thickly as it can be worked to flow from a brush, but can be thinned with the addition of either a little benzole or a few drops of pure alcohol; whilst it is absolutely impervious to water, but not to Canada balsam.

A cement for cells containing oil may be made by dissolving shellac (ground) in naphtha, and printer's ink and old gold-size, made up into a thickish fluid is an excellent cement for 'ringing' cells after mounting.

Heat-resisting Glass Cement

AHEAT-RESISTING glass cement may be made by grinding up together 1oz. of powdered glass and 1oz. of flourspar (calcium fluoride) until they are reduced to an impalpable powder. This is then mixed with 3oz. of sodium silicate ('waterglass'), and worked into a smooth paste; which must be applied immediately to the broken edges, as it sets very rapidly. The edges should be carefully cleaned before applying the cement.

Professional Glass-workers Cement

ASMALL quantity of glue (scotch) is placed in a wide-mouthed bottle with just enough water to cover it. After standing for 12 hours, the excess of water is decanted and the glue covered with methylated spirits, placing the bottle in a pan of water and heating until the glue is melted, when a little whiting is stirred into it. The cement is then allowed to cool and a small fragment of gum copal and a larger piece of gum ammoniacum is added. This cement should be warmed before use.

Gelatine dissolved in strong (glacial) acetic acid by placing the container in hot water also makes an excellent glass and china cement which must also be warmed before use.

Stone to Wood Cement

ACEMENT for this purpose which must be warmed before use may be made by melting together 4 parts of wood pitch, and 1 part of beeswax, finally stirring into the mixture 4 parts of ground brick-dust or chalk. This cement should be applied thinly to the surfaces to be joined.

Test your woodwork standard in SKILL FOR THE TILL

TO scoop a half-dome hollow in a block of wood so as to make a bowl for money, tin 'checks' and the like, is not one of the easiest jobs even for those who have a lathe, but here is a method that readers can try.

It is, we must admit, designed chiefly as a test in skilled woodwork: for those who like to test their skill in making unusual objects. It can be made any size, limited only by the section of wood available, so that either a really practical bowl, suitable for real trade use can be made, or a small bowl suitable for children's 'shops'.

It is necessary to get wood to the section shown in Fig. 3. The wood can, if necessary (and if available) be quite 6ins. square in section though, as hinted, smaller stuff can be used. In length it should be rather over four times the length of the side. It may be more convenient to make the shaped section in two pieces so that one can work from either end.

Shaping

The wood is first planed as in Fig. 2, and then shaped as in Fig. 3, using, chiefly, a gouge to complete the shaping. A piece of broken glass used as a scraper will be useful, no doubt. Get a large round bottle and break it with due care. With any luck, one will find a piece that will suit the curve aimed at. It is a good idea to make a cardboard template (shown partly in Fig. 3).

The next step is to mitre four pieces, just like making a picture frame except that, in this case, there is no interior opening. The assembled parts will look like Fig. 1. At this stage there is not a bowl-shaped opening but (if reversed) a kind of vaulted arch,

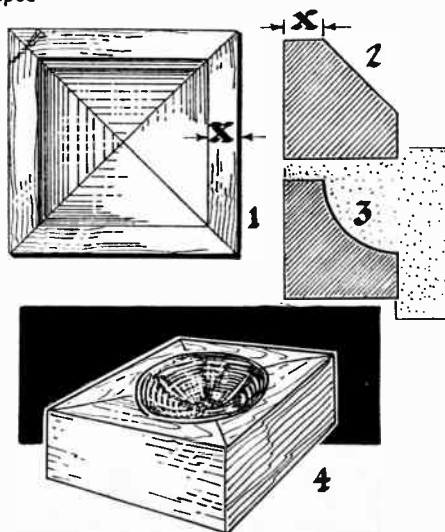
such as is seen in church architecture, etc.

Scooping

With this as a foundation, however, a bowl may be scooped. If a circular opening is needed, however, the distance (X) in Fig. 1 (which is the same as X in Fig. 2) must be quite twice as wide as is shown, otherwise the edge of the bowl will come to the edge of the block.

Before doing the final shaping, screws should be inserted as indicated in the upper left corner of Fig. 1, having them about half-way up the thickness of the wood. Take care they will not foul any subsequent shaping. The heads are hidden with plastic wood.

For the final shaping, a sharp penknife can be used to get to the upper parts. Quite an interesting model, however, is made by leaving it at the Fig. 1 stage.



Think how useful it would be to know about RE-BINDING OLD BOOKS

BOOKS which are in use a great deal, cookery books, reference books, and, perhaps, even more, the children's favourite books, have an unfortunate habit of losing their covers as time goes by, and once the outside cover has come off, torn and lost pages are the almost inevitable consequence. Luckily re-binding is a job which can be done easily and inexpensively, the chief

the book. Now cut a strip of cloth the exact width of the spine but about $\frac{1}{2}$ in. shorter and paste it on, leaving $\frac{1}{2}$ in. bare, top and bottom. Measure the pages of the book carefully and cut two pieces of white paper the length of a page and double its width.

Fold each piece of paper in half, and paste on the underside lengthwise for a $\frac{1}{2}$ in. from the fold and stick to the top and bottom pages of the book re-

wider than the spine of the book, but again $\frac{1}{2}$ in. shorter. Paste this on so it covers the spine and 1in. of each of the outer end papers (see Fig. 2). The book is now prepared and you can start making the actual cover.

For this cut two pieces of cardboard, $\frac{1}{2}$ in. longer than the pages and $\frac{1}{2}$ in. wider. Then cut a strip of cloth 1in. longer than the spine and 3ins. wider. In the centre of the cloth mark off a rectangle the length of the spine (leaving a $\frac{1}{2}$ in. margin top and bottom), and the width of the spine, including the two thicknesses of cardboard. Cut a strip of white paper the exact size of this rectangle and paste it in position on the cloth.

Paste the remainder of the cloth, lay the cardboard on so it lies flush with the paper stiffening, and stick it firmly. Turn down cloth at top and bottom of the spine and stick to the paper.

Covering

Next cut two pieces cartridge paper

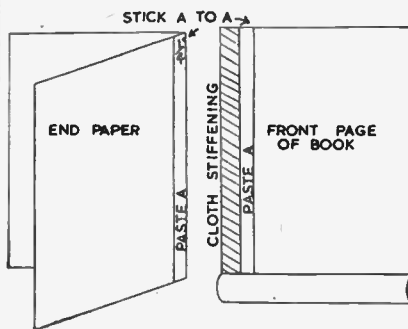


Fig. 1—Marking the end papers and stiffener

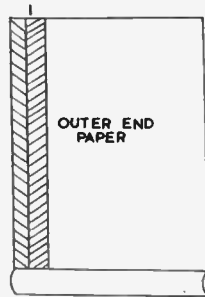


Fig. 2—First stage of work

essentials being neat fingers, really accurate measurements, and plenty of elbow-room in which to work.

The following materials are required. White paper, not too stiff, the type sold for lining drawers answers the purpose well. Paste of the thick white kind. Book-binding cloth; if this is not readily obtainable ordinary casement cloth can be used very successfully. Cardboard. Grey cartridge paper or any similar kind of coloured paper. Ruler, pencil, and pair of scissors.

Backing Cloth

Start by scraping off any bits of glue which may be adhering to the spine of

spectively, to form the end papers (see Fig. 1). Next cut a strip of cloth 2ins.

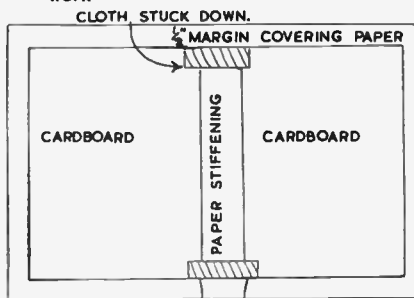


Fig. 3—Marking cover paper and cloth

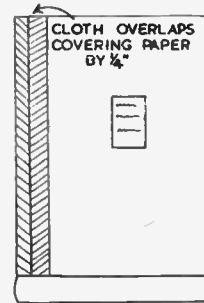


Fig. 4—Name panel

1in. longer than the cardboard and wide enough to allow $\frac{1}{2}$ in. margin at the front edges and to overlap the cloth by about $\frac{1}{2}$ in. If, for instance, the cardboard measures $8\frac{1}{2}$ ins. by $5\frac{1}{2}$ ins., the covering paper will measure $9\frac{1}{2}$ ins. by $4\frac{1}{2}$ ins. Before sticking the covering paper in position, it is a good plan to rule off $\frac{1}{2}$ in. of the cloth at the back and front edges to ensure accuracy, then paste the paper on, smoothing it down well (see Fig. 3). Turn the edges under and stick them neatly to the cardboard. This completes the cover.

Fix it to the book by pasting the outside of the end papers, one at a time, and sticking them to the inside of the cover. Close the book when the first side has been done and turn it over to do the second side. Great care should be taken to avoid wrinkles. The book should now be pressed under a heavy weight for at least 24 hours. Complete the job by printing the title and author's name in indian ink on a rectangular piece of white paper, and sticking it on to the front of the book, or on to the spine, as preferred (see Fig. 4).

A Model Maker's Solder

SOLDERING! One of the most useful processes and yet the one that so many model makers try to avoid.

Now, all the advantages of a cored solder are available for those soldering operations where hitherto fluid and paste fluxes with stick, ingot or wire solders have been used. The new Arax Multicore Solder recently introduced is intended for all home repairs of a metal-mending nature and for model-making.

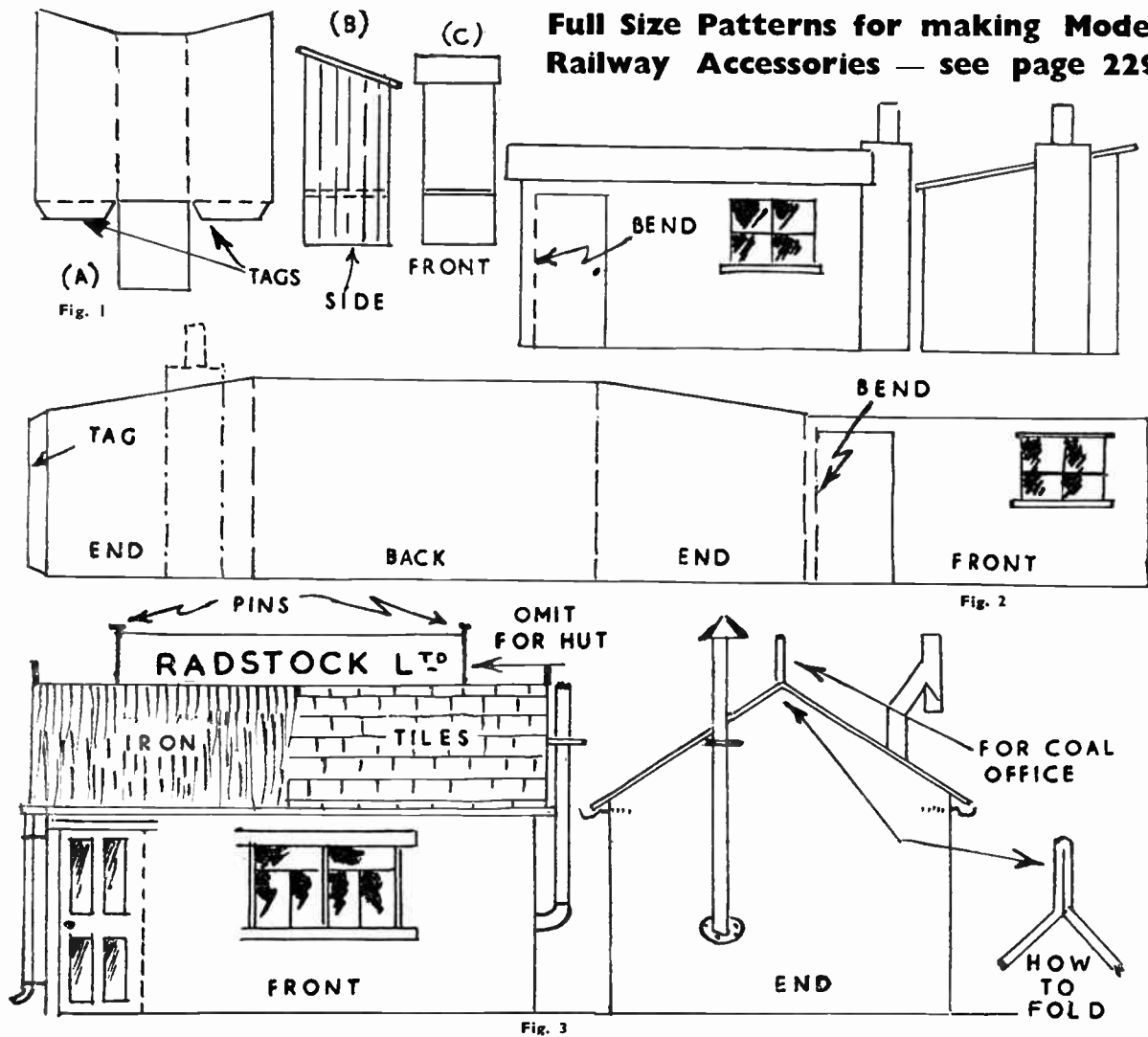
For all Metals

This Solder can be used on brass, bronze, cadmium plating, copper galvanised ware, iron, lead, mild steel,

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Full Size Patterns for making Model Railway Accessories — see page 229



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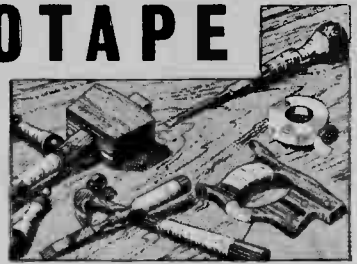


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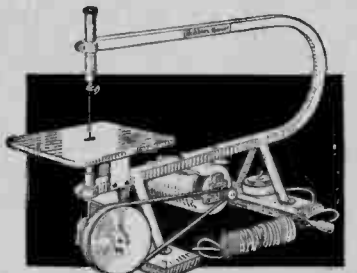
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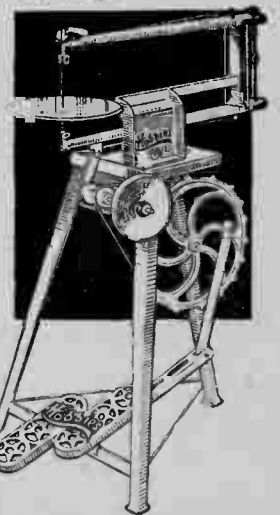
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Hobbies

WEEKLY

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January 18th, 1950

Price Fourpence

Vol. 109 No. 2829

Patterns for a novelty Wheeled Toy

THE BARROW BOY

HERE is another attractive toy to make up. Most woodworkers, we think, have a collection of odd pieces of wood of different thicknesses which might be used up for making toys. Any variety of wood can be used for this purpose as, in most cases, paint is incorporated to make a suitable covering to hide the colour and grain of any wood.

The illustration below gives a good idea of the toy which we are about to

describe and make up. As will be seen, the barrow is fashioned along the lines of an ordinary fruit or flower display truck, commonly seen in the market places of our cities.

The man is pivoted between the handles of the barrow, and is fixed to a base having two small wheels, enabling the whole unit to move freely.

Printed Parts

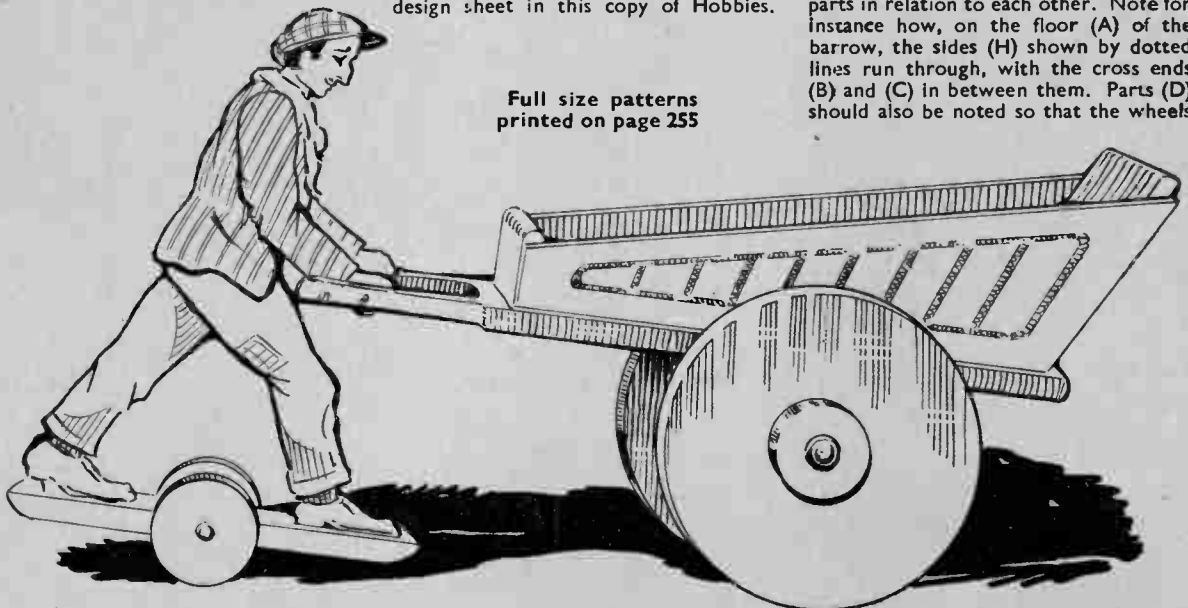
In making this toy the worker will have the advantage of the full-page design sheet in this copy of Hobbies.

Here are included patterns, all full-size, of every part, and he may stick these down direct to the wood or make a tracing of each and transfer the outline to the wood by means of carbon paper. This latter course enables the worker to keep his copy of Hobbies intact and without cutting.

Hints on Building

It would be a good plan before commencing to make up the toy to go over the page of patterns, and note parts in relation to each other. Note for instance how, on the floor (A) of the barrow, the sides (H) shown by dotted lines run through, with the cross ends (B) and (C) in between them. Parts (D) should also be noted so that the wheels

Full size patterns
printed on page 255



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

will eventually come in their proper place.

The pivot wire holding the hands of the man should also be noted and checked so that the holes running through the handles to take the wire are square across.

The first part to cut out will, naturally, be the floor (A), and wood $\frac{3}{8}$ in. thick would answer for this. After cutting round, clean off the cut edges with glasspaper, and then lay it aside while the two sides (H) and the ends (B) and (C) are cut out. Glue (B) and (C) between the sides and drive in one or two fret pins to strengthen the joints.

Then glue the whole to the floor and again put in a few pins from beneath to make a really strong job. It will be noted that one side (H) only is included on the pattern sheet. The second side is got by drawing round the first cut-out side after its edges have been lightly glasspapered and made smooth.

Axle Supports and Bar

The axle supports (D) will be $\frac{3}{4}$ in. thick and treated the same, the hole for the axle bar being slightly larger than $\frac{1}{2}$ in. to accommodate a length of $\frac{1}{2}$ in. diameter rod. A better result than cutting the holes in (D) would be to drill them with a $\frac{1}{2}$ in. twist bit, running through the two pieces (D) at one time for sake of accuracy.

The axle bar will in this case only need a light papering to allow it to move

freely in the supports. The wheels are to be $2\frac{1}{2}$ ins. in diameter and should be of $\frac{1}{2}$ in. wood. At (I) on the pattern sheet, part only of a wheel is given, and from this, using the centre dot shown, the arc of the wheel may be struck with a pair of compasses. The dotted line on (I) shows where the outer disc (J) forming the hub of the wheel will be glued.

Axle Rod

The axle is a piece of $\frac{1}{2}$ in. rod as previously mentioned, 4 ins. long. One wheel and its hub is glued on this, then the axle is threaded through the supports (D) and the second wheel and its hub glued on. There should be a clearance of $\frac{1}{4}$ in. at least between each wheel and the edge of the floor so that the barrow may run freely. The discs shown as (J) on the pattern sheet are for the hubs of the wheels, and same will be used for the wheels of the figure of the man, see the sketch of the finished article.

Figure Base

The base for the figure is shown as (E) on the pattern sheet, and it should be cut from $\frac{3}{8}$ in. wood. Shape off the front and back edges of the base so that it will run smoothly should it come in contact with the floor. Bore a hole through the centre of the base for an axle wire, as shown by the dotted lines, or if desired the wheels could be put on with large-

head wire nails; this latter is, perhaps, the quickest and easiest method.

Some careful cutting is necessary if the figure is to look effective. The body and legs should be cut from $\frac{3}{4}$ in. wood and the arms from $\frac{1}{2}$ in. wood. Trace the outlines carefully and transfer them to the wood or, the patterns may be stuck to the wood direct. The head and neck could be carved slightly if desired to give a natural effect, or the paint could be used to give this effect.

Cut two of the arms and glasspaper the edges and shape where the shoulders come. Bore holes through the hands for the wire connection between these and the handles of the barrow. Turn down the projecting ends of the wire on the outside of the handles.

Finishing Points

The wheels for the figure will be to the same diameter as discs (J) but small holes will be made in the place of those larger ones shown.

The whole toy should be painted up in bright colours; green or red for all four wheels, black or brown for the base of the figure and for the floor of the barrow. The picture of the toy shows how contrast can be got in painting the clothes of the figure; here again some bright colouring can be introduced. Two coat work in painting on the colour will give a much better effect than the one coat. Let the first dry thoroughly before applying the second.

Some Helpful Radio Replies—

Motor Usage

CAN I run a converted ex-Govt. electric motor 220v. A.C. from 250v. A.C.? If not, what could I use to drop the 30 volts? The motor I have in mind is type 47 G.M. with gear box and blower. (J.S.—Sutton-in-Ashfield).

IT is not possible to state what resistance is required to drop the unrequired 30 volts, because this depends upon the current consumption. Probably a lamp or wire-wound resistance of about 30 ohms would be suitable, but as the drop in any resistance depends upon the current flowing, this is only approximate.

Another method would be to use a 250/220 volt transformer, but this would be much more expensive. A suitable resistance could be found by trial; if the value tried is too large, the motor will run slowly; if too small, it will run at high speed and tend to overheat.

Voltage Usage

I HAVE fitted a pilot lamp on my radio set, using a 2.5v. bulb. I am taking the voltage for this off the two filament terminals of the last valve. I wondered whether this would run the accumulator down very quickly without giving any amount of 'juice' to the set. Is there any

way I could run it off the H.T. battery, etc.? (R.H.—Nottingham).

YOUR present method of connecting the pilot lamp is correct, and it would be very uneconomical to take current from any battery other than the accumulator.

The ordinary 2.5 volt torch bulb consumes rather a high current (as much as two or three valves) and it would be better to use one of the special low-consumption dial-light bulbs obtainable from good radio stores (also sometimes found as fuse bulbs in Woolworths Stores).

If the light is used for tuning only, and current consumption is to be as small as possible, a simple on-off switch can be wired in series with the bulb so that it can be switched off when not required.

Series Aerial Condenser

COULD you tell me where and how a series aerial condenser would be used, and to what advantage? (A.L.—Holbury).

ASERIES aerial condenser is connected in series with the aerial lead-in wire where the latter joins on to the receiver. Its capacity depends upon the purpose and type of receiver, and is usually between .0001 and .0003 mfd. Frequently a pre-set or variable condenser is used, as this can be adjusted to

different capacities to find which is most suitable.

In effect, the condenser reduces the damping the aerial imposes on the tuned circuit. This makes sharper tuning possible. The lower the capacity, the sharper will tuning become. Unfortunately volume is reduced as capacity is lowered, so that a balance between selectivity of tuning and volume must be struck, and volume should be restored as far as possible by increasing reaction or amplification by means of the receiver controls.

Crystal Valve's Function

IF constructional and functional details on a crystal valve are to hand, I would be greatly interested. (A.F.—Edinburgh).

THE crystal valve may be regarded as a crystal detector, and any crystal set circuit can be used without modification. In past issues of 'Hobbies Weekly' various suitable circuits have been described, and any of these would be fully satisfactory.

The sole advantage of this part is that it does not require to be adjusted to a sensitive spot, as with a crystal and catwhisker detector. It cannot be made up at home.

Any lady would be delighted to have this DRESSING TABLE LAMP

THIS is a really interesting piece of work to undertake, and the result should be most pleasing, as our illustration Fig. 1 shows. The finished article could be used for the dressing table or the bedside table, and as regards colour or finish, this depends largely on the kind of wood used in its construction. As will be seen from Fig. 1, there is an oblong box with lid to open from the front and, if desired, with front to let down, making, in this latter case for convenience in handling the contents.

There is, however, no need to have an opening front, as the inside is easily got at by raising the main top lid. The whole construction of the box is very simple, as Fig. 2 will show, and here are given the various parts all lettered up corresponding with the cutting list which is given at the end of this article.

Box Framework

The actual box measures 12ins. long by 7½ins. wide by 3ins. deep. These dimensions, of course, may be varied to suit any particular size or shape dressing table or bed-side table. The box, as can be seen from Fig. 2 consists of floor (A), two sides (B), two ends (C), partition (D), the lid (E) and (F), and a pediment rail (G).

The floor and the lid are identical in length and finish and the latter means that the edges of both pieces are rounded off smoothly. The sides and ends of the box are shown simply butted together and glued, and to help this simple jointing,

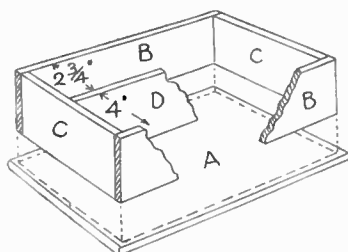


Fig. 2—Box construction

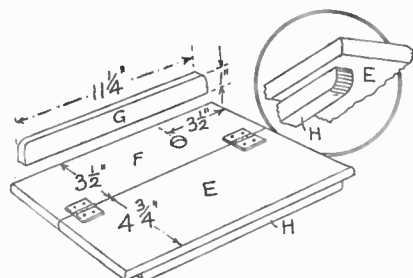


Fig. 3—Details of the hinged top

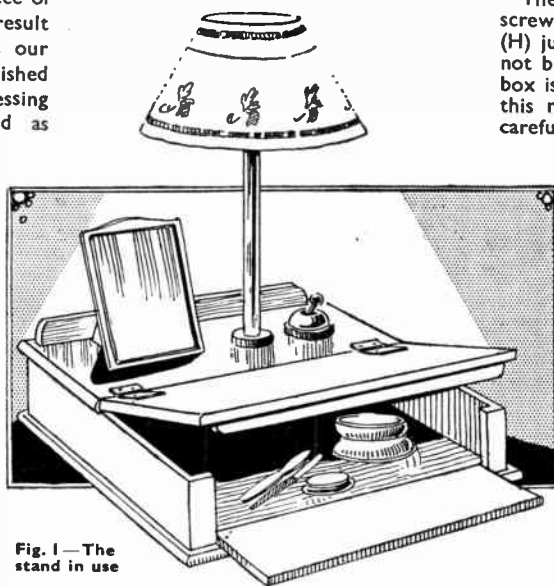


Fig. 1—The stand in use

small square or triangular fillets of wood should be glued in the angles inside.

A better and stronger method of jointing the sides and ends would be to pin joint them, or in other words form open mortise and tenons which fit one within the other, which obviously glue well and strongly together. For this form of jointing, however, the cutting must be carefully and accurately carried out.

The Hinged Front

If the front of the box is to be made to open downwards, as Fig. 1, then a space of 1in. at each end of the front part (B) should be marked off and cut down and the larger piece hinged to the floor with ¼in. brass hinges. The piece of wood for the lid will be marked off, as shown in Fig. 3, and cut through on the line, and the two parts then connected by a pair of ¼in. hinges.

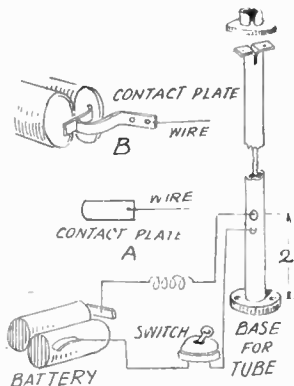


Fig. 4—Theoretical circuit of lamp

The pediment rail (G) is glued on and screwed from beneath. The small rail (H) just under the front of the lid will not be included unless the front of the box is made to fall down. The ends of this rail and also the rail (G) will be carefully rounded off and made smooth ready for painting or for other finish. A hole must be cut in the back portion of the top to take a length of tubing to connect up with the bulb of the lamp.

It should be noted here that the back also is screwed to the sides and back of the box with round-head brass screws to facilitate removal when a new battery is needed inside the box.

Bulb Holder

On the floor of the box, and immediately below the hole previously mentioned, there is fixed a disc into which to fit the metal tubing. A similar disc is glued on the top of the box, the tube passing through it as shown.

To form a fixing for the bulb holder which may be purchased ready-made and with the necessary points to which the flex may be attached, the tube is cut down at the top end and the two 'leaves' turned down or folded back and then drilled, as the detail Fig. 4 shows. Two holes are next drilled in the tube at about 2ins. up from its base for the flex to pass through on its way up to the top.

The arrangement of the batteries and the method of wiring is shown in Fig. 4. The batteries lie to the left of the lamp and in the corner of the box, being held in place there by two small-section wood fillets.

Switch Contact

The switch may be either fixed to the top of the box or on the right hand side of it whichever is thought to be most convenient. A brass or copper contact

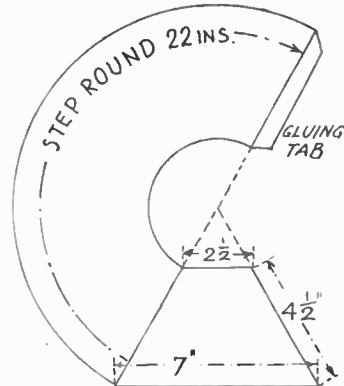


Fig. 5—Making the lamp shade

plate is fixed to the floor of the box just where the batteries will rest. The raised contact piece on the batteries will meet the plate which has one of the flex wires attached to it, see enlarged detail at (A) in Fig. 4.

A further contact plate may be fixed to the back of the compartment to form contact with the other brass strip on the battery. This contact plate is cut and bent up, as at (B), Fig. 4, and screwed in place and another wire attached for connecting up to the lamp.

Shade Holder

A simple form of lamp shade holder can be made by first twisting a length of stout wire round the metal tubing and then fixing or soldering a wire ring to it at the top for the shade to rest upon. The length of wire needed and the size of the ring will all depend upon the size and type of lamp shade adopted.

Lamp shades of all shapes and sizes can generally be bought, and it may not, therefore, pay to make up one, having to purchase in the first place suitable parchment paper, silk cord, etc. For

those workers, however, who desire to have their article entirely home-made, and much more value seems to attach to such an article—we illustrate a method of setting out a cone to any given required measurements.

Making the Shade

If, for instance, a shade is wanted, say, 7ins. in diameter and with a slope of $4\frac{1}{2}$ ins., as outlined in the diagram Fig. 5, we proceed to work as follows. We shall first require a piece of lamp shade paper measuring 12ins. by 7ins., or thereabouts. On a spare piece of commoner paper set out the outline of the cone to the dimensions suggested above.

CUTTING LIST

Floor (A)—12 $\frac{1}{2}$ ins. by 7 $\frac{1}{2}$ ins.
Sides, 2 (B)—12ins. by 2 $\frac{1}{2}$ ins.
Ends, 2 (C)—7ins. by 2 $\frac{1}{2}$ ins.
Partition (D)—11 $\frac{1}{2}$ ins. by 2 $\frac{1}{2}$ ins.
Lid (E)—12 $\frac{1}{2}$ ins. by 3 $\frac{1}{2}$ ins.
Lid (F)—12 $\frac{1}{2}$ ins. by 4 $\frac{1}{2}$ ins.
Pediment (G)—11 $\frac{1}{2}$ ins. by 1in.
Rail (H)—11 $\frac{1}{2}$ ins. by $\frac{1}{2}$ in.

Continue the slope of the sides until they meet at a point which will result in the triangle shown. At the apex put in the point of the compass and draw the two circles from the two points $4\frac{1}{2}$ ins. apart. Now, knowing that the circumference of a circle equals $3\frac{1}{2}$ times its diameter, step round with a pair of dividers or a measuring strip twenty-two 1in. spaces on the outside or larger arc of the two circles.

Connect the final point with the centre or apex of the triangle and thus complete the segment. Allow $\frac{1}{2}$ in. or a little more, perhaps, at the end of the piece as a gluing tab when the paper has been bent round into a cone. Some handwork in water colour or oil may be added as desired to decorate the shade and a row of stitching run round the edge at the bottom, perhaps, to hold the stiffening wire at this part.

The woodwork of the lamp should be finished off nicely by polishing or painting. There will be a useful space on top of the box at the back for standing a small dressing mirror which should nicely catch the light from the lamp.

TWO NOVEL FIGURE DOOR STOPS



Fig. 1—The artistic lady

markings for the dress may lightly be made for a guide for coloured enamel.

The figure should then be carefully cut out with a fine fretsaw, taking care to keep the edge square.

The Puppy doorstop, illustrated in Fig. 2, is very novel and attractive and is also quite simple to cut out. This is cut from wood $\frac{1}{2}$ in. thick, size 6ins. by 5ins. in the same manner as treated for the lady. Details of the puppy design are given in Fig. 4, and the outline is drawn by the aid of the $\frac{1}{2}$ in. squares already marked on the wood face, as described for the lady.

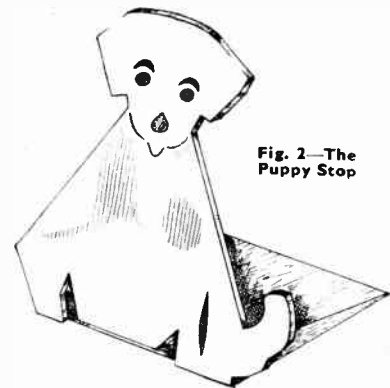


Fig. 2—The Puppy Stop

The Base

The base is common for both. Obtain sound wood $\frac{1}{2}$ in. thick and free from cracks. Cut to size $3\frac{1}{2}$ ins. by 3ins. and taper the top face $\frac{1}{2}$ in. from the

front edge to form a wedge. You can do this best with a small plane or a file.

Having made a base for each figure, the lady and puppy are fixed in position by means of a little glue and two or three small panel pins. When fixing the figures take care to get them square on the front edge of the base. The doorstops when made should be well smoothed and the base finished off with dark stain.

The figures themselves are neatly painted with coloured enamel paint, and both lady and puppy lend themselves to artistic treatment according to one's own choice. Choice colours make an artistic and bright effect.

THE two door stops here described are novel in design, quite easy to make from odds and ends of wood, and when coloured with enamel paints look very attractive and artistic.

The lady indicated by Fig. 1, of the accompanying illustrations, is well worth making, and is constructed in the following manner. Obtain a piece of sound wood $\frac{1}{2}$ in. thick, cut it to size 6ins. by 5ins., and mark one face into $\frac{1}{2}$ in. squares. Now draw the shape of the lady on the wood which is quite simple, as indicated in Fig. 3, by following the outline through the squares. The

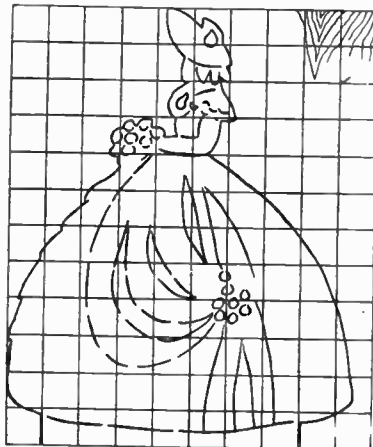


Fig. 3—Outline of the female figure to draw out

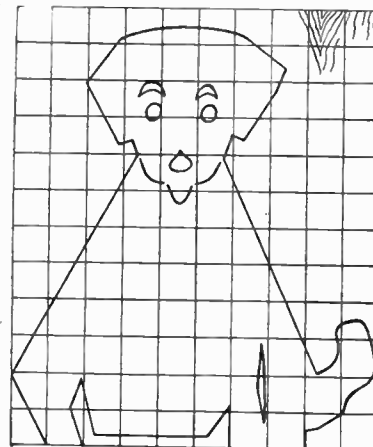


Fig. 4—The dog figure over $\frac{1}{2}$ inch squares

Pictures and panels in colour can be built up by means of WOOD MARQUETRY

MARQUETRY is a most artistic decoration to apply to home-made furniture, especially those articles designed with panels and such-like flat surfaces. Simple marquetry is not difficult and a panel, as that illustrated, quite free from complicated twists and twirls of foliage, serves as a good introduction to the art.

Fig. 1 shows the suggested panel, using four different coloured woods. A key to these is given, (A) being sycamore or holly; (B) satin walnut or other light wood; (C) light mahogany; (D) dark walnut. If the reader can obtain other woods of the rarer species, all the better, as long as a good contrast in tones is obtained.

Veneer

Veneer is used for marquetry, the effect being of a complicated inlay to the uninitiated. Knife-cut veneers can be used, but the beginner might prefer the saw-cut ones as being less fragile to handle. No particular tools need be bought, as a simple press can be made at home, and the ordinary fretworker's equipment will provide the rest, with such other woodworking tools as the average handyman can reasonably be expected to possess.

With regard to the press. This should

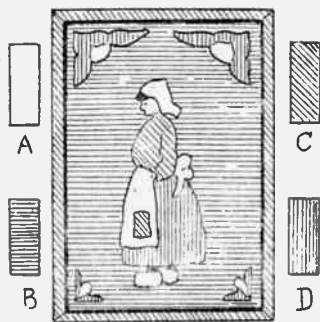


Fig. 1—A panel of four woods

be large enough to cope with any size panel likely to be used. A sketch of one is given at Fig. 2, from which it will be seen that it is composed of a pair of stout wood boards, the top one battened across each end, and both provided with one or two strong steel cramps each side, to exercise pressure. Provided with these and the necessary veneers, work can be commenced on the job.

The first thing to do is to make a full size drawing on thin white paper of the design. As the border is to be applied afterwards, this can be omitted from the drawing. The veneers are to be fixed together with a sheet of stout brown paper glued between each, as at Fig. 3. The glue should be thin and hot, not of the consistency required for the usual jointing job. When glued, press in the clamp until the glue is set.

The resulting panel should then be stiff enough to safely handle. A good plan here is to lay intermediate veneers with their grain at right-angles to those above and below; it helps to counter any tendency to warp. Another thing, the varied directions of the grain of the woods impart a pleasing variety to the work.

Cutting

Now paste the design on the panel, and when dry saw the design out. As the pieces are cut, lay them aside carefully and do not get them mixed up. Use the finest of saw blades for the work, and the smallest possible holes for the blade to enter, and drill the necessary holes in the least conspicuous positions. When all are cut, separate the layers by dividing them with a thin bladed knife. The unwanted pieces can be laid aside, the rest arranged in the panel in their correct positions.

Care must, obviously, be used in separating delicate pieces. Mostly they should part fairly easily, but if any are inclined to be obstinate, a little steaming will help, or they can be laid between wet blotting paper in the press for a few hours. The latter is the better method, but takes longer.

With a simple design like the one sketched, especially if saw-cut veneers are used, the whole can be glued straight away to the wood or plywood panel to be decorated. The design should first be trimmed at its edges to the finished size, and a pencilled area marked on the

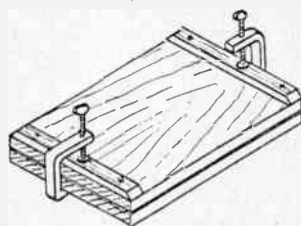


Fig. 2—A simple press

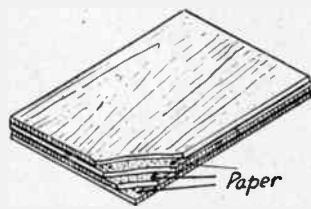


Fig. 3—Layers of work

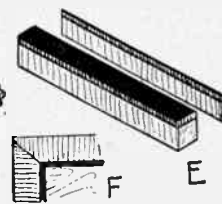


Fig. 4—Border strips

plywood as a guide.

The glue is then applied to the plywood and to the underside of the parts, and all arranged correctly and pressed down to the wood. Leave the margin spaces free for the border to be applied later. When glued, cover with several thicknesses of newspaper, and clamp up tight in the press.

Two methods of making up the border are suggested. For one cut a thick strip of the mahogany, with the grain running across the strip, not lengthwise. To the end of this glue a thin strip of darker wood, walnut would serve, and clamp up.

When set, thin slips can be sawn off, as at Fig. 4 (E). Alternatively, if knife-cut veneers are used, strips of the actual veneer can be sawn across and used instead. Thinner strips of the darker wood are laid side by side with

these, and both held together with a paper strip glued on top.

Remove the panel from the press, and clean off any glue that has squeezed out from the veneered design that might prevent a close fit between border and panel. Cut the border strips to length and try in place. Mitre them neatly at the corners. When all are closely fitted, lift them off and glue them back again. Then press once again until the glue is hard.

The next part of the work requires some little patience, as the paper and glue must be removed from the veneers to reveal the design. With saw-cut veneers some of this unwanted stuff can safely be removed with a smoothing plane, well sharpened and finely set. Use great care at the corners to avoid breaking the tips of the veneers.

Cleaning

With knife-cut veneers, the wood is too thin for this and resource must be had to the cabinet maker's scraper or even glasspaper. The latter is not too popular for such work, at least not at this stage, as it soon clogs and becomes useless, besides, the work of removing the glue becomes rather tedious.

A well sharpened wood scraper is about the speediest tool, except the plane, of course, and is also the safest. When all glue and paper are off, an examination of the work should be made and any cracks and gaps made good with stopping, coloured to match the woods. In the design the black portions (stock-

ings and tuft of hair under cap), can be stained, if the stain is carefully applied.

Small features such as the eye of the figure and marks of the bow of apron, can be put in with indian ink. If the parts are touched up with a little size beforehand the ink is unlikely to run.

The design should be made smooth with glasspaper, however, before any staining or marking is attempted. The panel can then be fitted in its permanent position and be french polished or coated with a clear varnish. A high gloss is not always to be preferred, and some readers may care to choose a thin glaze instead as showing up the design better.

Whichever method is undertaken, it is worth spending as much time over the process as the actual making. Too many workers ruin their handiwork by slovenly finish.

The handyman would do well to learn about RIVETING GLASSWARE

TO be able to repair china and glass in a satisfactory manner is a great asset these days. It is still none too plentiful, besides which the price very often makes an article prohibitive. The repairing of china and glass is a craft that is rapidly dying out and there is a grand opportunity for anyone to learn and carry on this splendid hobby with considerable success and financial gain.

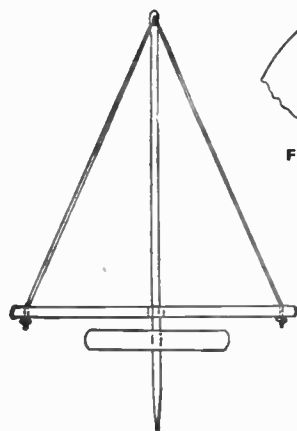


Fig. 1—The completed drill needed

It is a job that can be done anywhere and the tools and materials required are simple and few. The most important tool is a drill of a special type and not used for any other purpose. There is no need to buy one (even if that is possible now), as it is not difficult to make one.

The Main Rod

A piece of steel or brass rod 12ins. long and $\frac{1}{8}$ in. diameter is needed. It is possible to make it from dowel rod, but this would not wear so well. As a glance at Fig. 1 will show, this rod forms the rotating spindle of the drill and has a hole drilled in the top, while the other end is somewhat pointed. It is over this end that a tin tube holding the diamond drill is fitted.

About 2ins. up, a wooden disc is fixed tightly to act as a balance. Size is not important, but it must be heavy enough to keep the spindle turning. A bar of wood about 8ins. long has a hole cut in the centre so it will slide up and down the spindle quite easily.

A small hole is also drilled near each end, and a leather shoe lace threaded through these holes and also the hole in the top of the spindle. Knot the two ends so that when the bar is at rest it is about $\frac{1}{2}$ in. above the balance weight.

Motion is given to the drill by twisting the spindle a few turns so that the bars rise. Then with a light pressure of the fingers press the bar down and when

near the bottom release the pressure but still holding the bar lightly and let it rise by the momentum of the spindle. Continue this cycle of events and the drill will then be spinning merrily.

The Drill

For the cutting part there are quite a variety of bits that can be used. Undoubtedly the best is a small piece of diamond called a spark, and this you may be able to get from a jeweller. A piece of sheet tin is coiled up to fit on the pointed end of the drill with the diamond set in the small end and the edges burnished over to keep it in.

The bottom part of this tin tube should be filed parallel for about $\frac{1}{4}$ in. and not left tapered like the rest of the tube. There will be enough spring in the tin to hold it tight on the pointed end of the drill.

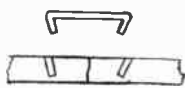


Fig. 3—Rivet shape and position

The writer has used other materials besides diamonds with quite good results, such as chips of flint and other stone. Good

results are possible with a piece of hard steel wire broken off to leave a rough edge.

Having got the drill made we are now ready to try a repair job, say, a broken plate, as shown in Fig. 2. Place the two pieces together and with a pen and ink make dots where you want holes drilled. They should not be less than $\frac{1}{8}$ in. from the break on either side or the job will be considerably weakened.

Now with the point of an old three-

corner file carefully chip off the glaze. We can then start drilling, lubricating the hole well with turpentine. The holes should be drilled to point towards the break slightly, as shown in Fig. 3. The job should be rested on a pad or cloth bag filled with sand while drilling.

Do not drill right through, about three-quarters of the way is sufficient. Clean the holes thoroughly by washing in warm soapy water and dry well.

A piece of half-round brass or white metal wire is then cut and bent as in Fig. 3, so it will snap in to the two holes and in so doing will hold the two pieces together. A small plate or saucer broken into two will need 3 or 4 such rivets to hold it together securely; more complicated breaks will require more.

Mix a small quantity of plaster of paris and water into a creamy paste and rub into the holes, along the rivet and also into the join to fill up all cracks. Then put aside to dry.

Watertight

If the article is to hold water it can be made tight by cementing the pieces before inserting the rivets. A thick solution of gum arabic and water is stirred with plaster of paris to form a cream and applied to the edges. Leave for about three days to set properly.

Another very satisfactory way is to paint the edges with a good white lead paint or a good varnish and allow plenty of time for drying.

Good waterglass, which is really sodium silicate, makes an excellent join, but the pieces should be warmed before applying this and afterwards well heated in order to dry the cement.

Catch That Drip!

THE old proverb tells us that 'constant dripping wears away a stone'. There may not seem much force behind a small drop of water, but when thousands of drops fall on the same spot, their cumulative force is surprising.

In a great number of bathrooms one can see quite clearly where the hard enamel on the bath has been slowly but surely eroded by dripping water.

Of course, a really bad leak calls for a re-washing of the tap. This is a simple enough job, described in all home-repair manuals, and, in fact, many waterworks companies will rewash a tap free of charge. But it is of the tiny drips with which we are concerned—usually caused by a tap that has not been completely screwed down.

All that is necessary to stop the trouble is to get a tin can and make a

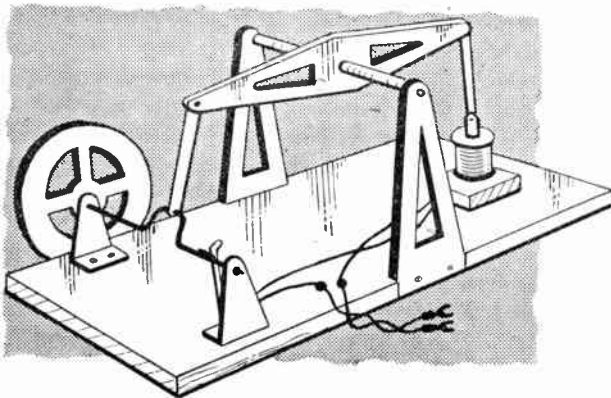
handle for it from wire, to hang over the tap as shown in the sketch. Have the wire so adjusted that the can is easily swung one side when water is running. The can need not be removed.

For better effect, and to prevent rusting, give the can a coat of aluminium.

The same idea can be used for other liquid containers that have taps—for oil drums, for example, where leaking contents would foul the floor and surrounding objects.



An interesting model to make is this working ELECTRIC BEAM ENGINE



THE beam engine was an early form of steam-driven engine and it lends itself well to building up in electrical form. When in motion a model of this kind looks quite effective. The construction is straightforward and should present no difficulties. The completed engine runs from a dry battery or accumulator and can attain quite a high speed.

How The Engine Works

Reference to the illustration will give a good idea of the arrangement of the various parts. As the flywheel and crank axle turn, the overhead beam from which this type of engine derived its name rocks up and down, the plunger moving up and down in its turn in the solenoid (which represents the steam cylinder of the engine).

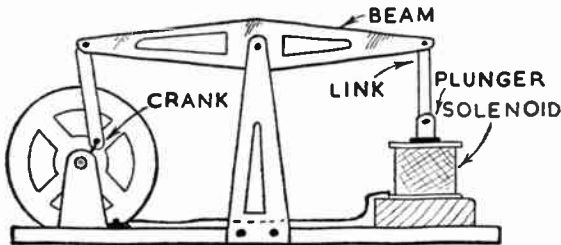


Fig. 2—Side view of the engine

The electrical circuit to the solenoid is completed through a contact screwed to the base which touches a small projection on the axle. This projection is level with the crank and as a result the solenoid is only energised when the plunger is moving down into it. An impulse is consequently given to the crank for approximately half of each revolution, the momentum of the flywheel completing the rotation.

Base and Uprights

Dimensions may be varied considerably, but a base about 9ins. by 4ins. is suggested. It is cut from $\frac{1}{2}$ in. thick wood. The two uprights are

4 $\frac{1}{2}$ ins. high and 1 $\frac{1}{2}$ ins. wide at the bottom. A simple triangular shape is cut out to improve appearance and the uprights are screwed into recesses cut in the base.

If desired, the base may be made about 1 $\frac{1}{2}$ ins. deep by fitting strips all round to form a box which is open at the bottom. If beading is added the appearance will further be improved. The battery used can also be kept from sight in the base thus formed, a cross strip holding it in position.

The beam is cut to the shape shown in Fig. 2 and is about 6ins. long. It should be made from $\frac{1}{2}$ in. thick wood so that a vertical saw-cut is possible at each end, where the connecting links will be pivoted, as shown at (A) in Fig. 3. These links should be cut from thin metal and have a small hole drilled near each end.

Any rough edges should be filed off so that when the links are pivoted in the slots cut in the beam they can move without impediment. A small pin or tack passed through, cut off and turned down, forms the pivot at each end.

At the centre of the beam drill a hole which will provide a tight fit for a length of dowel rod about $\frac{1}{2}$ in. in diameter, and secure with glue. As shown at (E) in Fig. 3, this dowel is pivoted at each of the uprights.

Thin nails or screws may be used for the pivots and a small washer should be added each side the uprights to reduce friction. The beam and connecting links should each move with absolute freedom.

The crank axle turns in metal brackets cut from any thin material and bent over at the bottom so that they can be screwed to the baseboard. These brackets should be about 2ins. high. For the axle, take a length of thick stout wire and bend it carefully into shape with pliers, making the cranked portion about $\frac{1}{2}$ in. out of line with the remain-

der (e.g., when the flywheel is turned each end of the beam should move up and down through a distance of about 1in.).

The crank axle should turn smoothly in the bearings and small washers soldered in position or held with a few turns of glued thread on the outside prevent sideways movement. A little free play should be left, however, between washers and bearings.

Before placing the crank axle in position, thread the one connecting link on to it. If the parts are fairly true, the link will run on the crank without difficulty.

The flywheel should be fairly heavy and may be cut from 5 or 7-ply. It should be finished off smooth and turn without wobble. It is a tight push-fit on the axle, but glue may be added to hold it quite secure.

Making the Solenoid

The detail at (D) in Fig. 3 illustrates the solenoid before winding. Each of the end discs is cut from really strong

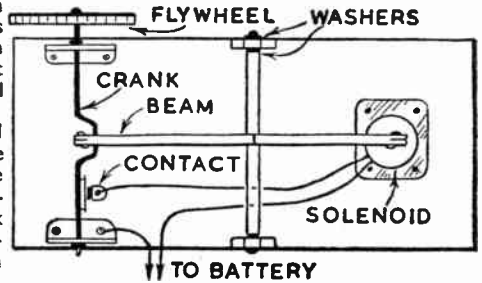


Fig. 1—Plan view of beam engine

cardboard or thin plywood and is about 1 $\frac{1}{2}$ ins. in diameter. The central tube should be of thin non-ferrous metal (brass, copper, zinc, aluminium, or similar material).

It should be about $\frac{1}{2}$ in. in diameter, inside, and can be made by bending a piece of metal round a suitable object. Alternatively, a brass or copper tube may be to hand and something such as a piece cut from the handle stem of an old

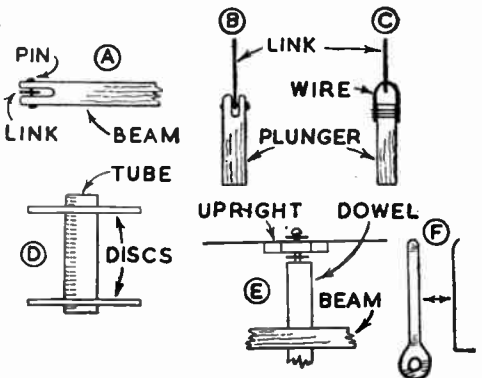


Fig. 3—Further details of construction

bicycle pump is ideal. The discs are a tight fit, glue helping to hold them in place. The tube is about $1\frac{1}{2}$ ins. long.

The Bobbin

The bobbin is wound nearly full with 20 or 22 S.W.G. insulated wire, for 4 to 6 volt operation. For 2 to 3 volts, use 18 S.W.G. wire unless full speed is not required. The thinner the wire used, the less current will be consumed, but the speed of the engine will be reduced.

Cover the completed winding with a strip of brown paper and glue the solenoid upright on a small block of wood which can afterwards be screwed to the baseboard. A slight recess should be made in the centre of the block for the lower projecting end of the tube to fit into so that the solenoid can lie quite flat.

The plunger must be of iron and should be an easy sliding fit in the solenoid. A piece sawn from a small iron bolt is suitable. The lower end of the remaining connecting link is pivoted to the plunger. If metal working tools are available, make a saw-cut about $\frac{3}{8}$ in.

deep and then drill a small cross hole for the pivot, as shown at (B) in Fig. 3. If this cannot be done a wire staple may be passed through the hole in the connecting link and then bound to the top of the plunger with glued thread, as shown at (C).

When the flywheel is turned the plunger should move up and down smoothly in the solenoid. When fully down, the bottom end of the plunger should be about level with the bottom of the solenoid tube. When fully up, the plunger should remain in the solenoid for only about $\frac{1}{4}$ in. of its length, or less, and the size of one of the connecting links may need adjusting to arrange this.

Contact and Wiring

One end of the solenoid winding goes to the battery, as illustrated in Fig. 1. The other goes to a contact cut from thin metal and shaped as shown at (F) in Fig. 3. This is screwed near the crank axle (see Fig. 1).

A short length of round metal (such as a small nail with head cut off) is soldered to the crank axle, or held in place by

binding at the ends. This is level with the cranked portion of the axle and touches the baseboard contact for nearly half a revolution of the axle. This completes the circuit through a lead taken from one of the axle bearings.

If the projection thus fixed to the axle is opposite the crank, instead of in line with it, the direction of rotation of the model will be changed.

Finishing Off

The model will look best if finished in colour, taking care no paint is put on bearing surfaces. Red, green, blue, silver and black can be used for the various parts, with the base possibly finished with glossy varnish.

For best results, the contact screwed to the baseboard may need a little bending and the idea is to arrange matters so that current only passes through the solenoid when the plunger is moving into the tube. Provided all parts move freely the engine should run without difficulty. The great point is to see parts run smoothly and with the least possible friction.

A simple-to-make and easy-to-play little SKILL BALL GAME

THE amusing little game described here is adapted from one that was popular in our grandparent's time. It was then a simple box with a number of holes into which a similar number of small balls had to be rolled. We have made the game much more interesting. The board contains a lot more holes, and a number of obstacles have been introduced, making it more difficult and needing a certain amount of skill to play.

Several people can play the game, the one scoring the highest points winning. The size of the board does not matter a lot, but it should not be made too large. One having 3 in. sides would be found most convenient. Therefore, for the baseboard we need a piece of wood $5\frac{1}{2}$ ins. long, $4\frac{1}{2}$ ins. wide and $\frac{1}{4}$ in. thick.

Drawing the Hexagon

To work out a hexagon, with a pair of compasses draw a circle having a radius of $2\frac{1}{2}$ ins., and then without altering them, mark round the circumference

The holes should be drilled before this board is fixed in position. Steel ball bearings $\frac{3}{16}$ in. diameter are used for the game, so the holes will need to be slightly larger than this.

Smooth Holes

The holes, together with the top of the $\frac{1}{4}$ in. overlay should be glasspapered quite smooth, after which the part can be carefully glued to the baseboard. Do not put too much glue on or you may block up some of the holes—just a few dabs will be sufficient to hold them together.

The three pieces marked (A) in the diagram are obstacles to make the game more difficult and are cut approximately to the shapes shown from $\frac{1}{4}$ in. wood and glued in position. Joining the three obstacles marked (A) are three bridges, which are placed immediately over the holes which record a score of 1.

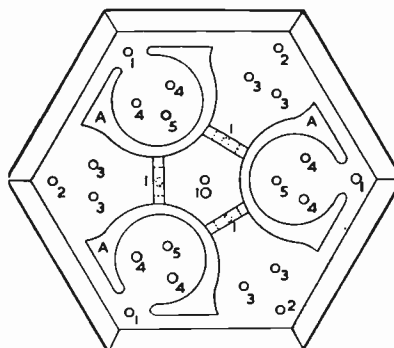
Bridge Obstacles

The width of the slot in the bridge should not be more than $\frac{3}{8}$ in. and is just sufficient to let the ball pass by the side of this hole. Therefore, in order to reach the highest scoring hole of 10 in the centre of the board, one of these bridges must be negotiated, and it is not at all an easy job.

The numbering of the board should be tackled next. Black paint is used if the baseboard is of a light colour, or white paint if the reverse is the case.

We are now ready to fit the sides to the case. Six pieces of wood just over 3 ins. long, 1 in. wide and $\frac{3}{8}$ in. thick are needed. A groove is cut near the top for

the glass to rest in and be made a fairly good fit. Mitre the ends, and four of the pieces can be glued in position. A few small panel pins will help to give added strength. When the glue is dry the glass is carefully cut to fit and slide in.

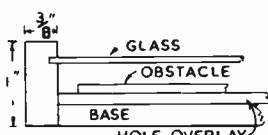


A plan of board and numbered holes

The Balls

The balls are now put in. It does not matter how many you have, although four, or perhaps, five will be quite sufficient to cope with. The two remaining sides can now be fixed in position, and when dry a final glasspaper and coat of polish will complete the job. The aim of each player is to get a big score and miss as many low numbered holes as possible.

Whilst the game is fascinating to play, it can be pleasantly annoying in the endeavour to obtain the highest score, particularly if you play with 'sides' or teams.



Section of parts

and you will have exactly six points. Join these up and you have a perfect figure. The holes for the balls to roll into are not made in the baseboard but in a separate overlay which is $\frac{1}{4}$ in. thick. Cut this the same size as the baseboard.

Analysis in solution is explained in this second article on HOME CHEMISTRY

FIRST of all, here are the chemical names of the substances we said you could analyse in the previous article in this series. Table salt—sodium chloride; Glauber's salts—sodium sulphate; blue vitriol—copper sulphate; green vitriol—iron sulphate; sal ammoniac—ammonium chloride; plaster of paris—calcium sulphate. We hope you managed to get them all correct!

Now, passing on to analysis proper there is a system of reactions in solution which enables us to find out which metals are present. Non-metals we will deal with in the next article.

Metals Present

Take the substance you wish to analyse and dissolve it in water. By the way, only distilled water should be used in analysis. Add a little dilute spirits of salts (hydrochloric acid). If either mercury, silver or lead is present you will get a white precipitate.

But how do you know which of those three metals is present? Well, if the ppt. (this is a convenient abbreviation for precipitate), turns violet in light, you have silver chloride. If it dissolves in hot water you have lead chloride. And if it remains unchanged, mercury is present.

Now the ppt. you obtained with hydrochloric acid will only tell whether one or more of these three metals is present. The chloride of any other metal will stay in solution. So, if you do get a ppt. with hydrochloric acid, then you filter off and test the filtrate for other metals.

Routine Procedure

This is the routine procedure all the way along. You add a substance which will ppt. a group of metals; you filter, test the ppt. for individual metals and then add a substance to the filtrate which will ppt. another group of metals, and so on.

The following table shows you which substances ppt. which groups of the

most commonly occurring metals:—

Precipitating substance	Metals precipitated
Hydrochloric acid	Silver, mercury, lead
Hydrogen sulphide	Copper, tin
Ammonium hydroxide	Iron, aluminium, chromium
Ammonium sulphide	Zinc, nickel
Ammonium carbonate	Calcium, barium

The precipitating substances are used in this order, one after the other. The only other common metals which may be present are magnesium, sodium and potassium. These must be tested for separately because they are not easily precipitated.

All the precipitating substances in the above table can be bought cheaply except hydrogen sulphide. This you must make yourself. You do it with the apparatus shown in the drawing. Remember it is a poisonous gas and must not be generated in a living room unless near an open window. But the smell will probably see to that for it resembles bad eggs!

Before adding ammonium hydroxide to ppt. the iron group, always boil the original filtrate, add a little dilute nitric acid and then a little ammonium chloride solution. And always wash each ppt. on the filter paper with a little water before testing for the individual metals.

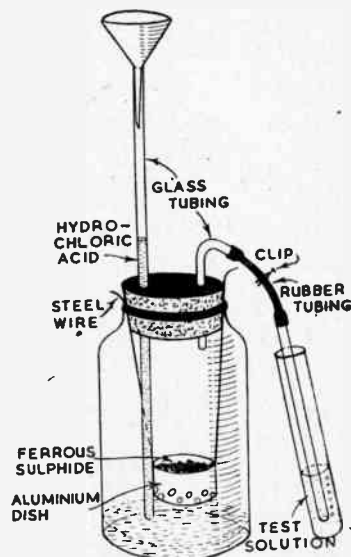
Now, quickly, for the separate metals. Boil the ppt. from hydrogen sulphide with dilute sodium hydroxide and filter. Keep the filtrate and label it (A). Boil the remaining ppt. with dilute nitric acid and add a drop or two of sulphuric acid. Stand a few minutes and add ammonium hydroxide. If copper is present a blue colour appears.

Add some hydrochloric acid to the filtrate (A). If no ppt. forms, tin is absent. If you do, get a ppt. filter and reject the filtrate. Boil the ppt. with strong hydrochloric acid, then dilute with water and filter if necessary. Reject the ppt. Add some pure iron wire to the filtrate and boil. Then add some mercuric chloride. A white ppt. shows the presence of tin.

Mix the ppt. obtained with ammonium hydroxide with water and add a little sodium peroxide. Boil, dilute with water and filter. Keep the filtrate and label it (B). Dissolve the remaining ppt. in boiling dilute hydrochloric acid and then add potassium ferricyanide. If iron is present a deep-blue ppt. forms.

If the filtrate (B) is yellow, chromium is present. To test for aluminium add a large amount of ammonium chloride and stand for a few minutes. A white ppt. shows aluminium is present.

The ppt. formed when you add ammonium sulphide may contain zinc and or nickel. Stir it up with cold, very dilute hydrochloric acid and filter. Keep



the filtrate and label it (C). Heat the remaining ppt. with strong hydrochloric acid and add a piece of solid potassium chlorate. Evaporate to dryness. A yellow residue shows nickel present.

Showing Zinc

Add a little sodium hydroxide to the filtrate (C) and filter if necessary. A white ppt. on passing hydrogen sulphide through the filtrate shows presence of zinc.

After adding ammonium carbonate, dissolve the ppt. in warm dilute acetic acid and add potassium chromate. A yellow ppt. shows presence of barium. Filter, add ammonium hydroxide and ammonium oxalate. A white ppt. shows calcium is present.

The filtrate remaining after addition of ammonium carbonate is tested for sodium and potassium by the flame test described in the previous article. To test for magnesium, add ammonium hydroxide and sodium phosphate. A white ppt. shows presence of magnesium.

(To be Continued)

A Famous College Celebrates

THE Bennett College, Sheffield, the famous study-at-home organisation which has helped thousands of men and women to reach highly paid appointments in all fields of commerce, science and industry, is celebrating its 50th anniversary this year.

Since the college first opened in 1900 with a handful of students, it has grown year by year until to-day it is the leading postal tuition college in the world with a highly successful record in all fields of study. Bennett College trained men are to be found holding important posts at home and abroad after studying under The

Bennett College plan of personal tuition whereby the individual student receives training as thorough and as detailed as though the tutors were actually at his side.

With 50 years of successful experience of training by post behind it and with an enthusiastic, expert staff ever ready to help the ambitious man to get to the top of whatever profession he has chosen, The Bennett College unlocks the door to prosperity and security by fitting him for the job, and with an exhaustive knowledge which will enable him to hold it.

The worker using cutting tools should rig up A PEDAL GRINDSTONE

It is a great advantage to be able to use both hands for grinding tools and other things, but this is impossible when one hand is needed to turn the handle of the grindstone. When two hands are used the job can be held much steadier, which means that a greater degree of accuracy is obtained.

With the aid of the very useful gadget described here, that rather tiresome business of tool grinding can be made a pleasure and the time taken to do the job greatly reduced.

An old bicycle frame supplies the major part of the material required, and by means of a few odd pieces of wood it can be securely clamped either to the side of the workshop wall or fixed in the ground outside.

An old Bicycle Frame

First procure the bicycle frame. You may have an old bicycle that is of no further use as such, or be able to buy one quite cheaply. You do not need the front fork, wheels and handle bars, and these should be removed. The pedals and chain are wanted and also the back wheel axle. The grindstone wheel is mounted on this axle, therefore the spokes must be taken out and the wheel dismantled.

Having got the frame ready fix it

Improved Water Fount

WATER must always be available for one's pets and livestock, but where small vessels are used it may not be convenient to replenish the supply as often as necessary. The inverted jar method provides a cheap and efficient solution to the problem.

For those not acquainted with it, the idea is to fill a jam jar or bottle with water, cover with a saucer or other fairly shallow vessel suitable for the birds or animals to drink from, and turn the whole quickly upside down. By raising the jar slightly from the bottom of the saucer the water will flow in and remain at a constant level, filling up from the bottle as the saucer is emptied.

The height of the water in the trough will depend on the height of the bottle neck from the bottom, but it must not, of course, come above the saucer rim or the whole lot will run away. Two strips of wood will serve to keep it raised.

A large jam jar would stand firm for small birds or chicks. But if a narrow necked bottle is used, or if the trough is for larger livestock likely to knock it over, the fount will need attaching to the wall or other support. Some fastening is really desirable whatever the size of animals or birds using it, and it should be easy to arrange a couple of strong wire hoops or similar contrivance which can

securely and mount the grindstone. The rear axle of the frame must be lifted so it is about level with the saddle—there will not be any stooping then, and the task will be easier. The saddle needs turning round to face the grindstone, and the angle altered to bring it level.

Rigid Fixing

The frame must be securely fixed because there will be a good bit of vibration when pedalling quickly. This is best done with odd blocks of wood. If the grindstone is to be outside, a few posts can be driven into the ground and the frame fastened to these, but if it is for use inside the workshop a different method must be adopted.

A block to rest the pedal bearing on and another for the front part of the frame unless it already rests on the floor. Then a few wooden struts fixed to the workshop wall and clamped to the bicycle frame. Whichever method

be quickly detached when the jar needs refilling.

When Using a Saw

REMEMBER that a saw has teeth the whole length of the blade. So, after making an entry into the wood, let them all have a share of wear—and at the same time do the job more efficiently and easily—by using long even strokes. Do not make short quick jabs, do not be too hurried, and do not press too heavily.

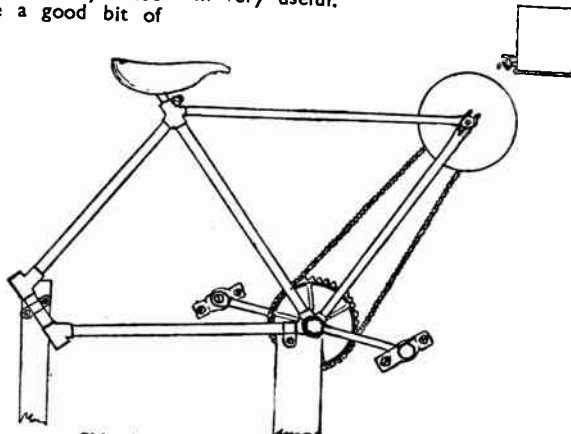
Starting the cut neatly is sometimes a difficulty for the novice, the solution here being to get the saw going with a few preliminary light upward strokes, then the down stroke, and carry on. Finishing the cut may also prove rather difficult for a beginner, the final stroke or two causing jagged splinters as the pieces separate. Here again, a light careful touch will ensure clean work.

A guide line is essential for making a straight course across the wood, though often a bigger difficulty for amateurs than cutting straight across is cutting squarely downwards, the divided pieces coming away with sloping instead of square edges. A critical eye must, therefore, be kept on the blade to check any tendency to incline it either to left or right.

The Craftsman.

is used see that there is plenty of freedom left for the legs when pedalling.

The grindstone can now be mounted on the rear axle. This job may sound rather difficult, but it is really quite easy. The hole in the stone will probably need opening to fit over the axle, and this can be done by very carefully chipping light taps with a cold chisel. A coarse old file will also come in very useful.



Side view of the whole apparatus described

Be careful not to try to chip too much off at a time or you may crack the stone. It is also very necessary to keep the hole central. When large enough the stone can be fixed on the axle in the same way as a large grindstone—by running lead in to the space.

A bed must be made of plaster of paris to hold the axle upright and to lay the stone on. Test this very accurately to make sure that it is dead upright. Heat some scraps of lead in a ladle or an old tin and when melted carefully pour in and fill up the space. When cold the axle is mounted in the frame and tested. Provided you have done your work carefully and tested for accuracy as you proceeded it should run smoothly and without any wobble.

Wetting the Stone

For most grinding jobs it is necessary to keep the stone wet, and this can be done very simply. A can is stood on a platform fixed over the stone. Solder a small tap near the base of the can so the rate of drip can be easily adjusted.

When pedalling at high speed it is an advantage to have a pad of felt or rubber lightly touching the wheel to prevent the water from splashing the operator.

Besides its use as a grindstone our pedal operated machine has many other possibilities open for development. It could, for instance, be used for polishing with a leather faced wooden disc or a wool or calico mop. There is no reason also why it could not be used to drive a small circular saw to cut thin wood.

Photographers can avoid mess and mistake by undertaking TANK DEVELOPMENT

If we assert that photography can be undertaken without mess or mistakes and it creates any doubts in your mind or makes you desirous of arguing with the author, then send along any points about which you are uncertain and ask for an explanation. But, before doing so, it is most important that you read through to the end and follow out the instructions very carefully.

By doing this you will almost for certain agree that it is possible to practice the hobby of photography without mess or mistakes and will conclude that those of the past have been very largely due to your own carelessness.



The parts of the developing tank

Let us tackle the question of 'mess' first. In the course of many years experience of demonstrating and lecturing on this very interesting subject of amateur photography, the author has been up against such remarks as 'Oh, I must not do any of the chemical business at home, it makes such a mess' or, 'We have not a spare room and I could not do the work in the bathroom' or 'It's such a messy job requiring a lot of chemicals and apparatus' and many other similar comments and excuses.

Now, the answer given to each and every one is 'Whenever I go on holidays or away from home the camera invariably accompanies me and in the kit-bag is a small bottle of developer, a small tin of fixing salt and a developing tank. As soon as a film is exposed for its full complement it is developed, and no landlady or hotel manageress has yet raised any complaints about a mess; the obvious reason being that no mess has ever been left.

Remember Cleanliness

No! It is not that any great care is taken in the process. Cleanliness is a very great factor in successful photography and it pays a jolly good dividend in more ways than one.

There is no reason at all for any of these excuses, as everyone will prove for himself if the following suggestions are adopted. You know that the author has always advocated doing your own

developing and printing, and contends that that is the surest way of avoiding mistakes and getting 100 per cent successful negatives.

You will have noticed that a 'developing tank' is always placed in the kit-bag when we go away. About 18 months ago Johnsons put a new one on the market. It was called the J20 tank. A postcard brought a copy of the booklet and it was not many days before one of the tanks became a constantly used part of the equipment.

Recent Improvements

Every tank that has been invented has been given a good trial, but this little and well-designed piece of apparatus appears to beat them all. Hitherto the adjustable model has been regularly used. It is one capable of adjustment to take different sizes of films, including Nos. 16, 20 and 27 roll films, and also 36 exposure lengths of 35 mm, and about 60ins. of 16 mm film.

All this is distinctly a great advantage to a possessor and user of more than one camera.

To those, however, who have to be satisfied with one camera, taking a No. 20 film, the J20 tank is just ideal. It is small and compact. The spiral film holder is in one piece, i.e., no adjustment is necessary. It requires only a minimum

amount of solution, 10 ounces. Further, there is an improvement in the lid which locks more easily and surely by giving it a slight turn, and the opening in the centre is more deeply set and is capable of receiving a small tube thermometer for testing the temperature of the solution.

The Scientific Way

Some of you readers may want to know why is it necessary to have a tank for developing a film? Why not do the work in a dish or basin? It is not necessary but, if you want to avoid mess and mistakes there is no better or more scientifically accurate way than with a tank and using the time and temperature method. It is simplicity itself and is in use by all classes of photographers—professionals, trade printers and amateurs everywhere.

Time and temperature developing is based on the fact that every brand of film has a definite time for correct development. This time only varies by altering the strength or temperature of the solution. Therefore, if you only use one make of film and one particular standard developing solution at, we will say, the usual 65 degrees fahrenheit, you can be sure that you will get the best results out of the exposures if you allow the film to remain in the developer for the recognised time. This time is to be found in the tables included with each bottle or packet of developer.

Come and see what happens when a No. 20 film is ready to be processed. It is not quite dark in the bedroom, so prepare to load the film into the J20 tank by putting the sections under the bed clothes. Then slit the paper cover of the spool and, taking this in the right hand, dive under the clothes and take the spiral in the left hand.

It requires a little patience to slip the end of the film into the first groove but it soon goes quite easily and the paper cover just slips away while the whole of the film is being wound into the wheel. When the end of the film is reached the paper cover is torn away and the wheel with the film is placed in the tank. The lid is slipped on, and, with the slight twist, the whole is locked and made light tight. The apparatus can now be handled in daylight.

Solutions

The next item is to prepare the solutions. For these, it is a simple matter to borrow a couple of orange or lemonade bottles holding about 25 ounces of solution. As there are likely to be five or six spools requiring developing during the next few days it is advisable to mix sufficient solution. So, taking 1 ounce of Azol, diluted with 24 ounces of water, it is placed in one bottle, and in the other, 2 ounces of fixing powder is dissolved in 15 ounces of water.

Do not forget that most tumblers hold 10 ounces and it is not difficult to measure the required amount of water. This preparation of solutions is done



Loading the film into the tank

over the wash bowl in which there is a small quantity of water, just in case a few drops of chemical solution is inadvertently spilled. The water will prevent staining or mess.

The film in use is an Ilford H.P.3, and the temperature of the developer is 65 degrees. So, on referring to the Azol booklet, it will be seen that this film is in group 6 and at 65 degrees with Azol one part, and water 24, the time of development is 11½ minutes.

Before pouring in the developer, fill the tank with water and give the film a twist with the spindle. Then after a couple of minutes pour the water away. This is one means of preventing airbells and it ensures that the whole surface of the film is in the best condition to be

acted upon evenly by the chemicals. Turn to your watch and take note of the time when the solution has been poured in and development starts. At several intervals give the spindle a twist to keep the solution agitated.

For Depreciation

At the end of the 11½ minutes pour the developer through the mouthpiece into the stock bottle of developer solution and replace it with the fixing bath. The next time the Azol is used it will be advisable to slightly increase the time of development. About 10 per cent each time is satisfactory, provided not too much time is allowed to elapse between each subsequent spool.

The made-up stock of 25 ounces is usually satisfactory for at least four spools, but it is a great mistake to attempt to economise a penny or twopence on developer solution and risk spoiling a whole film of exposures, which possibly cannot be repeated. Assuming that the holiday period is two to four weeks and the number of spools four or five then the 25 ounces of developer should suffice. The same applies to the fixing solution.

There you have a complete description of how to avoid 'mess and mistakes' and, at the same time the author has endeavoured to describe what is now considered the best, most correct, and simplest way of developing any spool.

During fifty years experience of processing plates and films the writer has long since discarded all the old methods and is convinced that by using a tank and the time and temperature method a greater percentage of successful negatives has resulted.

Ready for the Summer

This article has been specially written for this issue of *Hobbies Weekly* for two main reasons. The first is because many readers may still be in possession of some cash left over from their Christmas presents and would welcome the opportunity of buying a J20 tank. The second reason is that at this time of the year you will be able to make some first experiments and be so fully experienced when the holidays come along. The fact that no darkroom is required will help and it will start you on the right track of doing your own developing and so give you a far greater interest in the hobby.

The Best Results

In conclusion it is as well to anticipate one query which may have occurred to some. It is a very usual one. If a spool of 8 or 12 exposures has one or two under- or over-exposures what happens to them if the whole of the film is developed to a given time?

The answer is that 'By correctly developing the under- and over-exposures you have got the best out of them. Reducing or increasing the development time for those errors of exposure would not make perfect negatives of them. Nothing will do that although some might be improved by the usual "after treatment", methods such as intensification or reduction'.

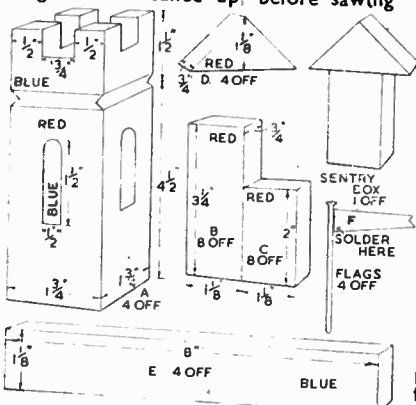
READERS may like early notice of an Exhibition being held next March by the Northern Association of Model Engineers. This will be held at the Corn Exchange, Manchester, and those wishing to participate should write to The Hon. Sec., 9 Ravensway, Bury Old Rd., Prestwich, Lancs., for particulars.

A simple method telling how a reader made a WOOD BLOCK TOY FORT

HERE is another idea (suggested by a Scottish reader) for a toy where accuracy is unnecessary, so that a boy could make it for a younger brother. His own kiddy has played for hours with this Fort and it is surprising how many different designs can be arranged. The actual work occupied only one afternoon.

Details

The four towers (A) were made from a length of 1½ in. square post cut into 6 in. lengths and cleaned up, before sawing



Showing the parts and number needed

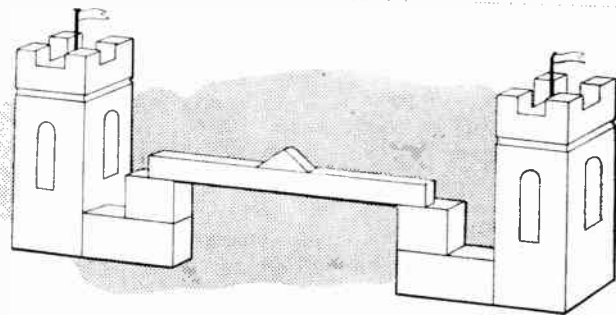
away the waste portions at the top. The next step is to cut away the windows and a V section to give shape to the tower top. To finish the tower paint the top with blue ink, and the bottom with red. Quite simple, quick and very

effective, although paint is preferred in the bath.

The parts (B), (C), and (D) are cut from a piece of ¾ in. by ½ in. wood, and once more cleaned up, hence the odd size of 1½ in. width. This, however, is unimportant as the whole job can be made from scraps. To simplify the building, glue the parts (B) and (C) together and secure with a panel pin although this is again unnecessary if the boy can tackle the building of so many pieces. Once more red ink can be used for the colouring of the parts.

Flags

The flags (F) are cut from a piece of a cocoa tin, but any of the thin tins in use today can be cut easily to the shape required. The tin pennants are then soldered to 3 in nails, and to cover the crude head of the nail, a blob of solder



will suffice. The pennants are painted to any design, making sure the colours are bright. The tin is bent slightly to give the impression of a windy day.

A ¼ in. hole is then drilled in the top of each tower for a depth of about 1 in. and the flags inserted. The pieces (E) are cut from a piece of 1½ in. by ½ in. wood, approximately 8 in. long, cleaned and painted blue.

Sentry Boxes

The sentry box (or boxes) if required, are made of pieces (C) and (D) (one each for one sentry box) and painted as you wish. The whole job is then assembled. Assemble one unit only for a start, as illustrated, and you will soon see that the fort can be made as a square or elongated to the length of the table as a background to soldiers, guns or other toys. Thus this is a toy in itself, as well as one merging with other toys.

MISCELLANEOUS ADVERTISEMENTS

The advertisements are inserted at the rate of 3d. 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 freework goods or those shown in Hobbies Handbook are not accepted. Orders can be sent either to Hobbies Weekly, Advert. Dept., Dereham, Norfolk, or Temple House, Temple Avenue, London, E.C.4

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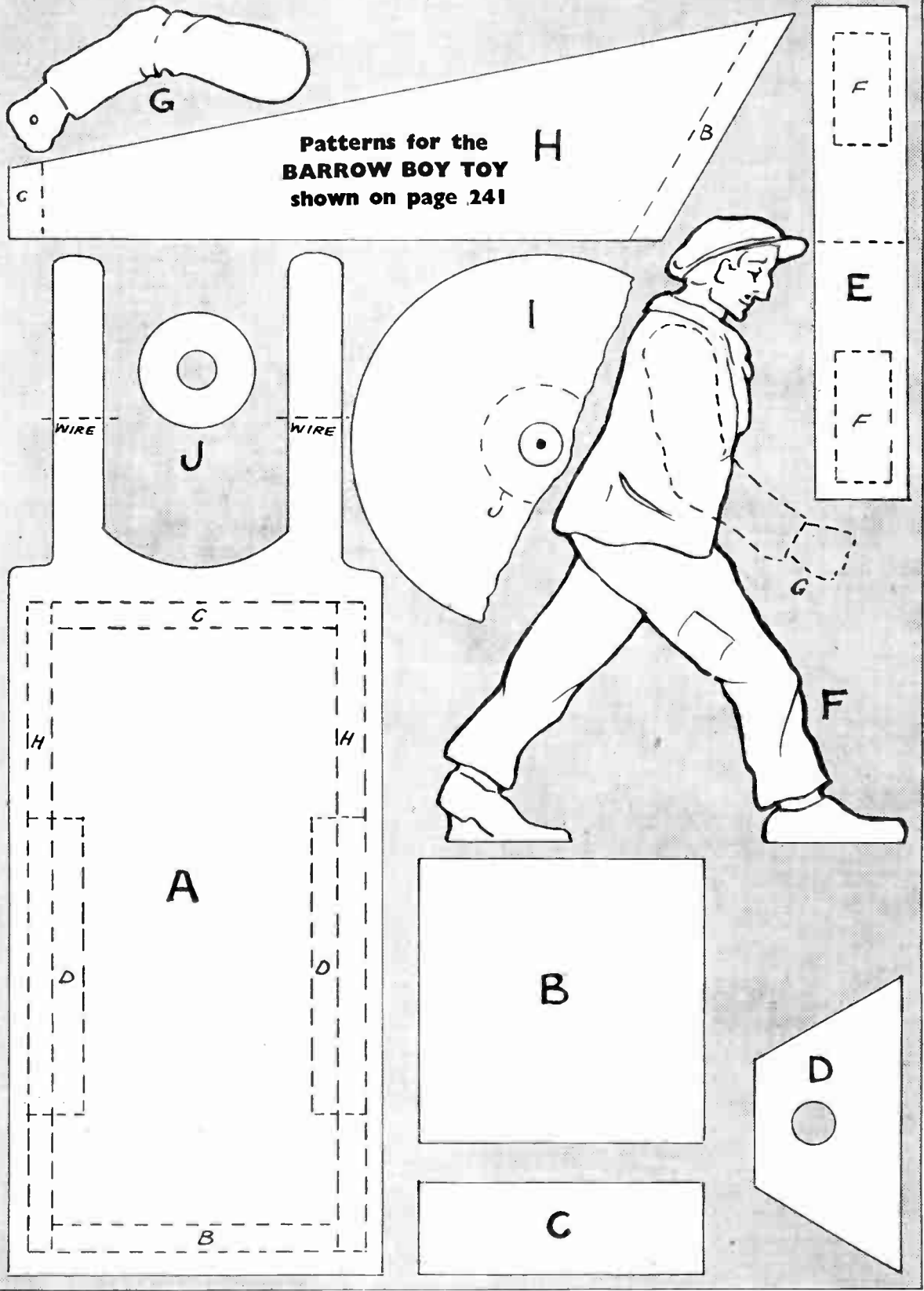
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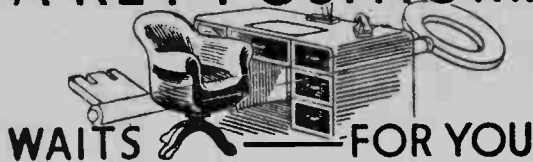
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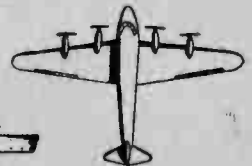
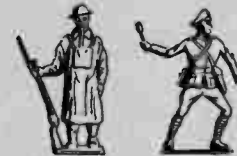
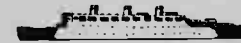
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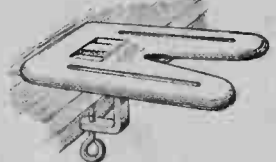
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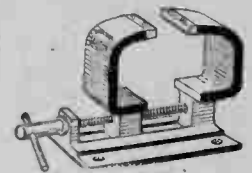
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January 25th, 1950

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Vol. 109 No. 2830

How the handyman can make a TABLE-TENNIS TABLE

AS there seems a better chance of buying plywood now, readers interested in the game of Table Tennis may care to make a suitable table themselves, to play it on. There is nothing difficult in the job, it is just a piece of ordinary carpentry. For the top, plywood, $\frac{3}{8}$ in. thick is about the most suitable material. Thinner stuff could be used, but the stouter quality makes a more solid article and is much to be preferred.

If plywood is not available, some of the plywood substitute might be tried. To avoid unnecessary joints the sheets

should be as large as possible. For the trestles, to support the table, ordinary deal will suffice.

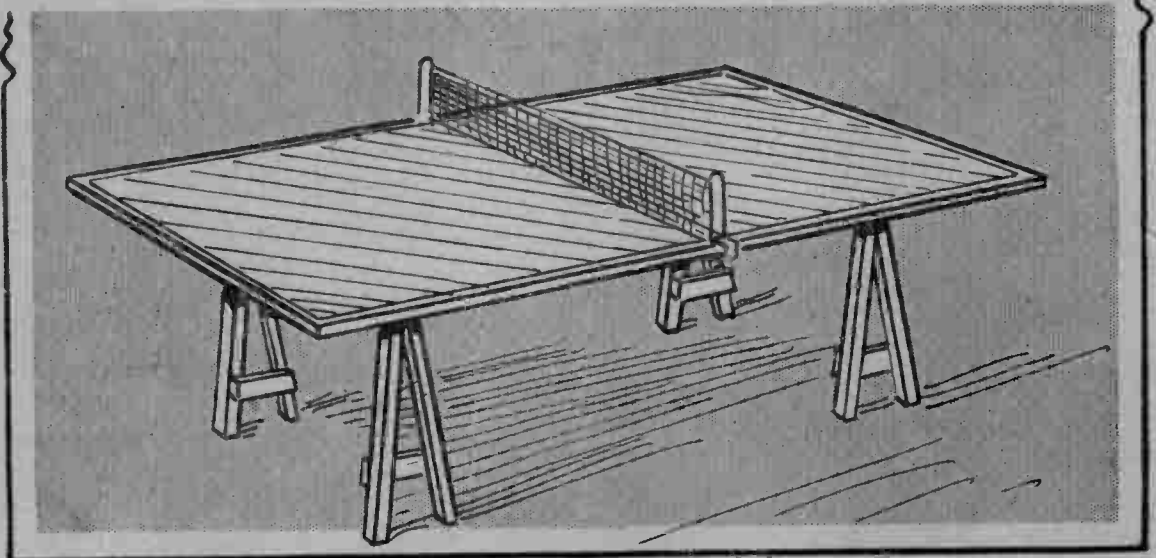
A framework on which the plywood is to be mounted must first be constructed. Fig. 1 (A) shows this, and as will be seen in the diagram, it consists of two long sides, two ends, and two long rails between. The latter can be cut from $1\frac{1}{2}$ in. wide stuff, the remainder from 2 in. stuff. All should be $\frac{7}{8}$ in. thick. To those who do not mind a little extra trouble, the lot could be sawn off a plank of the stated thickness. See the edges are planed quite square with the face sides.

Joints to Use

The corner joints of the frame are of the simple halved kind, as shown at (C) in Fig. 3, the rails are tenoned in the ends, as at (D). Quite short tenons will serve here, say, $\frac{1}{2}$ in. long. Cut the joints carefully so the frame, when glued together, lies flat and not twisted. A few screws may be added to the corner joints to strengthen the whole.

A Flat Foundation

When the glue is hard, the top of the frame should be levelled all over, as may be found necessary, to



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

provide a flat bed on which the plywood can be laid.

Unless thin plywood is used, it should be screwed to the frame from underneath, and screws of the right length be used, as no points should project above the table top. Glue can also be added, but must be hot and the work of screwing be done expeditiously before the glue gets cold. With thin wood it may be

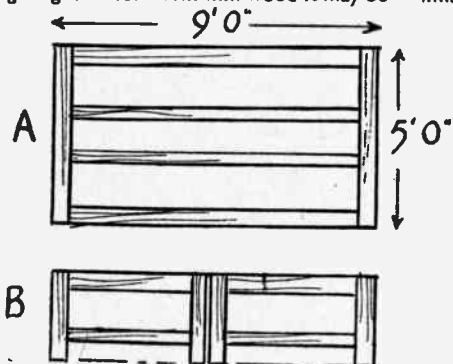


Fig. 1—The framework for the plywood

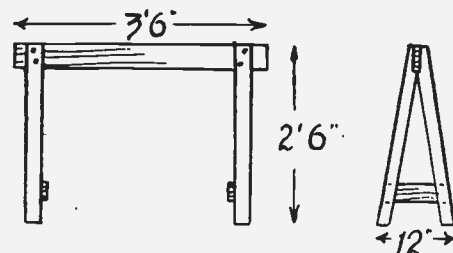


Fig. 2—Side and end view of trestles

necessary to nail through the plywood, but in this case use thin nails and punch them down a little.

The joints between the sheets of plywood should be glued, and should come, if at all possible, over the rails. Where this cannot be managed, a wood strip, $\frac{3}{8}$ in. thick and 1 in. wide, should be glued over the joint underneath. The whole surface should now be gone over carefully, and any nail holes or faults in the wood, stopped level with plastic wood, and the whole glasspapered.

Trestle Supports

To support the table a pair of light trestles should be made up. These are shown in Fig. 2. The top bars are $1\frac{1}{2}$ ins. by 3 ins., the legs $1\frac{1}{2}$ ins. by 2 ins., and the lower rails from board, 3 in. wide strips being suggested.

At Fig. 3 (E) a diagram is given to show how to cut the tops of the legs to give the necessary splay to them. Shallow grooves, $\frac{1}{2}$ in. deep, are cut in the top bars, at 2 ins. in from the ends, into which the legs are firmly glued and screwed. The rails are cut to length and nailed across.

Where storage space is somewhat limited, a folding table may be more

folding upwards, so that the whole concern lies flat for placing against the wall. The long top rails are cut 2 ft. shorter than the length of the table, and in the centre of them a notch, $\frac{1}{4}$ ins. long, and $1\frac{1}{2}$ ins. deep is sawn out to clear the hinged ends of the table above. The width across the two rails is 3 ft. 6 ins.

The rails are connected together by cross bars, of 1 in. by 3 in. wood at each end, the bars being grooved $\frac{1}{2}$ in. deep to receive them, as at (F). The rails, by the way, are cut from 1 in. by 3 in. deal.

The legs, 1 in. by 3 in. stuff also are fixed to the rails with iron bolts, so that they can be folded up for storage when not in use. Round the tops of these for neatness. The position of the legs is shown at (G) so that they can, when lowered down, press against the end bars at a suitable splay, say, 5 degrees from the vertical.

Ensure all four legs being at the same splay angle by setting a bevel, and drawing a pencil line at the angle, placing the legs in turn against the lines and then boring the holes for the bolts through legs and rails. It would be a good idea to cramp the legs in position when boring, to prevent them shifting from the guide lines.

This completes the work of construction. The surface of the table should be painted a flat green colour, and a 1 in. margin in white paint at the edges. The dimensions given provide for a table of standard size. Where the playing space is too limited for this the table can be made

smaller, but should be made as large as is possible, allowing sufficient room at the ends for play.

Remember too, that in playing, the table is frequently pushed and even on odd occasions, fallen upon. For this reason it must be sturdy and rigid as possible to prevent accidents to players and damage to the table. Another important point is the absolute smoothness of the top. Ensure the wood is glasspapered and that the coats of stain or paint, have no little blisters or "bumps".

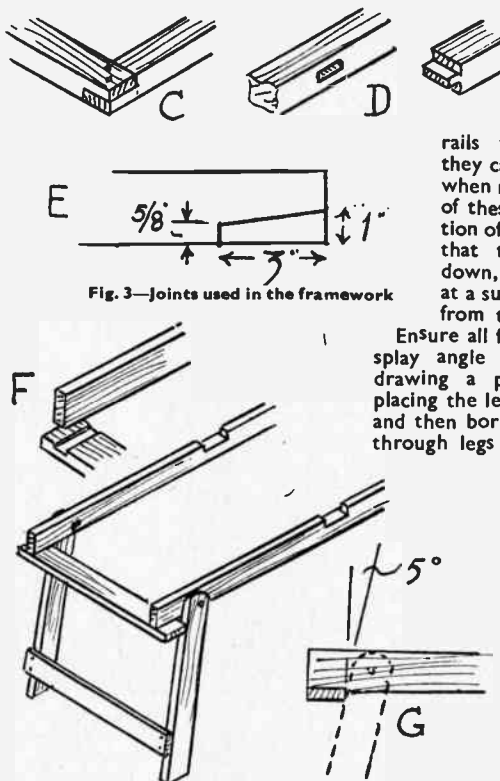


Fig. 3—Joints used in the framework

Fig. 4—A hinged folding type of leg

convenient. For this two separate frames are required, as at (B) in Fig. 1, joined as for the previous table. These are separately covered with plywood, and then hinged together underneath. The kind of hinges to employ are known as flapbacks, 2 in. size, three being required. The position of these is left until the under frame, on which the table lies, is completed, to avoid any chance of them fouling the frame rails.

This underframe is shown in Fig. 4, and is of the folding variety also, the legs

Precautions the Electrician must take—

FROM time to time articles dealing with mains-operated equipment are published, and these are welcomed by readers who wish to make use of their supplies instead of batteries, which are more costly and also require replacement from time to time.

However, constructors should never overlook that all mains-driven apparatus, whether home-made or commercially

manufactured, is capable of delivering shocks if wrongly handled. Because of this, the constructor who makes use of mains supplies should make it a rule never to touch any metal parts, connections, or so on without withdrawing the mains-supply plug.

Actually, shocks will usually only be felt as a smart tingling of the fingers, but if the constructor is holding some conducting object (such as a metal

screwdriver) and is standing on some conductive floor-surface (e.g., concrete) the shock may be more severe. Because of this no risks should be taken. If it is essential to make adjustments involving the touching of live connections, the constructor should use an insulated tool, if possible, or stand on a dry carpet and use one hand only with caution, if this is unavoidable. Better to be safe than sorry!

The handyman can easily learn the various methods of HOW TO FIT BED SWITCHES

THE convenience of being able to switch a bedroom light on and off from the bed is obvious, and this arrangement is quite easy to fit up. If desired none of the existing wiring need be disturbed, and the usual switch by the door will, of course, be retained in the usual way.

A Plug-In Arrangement

The circuit for this is shown in Fig. 1. It has the advantage that none of the existing fittings or wiring need be disturbed in any way, which is very desirable if there is any doubt about the

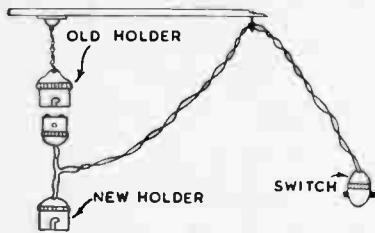


Fig. 1—Using a holder and adapter

permission of the owner being obtained. Three items are required. The switch can most conveniently be of the 'pear' type, totally enclosed and intended to hang from flexible wires. An ordinary bulb holder is also necessary, and an adapter. The latter resembles the bottom part of a bulb, but has a cover which is unscrewed to reveal terminal connections. A suitable length of twin flex is also needed, and all these parts can be obtained from popular stores or electricians.

Unscrew adapter and bulb holder and fit a 3 or 4 in. length of flex from one terminal on one to one terminal on the other, not forgetting to thread the wire through the covering caps so that the latter may afterwards be screwed on. Now part the ends of the twin flex and take one end to each of the remaining unused terminals. The pear switch is fitted to the other end of the twin flex, as shown in Fig. 1.

To use, remove the bulb from the existing holder and insert the adapter in its place. The bulb is placed in the new holder, any shade, etc., being left undisturbed.

As will be seen, this arrangement can be fitted up in any room in a few seconds, and taken down or moved if desired. The flex leads to the switch may be of any convenient length.

A Permanent Installation

If it is in order to alter existing wiring, the arrangement shown in Fig. 2 can be used. Unscrew the cap of the bulb holder and remove one lead. Join the end of this lead to one of the switch leads (tight twisting will do) and cover with insulating tape. Now take

the other switch lead to the terminal in the holder left vacant by the removal of the original wire. This is shown in Fig. 2, where the cover of the bulb holder has not been replaced so that connections may be followed more easily.

Switch off the mains supply before making these changes, and take care that all joints are good. The junction of the wires should be properly covered, and the moulded cap of the bulb holder is replaced after wiring is completed. The whole operates in the same way as the arrangement shown in Fig. 1.

A Bed Lamp

If it is necessary to have a light at the head of the bed, possibly for reading, this is quite easy to arrange. The lamp

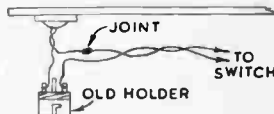


Fig. 2—Modifying existing wiring

may stand by the bed, or hang on the bed-rail, and the latter type is shown in Fig. 3. Wiring for either, however, would be the same.

From lampholder and switch twin flexible leads are taken to an adapter of the type shown in Fig. 1. This adapter is plugged into the fixture hanging from the ceiling, where the bulb was originally. So that the whole is as tidy as possible it is best to choose flex which matches the ceiling, and to take the wire along to the junction of wall and ceiling, and then down the wall to the head of the bed.

With this arrangement the switching will be the same as with the two circuits already described. That is, the light can be switched off at either the door or bed switch, and on again, when required, at the switch at which it was turned off.

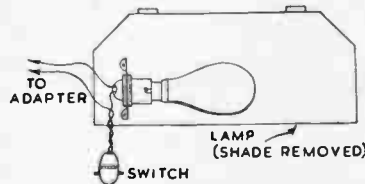


Fig. 3—Fitting a bed lamp

Usually this is perfectly convenient. The light can be switched on at the door when entering the room, and then controlled as necessary from the bed switch.

However, if the user arises in daylight he should remember to switch on at the bed light and off at the door switch, otherwise the door switch will not function when he enters the room at night, because both switches are in series. In practice this arrangement is

quite convenient and largely automatic. It is only necessary to remember that the light can only be switched on at the same switch as that used last to switch it off.

Using Two Bulbs

With a shaded bedside lamp it may be desired to retain the light in the centre of the room also. To do this, a two-way adapter should be purchased and inserted in the bulb holder in the centre of the room. This holder will have two sockets; the adapter feeding the bedside lamp can be inserted in one, and the usual bulb in the other. Both lights will then operate together.

Such adapters can also be purchased with a small internal switch already connected. By operating this, the central bulb can be put out, leaving the bedside lamp only burning, when required.

It is also possible to unscrew the existing bulb holder and take the leads from the bedside lamp to the internal terminals to which the wires coming from the ceiling are connected. No adapter at all will then be required, but the bedside lamp cannot then be plugged easily into any room-light, as when an adapter is used.

Two-Way Switching

With two-way switching a circuit is used in which two switches control a single light, but the light can always be switched on at either switch, notwithstanding which switch was used to turn the light out. Two two-way switches are required. One should be the usual wall type and will be fixed in place of the present switch, while the other will be of the pear type for use by the bed.

The complete circuit is shown in Fig. 4, and some of the existing wiring will have to be disturbed. Three

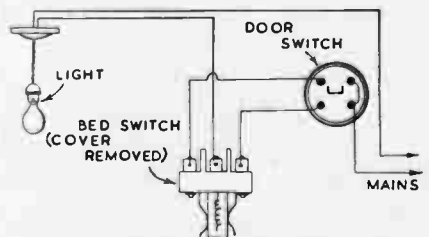


Fig. 4—Circuit for two-way switching

flexible leads are taken to the bed switch, which is shown with cover removed to make connections clear. These leads should be placed in the most tidy and convenient position, as before.

As a lead will usually go from the ceiling rose to the wall switch, the latter point may be the most convenient from which a wire can be taken to the centre contact of the bed switch. For the latter, it may be preferred to use a wall-type switch screwed near the bed.

A suitable method of preserving old-time needlework is by FRAMING TAPESTRY

THOSE readers who possess an example of old tapestry, or of ancient and modern needlework, will find a suitable framing shows up the beauties of the work. Frames, and stands as well, of such craft should be of simple design so as to not distract the eye of the viewer from the work displayed.

Many old-time drawing rooms displayed such work, as the collection of tapestry or working of it come to that, was the occupation of many ladies in more leisurely days. The taste for such work is still popular and it is worth displaying.

Fig. 1 shows two examples

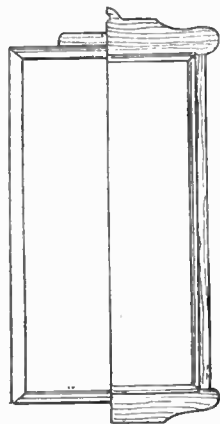


Fig. 1—Two frame suggestions

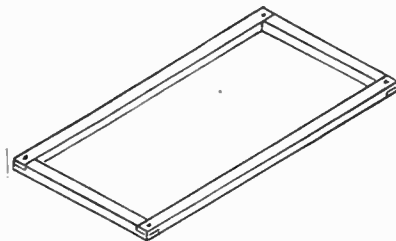


Fig. 2—The inner frame for the material

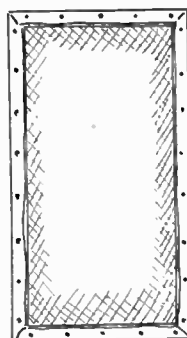


Fig. 3—Underside view

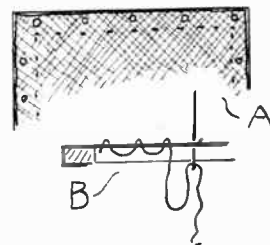


Fig. 4—Stitching the work

doubled over as tacked, so that the tacks go through a double thickness each time, also the corners should be most neatly folded before tacking, to avoid any lumpy bulges which might make the frame troublesome to fit in its outer show frame later on.

Fitting the Tapestry

With the covering stretched over as tight as possible, turn the frame over for receiving the tapestry. This should be pressed flat, and laid over the frame, then it is gently stretched and held down with drawing pins all round, as at (A) in Fig. 4. Be careful in both stretching and pinning down, especially if the tapestry is very old. Avoid any distortion of the design by correcting the extent of tautness as the work

removed. The tapestry should now lie quite flat on the frame, and show not the slightest tendency to sink in the middle, or crease up anywhere. It is then ready for insertion in its show frame.

As stated at the commencement of this article, two examples of simple but suitable framing are given in Fig. 1. The left-hand side one is a frame of half-round moulding, of the usual picture frame style. The rebate must be deep enough to receive frame, glass and backing, as well as, as in Fig. 5 (C), say, $\frac{3}{4}$ in. deep, and can be in black or gold, both, perhaps, equally suitable.

It should, for preference, be rather narrow, but that will depend somewhat on the dimensions of the displayed tapestry or needlework. A width of $\frac{3}{4}$ in. to 1 in. is suggested, but readers can, naturally, use their own taste and judgment on

of suitable frames, half only of each design being shown, but before making the frames the tapestry or needlework must be gently straightened out to lie flat and be prepared for the purpose. An inner frame on which the tapestry will be fastened, should be constructed. Fig. 2 shows this—it is quite a simple job.

Make the frame from $\frac{3}{4}$ in. by $\frac{3}{4}$ in. deal (heavier stuff, if the example to be framed is a large one), using a simple halved corner joint, secured with one nail and no glue. The outside dimensions of the frame should be approximately the same as the sample of tapestry, when gently stretched out, and laid flat on the table.

Backing Material

To this frame a covering of some strong black material is stretched and tacked over to the underside. A piece of some of the various black-out stuffs might do here. There is still plenty of choice. But the material must be a strong one, as it should remain taut to support the tapestry or needlework which is fastened to it.

When tacking the stuff do not place the tacks indiscriminately, but adopt the system previously explained in upholstery articles for stretching canvas. Fig. 3 shows an underside view of the frame, with the covering tacked down.

The edges of the covering should be

progresses.

It may be added that any dust, etc., and some of this old work collects plenty, should be gently beaten and brushed out before stretching. When the job is satisfactory the tapestry should be further attached to its black foundation by a line of small stitches all around, close to the frame.

These stitches should be of black silk or cotton, and be made from underneath, as in detail (B). Here the stitches are shown as loops for clarity in following, but actually, of course, they will be drawn moderately tight, tight enough at any rate to hold the tapestry in position.

The stitches should be quite small where they hold the tapestry down, and should, if the work is neatly done, be inconspicuous. When the stitching is complete, the drawing pins can be

such a matter.

Make the frame or have it made up for you, with the rebate size approximately that of the inner frame, for the latter to fit snugly inside. Glass will most likely be introduced to keep the dust out, but the tapestry will remain flat even if the glass is omitted.

Fancy Frames

Fix in the frame with a few picture frame brads or sprigs and cover the joint between frame backing and frame, with brown paper, glued over, to keep any dust from working through. A simple pediment can be added to the frame, as shown in the illustration, if liked (it is quite optional), and the frame suspended with gilt picture wire or chain.

Readers who do not care particularly for the conventional work of frame-making, and it is no easy matter without cramps and a reliable mitre block, can make up themselves an equally suitable frame without bothering about troublesome mitres.

The right-hand example, in Fig. 1, shows such a frame, the top and bottom of which are fixed to the sides with a stub mortise and tenon joint, as at (D). A slip of shallow half-round moulding is glued and pinned round the opening, and overlaps it, as in detail (E), to make the rebate for the glass and frame.

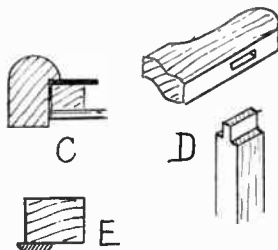


Fig. 5—Rebate and joint details

A novelty type ship is easily made as a CRUISER CIGARETTE BOX

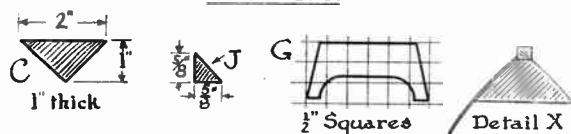
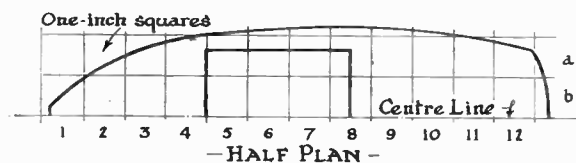
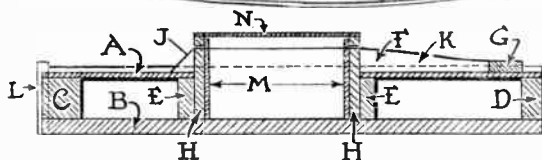
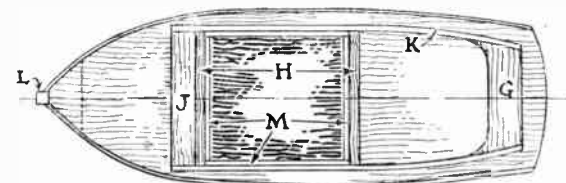
At one time or the other, cigarette boxes have been designed in all manner of possible and impossible forms; inside model grand pianos, aeroplanes, and the like. Here is a box, however, that is not only novel in form, but reasonably logical. Inside the cabin of a water-line model of a cabin-cruiser we find a 'cargo' of cigarettes.

As will be seen from the illustration, quite an attractive model results, and in planning this novelty, we have kept in mind the fact that it is primarily a cigarette box and not a scale-model of a cabin cruiser. Difficult curves of the hull, such as would be met with in the real boat have been avoided, and the deck levels much simplified to make for easy construction.

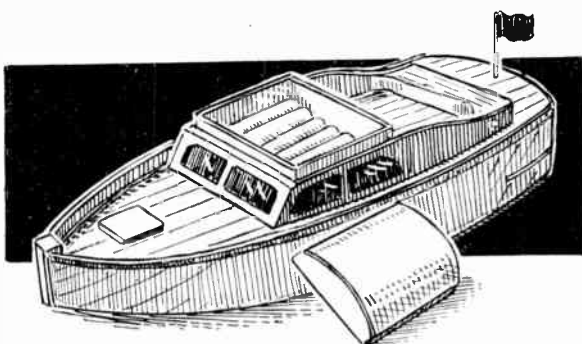
If, however, the reader is well 'up' in real or model boat building, and wishes to make a model that would not be out of place, say, in the home of an expert cabin-cruiser owner, he can use our simple model as a basis on which to make a more elaborate one.

Full-size Patterns

The first thing to do is to prepare full-size paper patterns for the top and bottom decks (both alike). Actually, only one half of the design needs squaring off. A piece of paper is doubled the long way, and one half of the design drawn on it, the centre-line of the design being along the fold. The pattern is cut round with scissors. When opened, a perfectly symmetrical design will be



Details of the parts and (at top) plan of boat



obtained, which can be transferred to the wood.

The top deck (A) is made from $\frac{3}{8}$ in. plywood, and the bottom (B) from $\frac{3}{8}$ in. solid wood. The top deck only has a $3\frac{1}{2}$ in. long by $3\frac{1}{2}$ in. wide hole cut in it. Unless you have a fretmachine, it is probable that both decks will have to be cut separately and after cutting they should be temporarily held together and, with a file, etc., made exactly alike in outline.

Front block (C) is next cut. It is a simple triangular piece, dimensioned as shown and is glued and pinned to the front of the lower deck. Piece (D) need not be shaped at first. It is cut from 1 in. thick wood, $3\frac{1}{2}$ ins. long and $\frac{5}{8}$ in. wide. It is fixed to the stern end of the lower deck, and when the glue has set, the block may be shaped to conform with the curve already at the end of the

deck. The upper deck may then be fitted, taking care that it is exactly over the lower deck.

Two pieces (E) are also fitted at this time. These are of 1 in. by $\frac{3}{8}$ in. section, and can be cut $4\frac{1}{2}$ ins. long. When in position, immediately inside the fore and aft ends of the square hole, the ends can be chiselled off. Work, at this stage, is illustrated in Fig. 3.

Before any more work is done, the upper deck should be sanded quite smooth, all nail holes being stopped with plastic wood. Lines to represent planking can be scratched on with, say, a bradawl run along a metal rule, or they can be pencilled in. This is

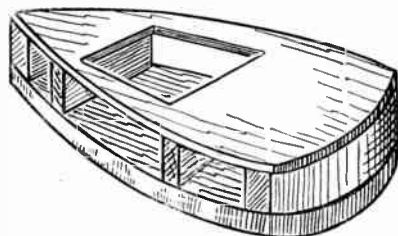
the last opportunity we have of working on a clear flat deck.

Two sides of the cabin (HH) are now made. They are of $1\frac{1}{2}$ in. by $\frac{1}{4}$ in. section and $3\frac{1}{2}$ ins. long. That is, they fit exactly inside the opening in the top deck, and go flat against parts (E), to which they may be glued. Part (G) is of $\frac{1}{4}$ in. plywood, shaped as shown, and glued to

the top deck $\frac{1}{2}$ in. from the stern. Part (J) is a triangular fillet, of the section shown, and $3\frac{1}{2}$ ins. long. It is glued on the front deck, right against the fore-most of the (H) pieces.

The Sides

Sides (K) are of thin plywood with the grain going the long way of the outside surface. The strips are cut $\frac{5}{8}$ in. wide and just over 9 ins. long. They go from the front of the (J) piece to the rear of the (G) piece, forming another side for the cabin.



Showing general construction

When length has been checked, taper off the end and chop off a corner of the front so it goes neatly against the triangular fillet (J). This (K) piece is attached to parts (J), the two (E's and G). Very small panel pins are used as well as a spot of glue.

Ordinary pins can be used. They are driven in a reasonable way and then the rest is cut off with a pair of pliers, of the clawed type. The top of the (K) strips should be level with the tops of the (E) pieces.

Lining

The box is now lined with pieces of $\frac{1}{8}$ in. wood (M) solid or ply, which project $\frac{1}{8}$ in. above the main cabin top so as to form a flange to enable the lid to sit on. There will be no difficulty in attaching one set of sides to pieces (E). Small packing pieces may be needed to take the other sides. During the gluing, etc., process, take great care to keep the inside of this box clean.

(Continued foot of page 262)

Having made the cinema you can undertake a HOME-MADE CINE SCREEN

LAST year a design was given in *Hobbies Weekly* for a home cine. For readers who have made this and others who possess a small cinematograph, here is a screen which gives a more brilliant picture than any other type. For it is of a translucent type, the picture being seen by transmitted and not reflected light.

In the ordinary screen the light from the projector strikes the surface and then is reflected back to the eye, and it depends how much light is absorbed by the material whether the picture is bright or dull.

Translucent Material

With a translucent screen, however, the picture is projected from behind and the audience see it through the material just as you see the picture on the ground glass of your camera. Your size of picture need not be very great for a small room, and the screen shown here gives one of 2ft. by 1ft. 6ins.

The translucent material can be 'Celastoid' or some other form of plastic or engineer's tracing cloth. In both cases it has to be under tension to give the perfectly tight, flat surface that is so essential to all types of ciné projection for good results.

First, therefore, construct the frame. This is made up of two pieces (A) and (B), 2ft. 3ins. by 1½ins. and two side strips (C) and (D), 1ft. 9ins. by 1½ins. (both ½in. thick). Also required is the top front piece (E), 2ft. 3ins. by 1½ins. and (F), 2ft. 3ins. by 2½ins. and two side strips (G) and (H) which are 1ft. 6ins. by 1½ins. The frame is fitted together after making and putting in the screen.

Tracing Cloth

For the latter is required a rectangle of either of the two above materials, 2ft. by 2ft. 2ins. The plastic is really the better material of the two, for while the tracing linen is quite good, there is a slight tendency to show the texture. If you are using tracing cloth, however, get some of the rough variety, this being better than the high gloss.

The screen is secured at both top and bottom to a length of very stiff dowel, the top length being 2ft. 2½ins. long and the lower 2ft. 2ins. There is 6ins. to spare in the vertical direction of the material, so 3ins. is wrapped tightly and evenly round each dowel where friction and a row of sprigs will hold it firmly in position.

The Frame

Two holes are now made at (a) to take the ends of the top dowel and the frame is fitted together, the way this is done being clear from the diagrams. Top and bottom pieces fit over the side uprights and then everything is locked by the front strips which are held by a close series of short screws along their edges. Further strength is given by the four small angle irons (b) which can be bought at any chain store.

Now we come to the bottom. Here three small coil springs are fitted (obtainable at an ironmonger's). They are fastened permanently to the lower

dowel by binding with wire, but their lower ends slip over small hooks in the lower strip (i). Adjustment must be such that when on the hooks the screen is pulled to a nice even tension. When the screen is not in use the coils are released and either let them hang loose or they can be slipped over two long-necked hooks (d).

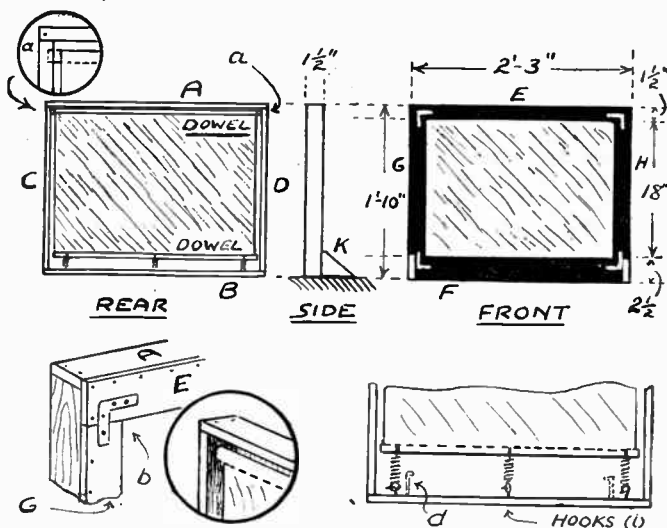
As far as the woodwork is concerned, we now only have to fit the feet (K).

These are triangular pieces of wood ½in. thick and held to the lower front by two small hinges each. The hinges are set with their pivots to the inner side so the triangle will turn inwards when the frame is packed away. Care must be taken to see that when the triangles are in the 'out' position the screen is perfectly upright.

Painting

Last comes the painting. The inside of the frame must be given a coat of matt or 'drop' black, i.e., a non-reflecting black. The front face can be also black or deep blue. On no account must a light colour be used, as we want to present a border as sharply contrasting as possible to the illuminated picture, and a light colour does not do this.

It is interesting to note that as well as giving a more pleasing picture the translucent screen is useful because it allows a greater number of people sitting right in front of the picture, as



there is no space wasted by the projector or the necessary beam of light from it to the fabric.

Cigarette Box—(Continued from page 261)

The post at the bow (L) is made from ½in. square stripwood, 1½ins. long. With one or two neat vertically downward strokes of a chisel, the pointed prow is flattened a little so that the post can be glued and nailed on. This done, the sides (M) can be fitted. These are of ¼in. plywood, with the grain running the short way of the strip, which is 1½ins. wide and approximately 13ins. long. They are cut oversize as regards length, as they can easily be trimmed off afterwards at the stern.

Fixing is started at the bow end (see detail (X)). There will be no difficulty in driving small panel pins into the thick-

ness of the lower deck (B) or the pieces (C), (E-E), and (D). If the two decks (A) and (B) are immediately over each other, it is not essential to drive pins into the thickness of (A), though one or two very small pins may be used. Glue will fill any small gaps.

The sides project ½in. above the deck level.

No detailed instructions need be given for the lid (N) (cabin top). To simplify construction, the top can be quite flat. Otherwise the ends are shallow D-shaped pieces and the curved top is either thin plywood or stiff card. Make sure that the lid is a decent fit.

As regards decoration, the deck can be left in natural colour and varnished. The sides can be white enamelled and the cabin sides done in a contrasting colour, say, green. The cabin windows are simply painted on as solid masses.

The sketch of the finished model suggests a few extra refinements such as a hatch cover at the front, some rubbing strakes, a flagstaff, etc. A few of such 'extras' give a finished touch to the model, but do not overdo them.

The interior of the cabin where the cigarettes are contained, is left in plain wood, given a coat of varnish.

Home Cements for Handymen

Leather to Iron Cement

Paint the iron first with a paint of white-lead and lamp-black, then soak good Scotch glue in cold water till soft, finally dissolving the glue in acetic acid or vinegar at a low heat. Then add one-third of the complete bulk of white spirits of turpentine, finally mixing thoroughly, and applying it to the painted iron whilst it is hot. Apply the leather quickly, and press into close contact until completely cold.

Cements for Small Machine Belts

There are several recipes for leather cements for this purpose, but belt joints should never depend entirely upon them, but should be stitched as well.

Half a pint of hot Scotch glue mixed with a table-spoonful of glycerine and a tea-spoonful of spirit of turpentine is a good cement for leather, as is $\frac{1}{2}$ lb. of raw rubber, 1 oz. of pitch, and 1 oz. each of shellac and sweet (olive) oil. The latter formula should be used hot.

Sheet gelatine dissolved in acetic acid or glue (liquid) to which enough tannin has been added to make it syrupy is also a good leather adhesive; whilst 20 parts of raw rubber, 2 parts of pitch, 1 part of shellac and 2 parts of raw linseed oil is yet another well-known formula.

Amber Cement

A cement for repairing amber may be made by dissolving sufficient gum in ether or alcohol (ether by preference) to form a treacly fluid. The broken parts should be slightly heated, the cement very quickly applied, and the parts as speedily brought together and bound with string or wire. Any protruding excess may be scraped away quite easily with a really sharp knife.

Steam Pipe Cement

Steam joints may be successfully made with the following mixture. 50 parts of finely ground graphite, 15 parts of ground chalk, mixed together and allowed to dry hard. When dry the mass should be reground and 15 parts of boiled linseed oil, together with 20 parts of litharge added, mixing to a stiff paste. This cement remains usable for a long time and is applied to the joints before screwing up tight.

Cement for Steam Pipe Leaks

Leaks in steam pipes may be permanently sealed with a mixture of linseed oil and sufficient oxide of manganese to form a stodgy paste. Steam pressure should be removed or at least diminished during the operation, and the pipe surfaces at the leak kept hot. This cement sets very hard in about 24 hours.

A novel mechanical toy THE MAN AND PUP

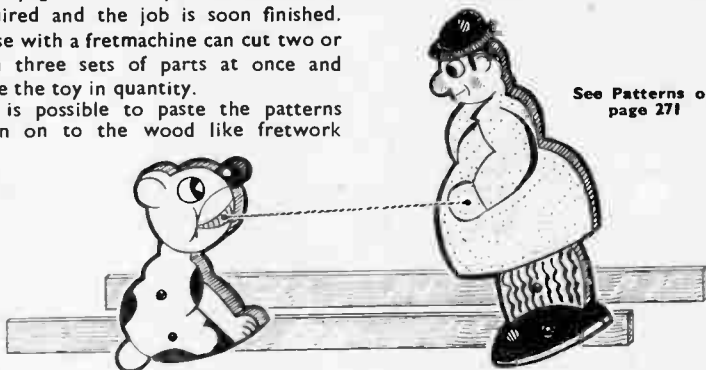
ILLUSTRATED herewith is a grand old toy for which we give full-size patterns on page 271. Very little cutting is required and the job is soon finished.

Those with a fretmachine can cut two or even three sets of parts at once and make the toy in quantity.

It is possible to paste the patterns down on to the wood like fretwork

The back and edges are to be blacked. This is best done first.

The two strips can be of ready-



See Patterns on page 271

patterns, but this is not recommended. It is better to trace off the patterns so the printed copy is left intact for reference as to the markings of the features, etc.

Three Methods for Patterns

Three methods suggest themselves: (a) lay the printed copy over suitable scraps of clean wood and trace through, using a sheet of carbon paper, (b) make a tracing, on tracing paper, and then trace down on to the wood. This method is particularly suitable when odd scraps of waste wood, off-cuts, etc., are being used. (c) Make cardboard templates that can be pencilled round. This is particularly suited where the toy is being made in quantity.

Plywood $\frac{1}{8}$ in. thick is suitable with the outside grain going the long way of the figures. Note particularly that only the outline is cut. The man's arm, for example, is just painted on afterwards and so is the space to the left of the pup's extended foreleg. Do not forget to drill small holes where shown. The actual diameter of these depends on the size of the split pins being used.

Painting the Parts

The parts are best painted before being assembled, but only the simplest and boldest of colouring is needed. The pup could be white, but this would soon show the dirt. Black in large areas is very unsuitable on children's toys. Suppose we have a light fawn body for the pup with dark brown patches. The nose, of course, is black.

The man's hat is dark brown. The face is pink, made by mixing a little red with white and yellow. The coat can rival Joseph's in brilliant colouring. Never forget that though, in actual fact, a man's coat is usually in a sombre colour, children like bright colours and a bright green overcoat and dark green trousers would not be out of place. The shoes are dark brown. The painting is done in bright enamels on the face side.

prepared stripwood or cut from plywood $\frac{1}{8}$ in. or so wide. On the pattern sheet, the two figures are shown rather close together for economy in space, but they are shown better spaced in the drawing that heads this article. Actually, the length of the strips is immaterial to the working but there is no point in making them excessively long.

Holes are drilled in these strips to correspond with the holes in the figures. The pattern sheet will show the lay-out. The space between the strips need not and should not be very great.

Assembling the Parts

The parts are assembled with split pins which can be obtained from any good ironmonger. They are somewhat similar to brass paper-fasteners but, of course, more pin-shaped. Whilst you are getting these, get some small washers to match. Put a washer between the strips and the figures, and another under the head of the split pin. Another washer should be put on before the ends of the split pin are turned over. If this is done, the figures will work without stiffness.

Note that the right-hand end of the upper strip and the left-hand end of the lower strip project a bit more than their counterparts. It is these two strips that are taken in either hand and pushed too and fro. When this is done, the figures rock from side to side.

Tug-of-War

A piece of string is inserted through a hole drilled in the man's hand and taken across to a similar hole drilled in the dog's teeth. When the toy is worked, a most realistic tug-of-war takes place between the man and his pup.

There can be few, if any, readers of *Hobbies Weekly* who have not, at one time or the other, had a frisky puppy straining on the end of a lead, and most children for whom the toy is intended will see the point, too.

Learn the art and amuse your friends with CHAPEAUGRAPHY

THE word Chapeaugraphy comes from the French—Chapeau meaning hat, and the Greek Graphos meaning to write or record. The art of Chapeaugraphy, therefore, is the ability to depict various kinds of hats. Besides being instructive a considerable amount of amusement can be obtained by practising it.

It is believed that a Frenchman introduced the art about 200 years ago, and although it was very popular until early this century, very little is seen of it now. This is rather surprising as it is not a difficult art to perform and with a little practise considerable skill is soon acquired.

A Felt Ring

The only piece of apparatus really necessary is the chapeau or ring as it is sometimes called. The idea is to portray different characters or types of people by folding the ring and thus forming different kinds of hats.

The ring is made from a piece of fairly thick black or dark coloured felt about 20ins. in diameter. A circle is cut out of the centre having a diameter of 7ins., leaving a ring of felt $6\frac{1}{2}$ ins. wide. This must be made quite pliable by rubbing.

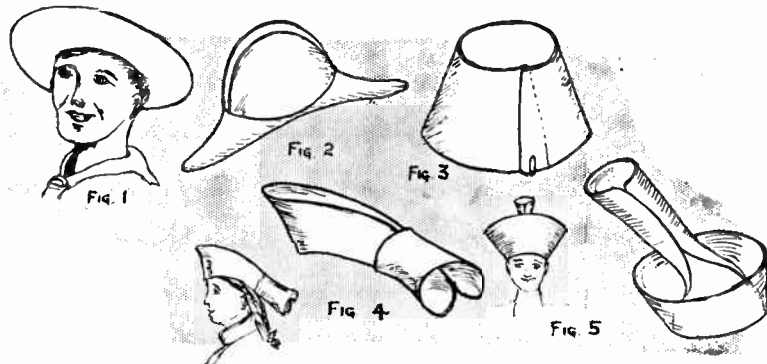
Some chapeaugraphists use various accessories besides the ring for their act, such as a cloak to throw over their shoulders, spectacles and moustache, a coloured handkerchief and a stick to name but a few. Other performers are content to use the chapeau only, and to rely on facial expression to depict their characters.

Now let the show begin. The first figure is quite an easy one and requires no folding, just put the ring over the back of the head and you have the Cowboy Sombrero (Fig. 1). A handkerchief tied round the neck and a length of

rope will add a little colour to the scene. Napoleon (Fig. 2) is also quite easy. Take hold of the ring by opposite edges and push through the centre, pulling one a little further than the other. Turn your coat collar up and push one hand

and a cane and, perhaps, a pair of spectacles, having them on the tip of the nose to look over the top of them.

The next hat is that of a soldier of about 200 years ago. To make it, take one edge of the ring and pull it through



into your buttoned-up coat. Also wear a somewhat sour expression.

An Admiral, or the Duke of Wellington, can be done with the same hat, but do not push the pieces through quite so far. And wear the hat with the points to the front and back instead of sideways.

More Shapes

The Turk's cap (Fig. 3) is very simple. First fold the felt ring in half then form a roll and clip the two ends together. When putting this hat on be sure that the clip is at the back.

The Mortar Board of the Schoolmaster is made up the same as the one for Napoleon. The sides are not pulled so far through the centre. The hat is worn the reverse way to Fig. 2, with the board on top, which should be flattened as much as possible. A little more realism can be given to this one by having a book

the centre. This is called a half twist, and in this state it forms another hat which was worn by the old fashioned Beadle. Now by continuing the half twist you will form a full twist, and the felt will fall into position making the hat as shown (Fig. 4). It is worn with the tail part behind.

Priest and Chinese

By turning the hat round and having the tail part over the front of the head we have yet another character—the Village Priest of France.

The Chinese hat shown (Fig. 5) is a little more difficult to make. First fold the ring as in Fig. 4 for the soldier. With one hand hold the end with two rolls, then with the other hand turn the outside edge of the brim up and the inside edge down. Do not let the 'pigtail' part stick up too high.

By a slight adjustment of this last hat another character is easily made—that of a Spanish Bull Fighter or Toreador. The brim needs to be only half the width of Fig. 5, and to do this the bottom of the brim is rolled in into the centre hole.

Individual Efforts

The hats just described are only a few of the large number that it is possible to make with the ring of felt. Only a little experimenting is necessary in order to create some new and very striking creations, the presentation of which will give endless fun to yourself and to your friends.

When you get expert a splendid little show could be arranged and you might often be able to assist at concerts.

Many of our lady friends would be thrilled with some of the striking designs for hats that it is possible to create with the aid of a simple ring of felt. It is even probable that you might evolve a new design.

A Miniature

Model Mine



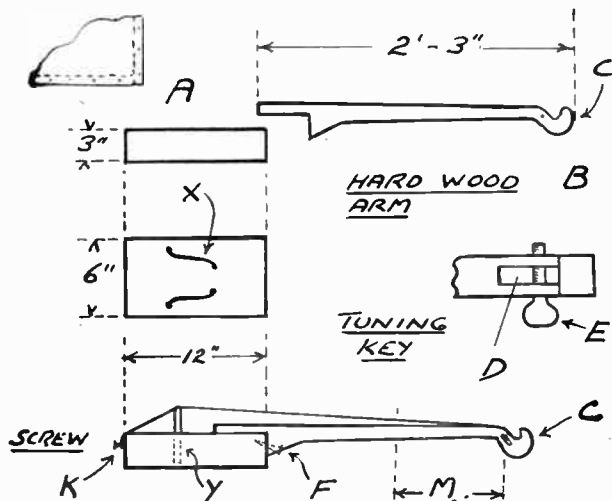
Nottingham Guardian Photograph

WHO says boys have not patience to do little things neatly and realistically? Look at this. A tiny model of the surface workings of a coal mine, based on the layout of Welbeck Colliery was made by the two lads you see—K. Lilley (on the right) and D. Truman in whose home district of Nottinghamshire the pit is situated.

Learn to entertain yourself by making a ONE-STRING FIDDLE

THE making of a one-stringed fiddle is quite a practical proposition. Indeed, with care an instrument can be turned out which will not offend the most musically-minded. An official bow, of course, must be bought, as these cannot be made by the amateur. The string, too, must be obtained from a music shop—this being of the ordinary violin variety.

Now with regard to the constructional part. First we require a thin wooden box (A), 12ins. by 6ins. and 3ins. deep. Cigar box wood is ideal for this, but it is hard to obtain nowadays, so the box may have to be built from six sections of whatever material you can get. The two end pieces must be $\frac{1}{4}$ in. thick, to which the top, base and side are fastened by fine screws.



The sides can be a shade thinner than the ends, and the base and top should be as thin as possible compatible with sufficient strength— $\frac{1}{8}$ in. material will do quite well. The great aim is to make a solid well-knit box, and, to help this, top and bottom pieces are glued before being put in position, and then a series of very fine model-makers spikes ($\frac{1}{16}$ in. long) are put through the edge of these pieces into the sides.

The Bridge

Model-makers spikes can be pushed home and if they are carefully inserted there is not the least danger of splitting, although one is working to such very fine limits. Before finally putting on the top, however, cut the two small holes (X) and fit the bridge. Also the small piece of wood (Y) that goes under the bridge to the base. This is only a strut, $\frac{1}{16}$ in. section and is held by a sprig from below and glue.

The bridge is a piece of $\frac{3}{16}$ in. material of 2in. height and about 3ins. wide. It is

eventually held in position by the string, and all that is needed is some fastening at its base to prevent it 'skidding' away as the string is tightened, or being lost when a string breaks or is being changed.

To effect this the lower end of the bridge is glued and then a series of the spikes pushed up through the top into its lower edge. This makes everything quite firm.

The Main Arm

The idea of the sound holes in the top is to allow of free exit of the sound vibrations set up inside the box—thus improving the tone.

The main arm (B) is 2ft. 3ins. long and is shaped out of hard wood to as near the pattern given as possible. It must, however, go smaller towards the top and have the lower end shaped, as indicated,

to fit over the 'sound box'. If the top end can be shaped as (C) so much the better, as this makes comfortable holding and gives a more official finish. Of course, standard violins are like this. In any case the channel (D) must be taken out with a sharp chisel to allow for the tuning and string-tightening arrangement.

The channel taken out, prepare the hard wood key (E). A

piece of beech or mahogany should be used for this, as it has to stand up to a fair amount of strain. Note that the key is not of constant diameter but gets smaller towards the end furthest from the finger grip. It is finished with a small hole to take the end of the string.

To complete this part of the instrument, two holes are bored in the side of the channel (D) into which the key will

just fit. As the key is slightly truncated, the hole on one side need not be quite as big as the other.

In action the key is turned, so making the string taut and the position is set by merely pushing the key further home, which gives it a marvellously tight grip by friction alone.

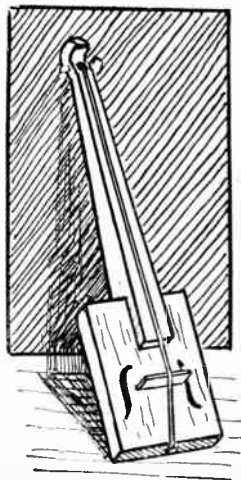
The arm is now fitted to the box by a single screw at (F) taken in at an angle. Also by two smaller screws through (H). Actually the one big screw at (F) is sufficient, as the tension on the string tends to pull the arm up and jam the extension (H) tighter against the top of the box.

Before putting on the string, the instrument should be stained and polished, as this will give it a nicely finished appearance. A screw is now inserted at (K) and the string (which has been obtained from a music shop) firmly attached. It is then carried on up over the bridge and through the hole in the key. Several turns anchor it well here and then final tuning up can be carried out.

Playing

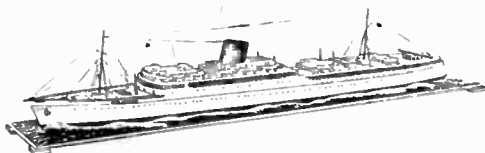
Nothing has been said about the actual playing of the fiddle as it is assumed that you will have some musical knowledge. The sound is produced by drawing the bow across the taut string and the pitch of the note is altered by pressing on the string at various points along the area (M), thus varying the effective vibration length. It is by these variations that the music is produced.

They may sound awful at first, but practice will produce results.



Waterline Model 'Pretoria Castle'

The specially enlarged design sheet given with this issue is for patterns of a 15in. model of the latest P. and O. Liner. Complete Kit of parts (No. 241 Special) obtainable from Hobbies Branches for 3/6 or sent post free for 4/3 from Hobbies Ltd., Dereham, Norfolk.



How the handyman with a gramophone can undertake REPAIRING A SOUNDBOX

WHEN a gramophone squeaks and wheezes or fails to sound the top notes or low bass correctly the cause can nearly always be traced to the soundbox. We will assume that the motor is in perfect running order, and any handyman should be sufficiently expert to be able to keep this part of the machinery in trim by an occasional oiling and adjustment. It is, however, something of an expert's job to set up and adjust a soundbox, but it is an art which can be learned.

There are numerous types of soundboxes to be found today, but once you understand a few of the fundamental principles you will be capable of undertaking any type of job, and should be able to earn quite a nice income by doing the work.

A Typical Box

Let us first inspect a soundbox to see how it is built. Fig. 1 shows the section of an average type of box and gives a good idea of its construction.

The case, which is made of metal should not be too light in weight, nor should it be excessively heavy. In the first place the needle would not run smoothly in the record grooves and will produce a chatter, while if the box is

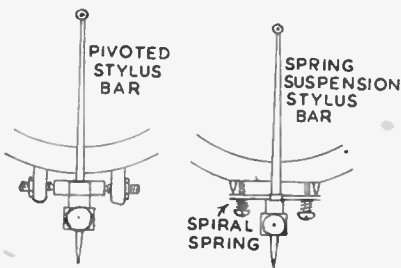


Fig. 2—A good type bar

Fig. 3—The old type stylus

very heavy the needle will tear out the grooves and soon wear the record away.

The diaphragm, which is now made either of metal or mica is held firmly in position by two rings of rubber called gaskets. The diaphragm must be a little smaller than the case in order not to touch the sides anywhere. About one millimetre all round is enough space. The two gaskets are pieces of soft rubber tubing fitting snugly round the sides of the case and pressing together sufficiently to hold the diaphragm tight between them.

Stylus Bars

Stylus bars have been made in a variety of ways, but, undoubtedly, the best is that having two pointed pivots working in cup screws. When this type is correctly adjusted there is no strain on the diaphragm and it is free to vibrate with perfect ease (see Fig. 2).

The old stylus bar (see Fig. 3) with its

spring suspension in various forms was very bad unless very carefully adjusted, and even then it was far from perfect.

When a soundbox fails to reproduce the sounds as it should, the first place to look for trouble is the diaphragm. This is very easily damaged, especially the metal ones, and great care should always be used when handling a soundbox. A knock is sufficient to do serious damage.

Remember also when letting the soundbox down on to a record to do this gently—the diaphragm is less liable to get buckled and the records will wear longer.

Diaphragms often break away from the centre fixing to the stylus bar; the only cure is to fit a new one, which can be obtained from a music dealer. Do not attempt to cut one out yourself, as it will most certainly end in failure. Diaphragms are not so expensive and it is an expert's job to make them.

From a musical point of view there is nothing to beat a good mica disc carefully adjusted. The reproduction is much more mellow and sweeter than from a metal diaphragm which is inclined to be very harsh on some notes. There is greater volume to be obtained by fitting a metal one, but this advantage is easily outweighed by the greater purity of a mica one.

Fitting a Diaphragm

In fitting a new diaphragm, first see that the gaskets are nicely soft. They should also be quite round so the centre hole is not blocked up. The old ones have most likely gone hard and are useless. New ones can be bought from a music dealer quite cheaply. Buy them a little longer than wanted, so they can be cut to fit snugly in the case—not too tight to buckle, but with the ends just touching.

Drop them in hot water for about a minute, wipe dry and blow the water out of the centre hole. Having put the lower one round the inside of the case, carefully place the diaphragm on top of it, making sure it does not touch the edges of the case. Then coil the other gasket round the case and screw on the ring.

It may be a soundbox that has no detachable cover ring—in which case the top gasket is just tucked underneath the flange, but be very careful not to shift the diaphragm in doing so.

The next job is to get the stylus bar fitted and adjusted correctly. This is extremely important. The most common types now are pivoted in cup screws—these should be tightened up so there is no end shake whatever. Then swing the bar over and see that the screw corresponds exactly with the centre hole in the diaphragm; if not, carefully bend until it fits exactly, then screw it up securely.

Sealing Wax Fastening

This fastening is not sufficient alone as the constant vibration that it receives might loosen the screw. It is, therefore, waxed as well, and a good hard beeswax will do for this. Cut a few very small pieces and place them round the screw, then with a heated piece of wire touch them lightly and the wax will run all round. Do this on both sides of the diaphragm.

Another type of soundbox that was very popular but is now giving way to

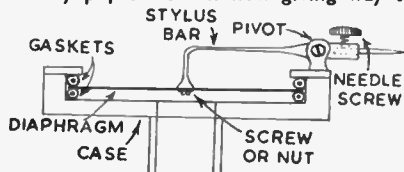


Fig. 1—Sectional diagram of soundbox

the superior pivoted type had its stylus bar suspended on springs. The fitting of a new diaphragm is carried out much as before.

As the stylus bar cannot be swung over it must be unscrewed to fit the diaphragm, after which it is screwed back in position. Give the two screws the same number of turns, because the tension of the two springs must be equal. The stylus bar must also lay on the diaphragm, just touching it and lining up with the centre hole. Then screw up and wax as before.

Testing

An expert tests the sound box by giving it a light tap with the finger nail on the needle screw. This should give a rich mellow 'plonk' if all is well. Should it rattle or if there is a cracked sound, there is a screw or something loose, or there may be an air leak somewhere.

It is very important that everything should be tight, the diaphragm flat and free from flaws, the centre nicely waxed, the gaskets pliable and tucked in snugly and the stylus bar screwed up securely. If you can give the O.K. to all these points you will have done a first-class job.

Plaster of Paris Hardening

PLASTER of paris can be increased in hardness by the addition of substances such as Portland cement, provided a slightly increased roughness is not objected to. Gelatine dissolved in water and used in the same way as plain water, has a hardening or toughening effect. The plaster can be surface hardened by metal spraying, and to a lesser degree by several coats of shellac varnish.

The Gothic style can be introduced into this CHURCH NOTICE BOARD

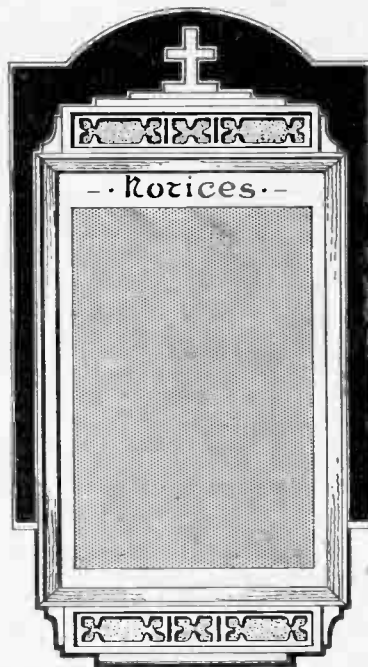
HERE is a useful form of notice board, suitable for the church porch, vestry or club room. Any handyman with the ordinary kit of tools could make it and feel proud of the job. Doubtless, too, he would receive the gratitude of the Church Council or the kindly acceptance of the club for which the board is made.

The size of the board shown here, without the top and bottom ornamented rails is 24½ ins. by 16½ ins., but there is no need to abide by these figures. The board could well be a few inches larger or smaller each way without appreciably altering its actual design.

Without Decoration

A note here regarding the decorative rails. The Gothic feature introduced here could be omitted if desired and the rails left plain. The fretted overlays could also be omitted in the two places. The illustration of the finished board shows it as essentially for a church. By omitting the cross and the fretted panels just referred to, it would be suitable for a Scout or any other Club.

If it is desired to have the name of the club displayed at all, then this could be either carved in relief or simply painted in on the top panel to take the place of the Gothic fretted panel. Another suggestion, too. It sometimes happens that the donor's name, with certain dates and particulars, is desired on the board. This then could be included on the lower panel, again omitting the fretted work here. If the board has been



made up in oak, and we know of no more suitable wood, then the painting might well be carried out in black matt paint or in gold lettering.

The board is made in three distinct units—the frame and its board, the top and bottom additional rails. The dimensions of each part are given for easy reference.

The Framework

The middle part of the board will be the first item to make. It consists of an open frame made of four pieces halved together, as shown in Fig. 2. The general dimensions are given in Fig. 1. The wood for this frame might be deal 1½ ins. wide and ¾ in. or ½ in. in thickness. Mark off the halvings carefully and cut them down with a tenon saw, cleaning out the waste wood with a chisel.

Note, too, how the middle stiffening

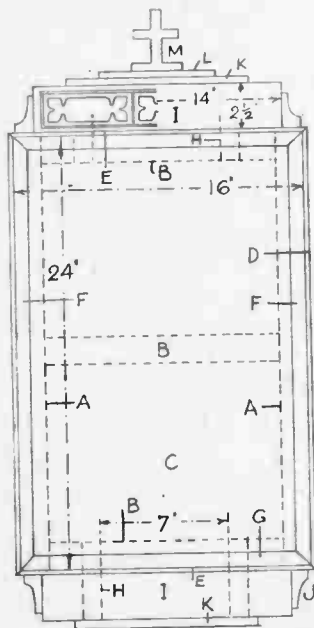


Fig. 1—Details of back and parts

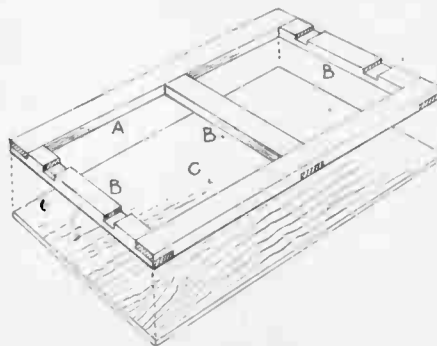


Fig. 2—Frame and backing

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rail is 'let in' by halving. The two recesses in the top and lower rails are to be 1 in. wide and ¼ in. deep and are intended to take the short rails holding the wide top and lower rails to the frame (see Figs. 3 and 4). Glue the halvings of the frame together and before putting in the fixing screws, test the angles with a square.

The Centre Panel

Cover the frame with a panel of ½ in. or ¾ in. plywood or fibreboard, the latter answers quite well as the whole surface should afterwards be covered with baize. The holes for the screws for the fixing of the plywood or other board to the frame should not be more than ¾ in. in from the edges, and should be counter-sunk so the cover strips which are put on later lie flat and close to the plywood surface.

Edging Strips

Next prepare the four edging strips from 1 in. by ¼ in. stuff, and mitre the corners neatly before screwing them on with the ¼ in. round-headed screws. When these are on, stretch the baize and tack it on. Then add the cover strips which must be neatly mitred at the corners.

Take careful measurements first before cutting the mitres with the fretsaw. Glue the strips well up to the edging pieces and put in one or two brass fret pins to make all secure. Before leaving the frame to proceed with the other parts, complete the recess for the short upright rails by cutting away the edging strips at these parts, as shown in the enlarged detail at Fig. 4.

The wide top and bottom cross rails measure 13½ ins. long by 2½ ins. wide by ½ in. thick, and each is fixed to the short rails by screws as shown and with glue also where they meet the edging strips. The small shaped bracket-like ends are cut from ¾ in. stuff and glued in the angles. The top rail and the lower rail are identical in design and make up. To the top rail, however, the additional two strips and the cross are added while on the lower, one strip only is

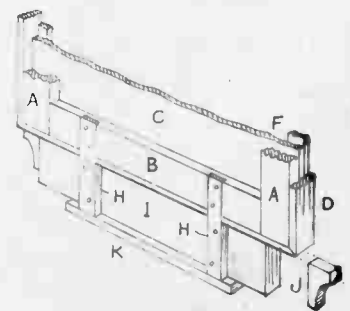


Fig. 3—Lower hanging panel part

glued on, as can be seen in the detail Fig. 3.

The cross is cut out with the fretsaw from $\frac{1}{4}$ in. stuff measuring $3\frac{1}{2}$ ins. by $2\frac{1}{2}$ ins. and fixed with glue and a single dowel pin, perhaps, to the strip (L). This in turn is screwed each side to the top of strip (K)—the latter is glued and screwed to the frame edging.

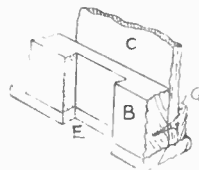


Fig. 4—Recess detail

the design to the other side of the centre line, shown dotted in our illustration. Use as fine a fretsaw as possible for the cutting of the two $\frac{1}{4}$ in. panels. After a careful clean up, glue them to their respective panels, one at the top and one at the bottom. In cutting round the outline of the fretted panels keep well outside the line so that after they

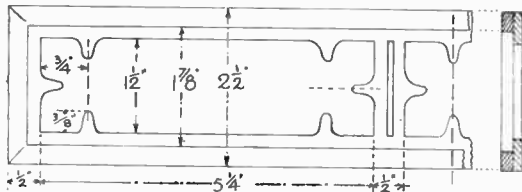


Fig. 5—The fretted panel decoration

The fretted overlay of Gothic design is made up in two layers. First there is a layer of $\frac{1}{4}$ in. thick wood cut to the outline of the panel (I). Pencilled on this is the fretted design marked in to the measurements given in Fig. 5.

One side only is given here, the other side of the design being obtained by tracing the pencilled half and transferring

are glued to their backing the slightly projecting edges may be cleaned away flush with the $\frac{1}{4}$ in. thick panel (I) and a perfectly flat and even surface obtained.

Finally, as a kind of border to the fretted panels, cut and glue on four mitred strips to each, as seen in Fig. 5, and at the cross section at the right hand of this diagram. Take care in the

cutting and fitting of the mitres, as on this work the finished good appearance rests. Clean round the edges of these border strips in a similar way to the previous fretted panel.

CUTTING LIST

- A—2 Rails—24 ins. by $1\frac{1}{2}$ ins. by $\frac{1}{4}$ in.
- B—2 Rails—16 ins. by $1\frac{1}{2}$ ins. by $\frac{1}{4}$ in.
- C—1 Panel—24 ins. by 16 ins. by $\frac{1}{4}$ in. or $\frac{1}{2}$ in.
- D—2 Strips—24 ins. by $1\frac{1}{2}$ ins. by $\frac{1}{4}$ in.
- E—2 Strips—16 ins. by $1\frac{1}{2}$ ins. by $\frac{1}{4}$ in.
- F—2 Strips—24 ins. by $1\frac{1}{2}$ ins. by $\frac{1}{4}$ in.
- G—2 Strips—16 ins. by $1\frac{1}{2}$ ins. by $\frac{1}{4}$ in.
- H—4 Rails—4 ins. by $1\frac{1}{2}$ ins. by $\frac{1}{4}$ in.
- I—2 Rails—13 ins. by $2\frac{1}{2}$ ins. by $\frac{1}{4}$ in.
- J—4 Blocks—2 ins. by $1\frac{1}{2}$ ins. by $\frac{1}{4}$ in.
- K—2 Strips—10 ins. by $1\frac{1}{2}$ ins. by $\frac{1}{4}$ in.
- L—1 Strip—6 ins. by $1\frac{1}{2}$ ins. by $\frac{1}{4}$ in.
- M—1 Cross—3 ins. by $2\frac{1}{2}$ ins. by $\frac{1}{4}$ in.
- Overlay—one piece 13 ins. by $2\frac{1}{2}$ ins. by $\frac{1}{4}$ in. and one piece 13 ins. by $2\frac{1}{2}$ ins. by $\frac{1}{4}$ in.

If oak has been used for the notice board it should be given a brushing of light oak stain with a final rubbing of linseed oil or a wax polish. Two or even four brass hanging plates screwed on at the back of the frame should make a secure holding for the board.

HINTS ABOUT BICYCLE LAMPS

HERE are some hints about your good friends the cycle lamps. If buying a new battery lamp try and get one with as positively-acting switch as possible. And one which, through sturdy build, will be pretty weatherproof. Some battery lamps fail badly on these points.

Should a battery lamp refuse to light and the bulb and battery be known to be in order the cause may be one of four things, (1) a loose bulb, (2) front contact not touching the bulb, (3) top contact pressed too low down or (4) rust.

Rust can be a very subtle trouble, but if all the other points have been checked, the reason for non-lighting is sure to be this. The rust can be in the threads of the screw which acts as a switch on top, or under the lid, around the upper edge of the case. The screw may be cleared by working it up and down vigorously several times, after which a little (and it must be a little) oil is put in.

Good Contacts

Rust round the upper lip of the case, and in the lid, must be glasspapered away, special attention being given to the extreme top of the rim. For a lamp to burn properly there must be a perfect contact between the case and lid, and lid and switch screw. The brass contacts of the battery do not rust but they may get greasy and so if you are having a good clean up give them a wipe—it will all help.

Dampness, if continued, is the great enemy of all batteries. So if your lamp has been out in a real soaking, it is always advisable to take out the battery and give it a wipe over. At the same time wipe out the inside of the case and the bulb end.

A good tip to keep a tubular rear lamp (battery type) free from rust, at the point where the back portion of the case rotates to switch on, is to slightly grease the threads and then cover the joint with a short length of rubber cut from an old inner tube. Quite a narrow piece will do and it will be found that the diameter of the tube is such that it just nicely holds by friction. The band, for that is what it really is, effectively keeps out all rain but it does not interfere with the end turning in the usual way. Rust on the threads is the main trouble with rear lights of the rotating case type. But this 'rubber band' idea is a sure preventative.

Clean for Brightness

Never under-rate the efficaciousness of having the reflector, bulb and front glass perfectly clean. A dirty reflector can absorb much light while a brilliant one can almost double the illumination. Cleaning should be periodical and do not forget the bulb and front glass in your endeavours to get a good polish on the reflector.

Batteries always run longer when used intermittently. Thus a battery capable of giving, say, thirty hours of continuous light will burn comfortably for two periods of twenty hours each. The proportionate length of time increases according to the number of rest periods, so switch off whenever the lamp is not actually required.

Be sure that you know the right type of bulb for your lamp, as one that is of too low voltage will burn out at once. Bulbs sooner or later all burn out, for although it is very protracted normally, the light is given by a slow combustion of the filament. Older bulbs usually 'go' just after a new battery has been put in, so it is good to have a spare one handy at

such times. In fact you should always have a spare bulb somewhere about and many lamps supply a clip for one just inside the lid.

Fixing the Lamp

It is a deplorable fact but hundreds of cycle lamps are stolen every year. You can prevent losing yours, however, by wiring it on. A turn of fairly strong wire taken round the bracket and finished by twisting with a pair of pliers does the job well and the writer can point to one lamp at least saved by this simple expedient. If put on carefully the wire is quite inconspicuous. Rear lamps are not so readily removed and may be regarded as safe as they are.

Here is another hint about a battery front lamp—again to do with weather-proofing. If you have to be out with your machine in continuous drenches of rain it is quite a good idea to make a small mackintosh cover for the lamp. This need only be a rectangle of old rubberised material with a rough hem turned at the bottom in which there is a length of elastic.

And here are some final tips. When the 'finish' starts to chip off a lamp, paint over the bare patches immediately as this prevents rain from getting further under the enamel. If the spring under the screw switch loses resilience replace with a new one. Light coil springs can be readily made or can be bought, cutting to length if necessary.

Never force a bulb by twisting hard on the glass and never, never, use a screwdriver to get off a too stiff lid. Heat gently and the lid will soon come away, as the outer rim expands a little. Use a cloth to take off the top as even moderately warm tin is uncomfortable to hold.

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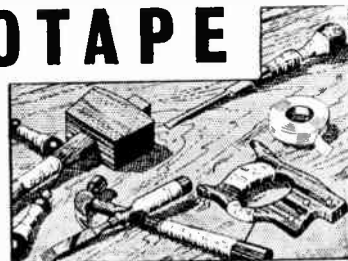
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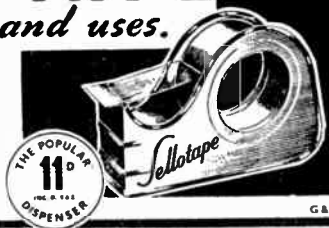


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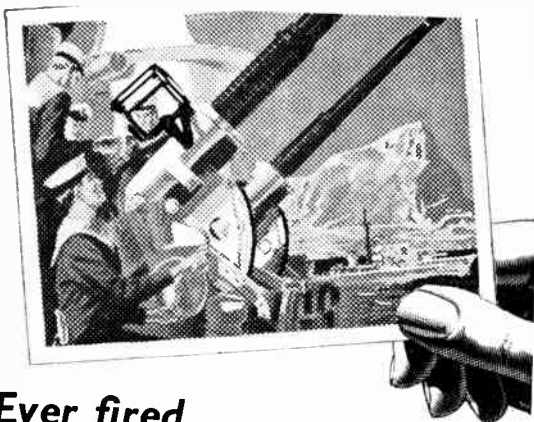
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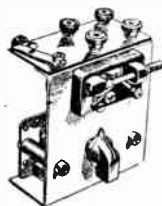
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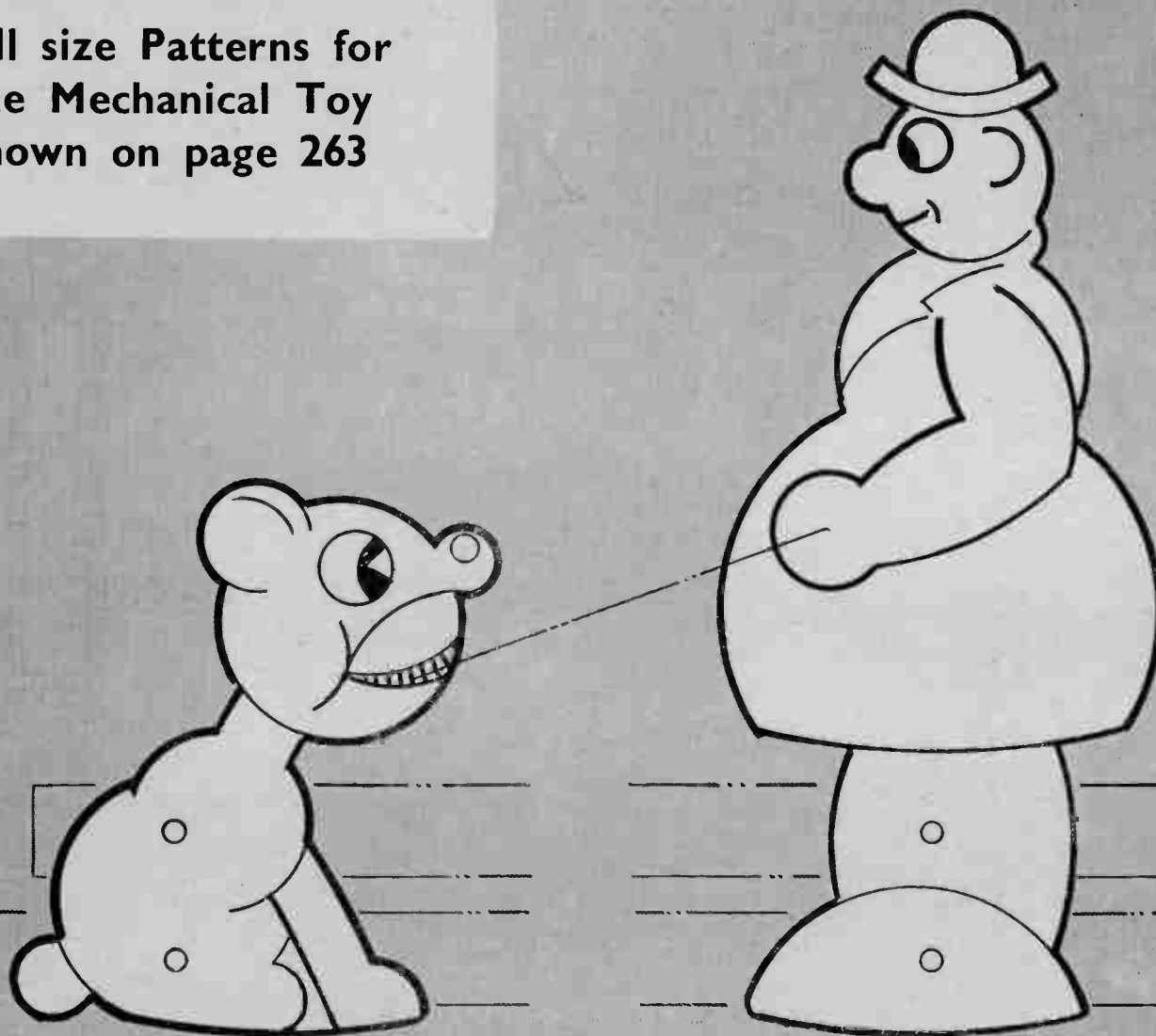
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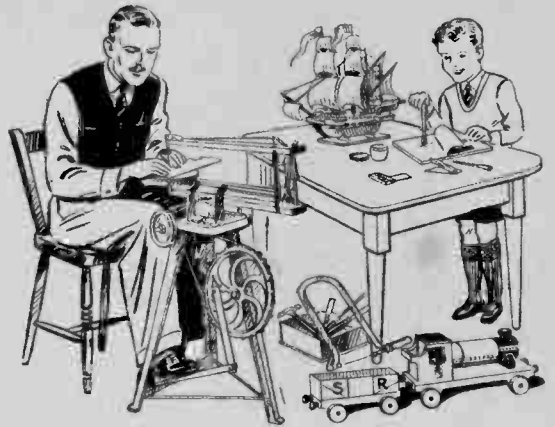


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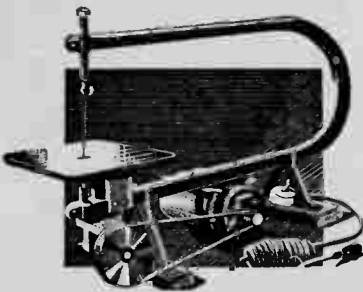


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The sawing machine for the handyman. For fretwork, furniture making, model making or a hundred-and-one odd carpentry jobs, this is what you want. You can save money and earn money in many ways, as well as get pleasure in your spare time. Profit and pleasure for your spare time. Suitable for cutting wood, composition board, sheet metal, leather, card, slate, etc. Imagine what you can do in your spare time, with the hundreds of Hobbies Kits to choose from.

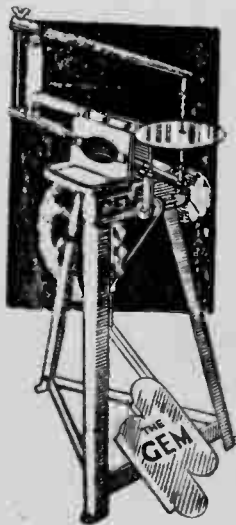
**LIGHT WOODWORK
MODEL MAKING
FRETWORK
TOYMAKING
METALWORK
LEATHERWORK**



All these machines
are made in
Hobbies Factory

THE MARVEL MOTOR DRIVEN SAW

A sturdy bench fretsaw fitted with fractional AC/DC motor for running off the ordinary electric light circuit. Cuts wood to 3/4 in. thick by means of a strong spring-loaded saw action. There is a distance of 1ft. 5in. between sawblade and back of frame so large work can be undertaken. Vertical stroke, hardened steel parts, polished metal table, complete with motor, switch and flex with adaptor plug. Also supplied without motor for £3/10/0. **£10**



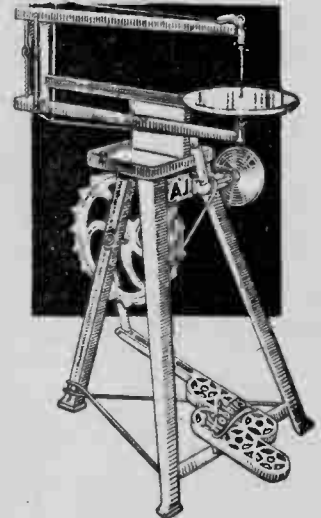
THE AI MACHINE

A strong rigid machine with cast metal legs, large table and a tray for small tools. The wooden arms are specially trussed to prevent warping and adjustments are practically universal. The back spring automatically raises the arm when a saw breaks. The Hobbies saw clamps hold the finest blade, and correct tension is easily obtained by the special lever action on the top arm. The table can be tilted for bevel cutting, and work up to 19in. behind the saw can be manipulated. **£6 6 0**

All machines are well built, sturdy and of good material throughout. Spare sawblades, a design, and a 64-page book of instructions and suggestions are supplied with each. All machines are ready to use and spare parts are always available should they be required. Suitable designs, saws, wood and materials are available for whatever work is in hand. Treading is soon learned and the machines run with ease and speed to make work a joy.

CARRIAGE

Machines are forwarded by rail ready to use and 3/6 extra must be added for any part of Great Britain. Orders from anywhere in Ireland are under export rates.



THE GEM MACHINE

The length of the arm allows work up to 1ft. 6in. long to be manipulated with ease and pleasure. Built with all-steel frame for strength and rigidity, so the parts cannot get broken. The arms are U-shape, with large wing nut at the back for quick tension on the saw. The blade is held in special Hobbies clamps which grip securely. The treading is easy and a large tray provides a holder for small tools. **£3 19 6**

From leading Stores and Ironmongers everywhere. Hobbies Branches at 78 NEW OXFORD ST., W.C.1, 87 OLD BROAD ST., E.C.2, 117 WALWORTH RD., S.E.17, 326 ARGYLE ST., GLASGOW, 10 PICCADILLY, MANCHESTER, 14 BULL RING, BIRMINGHAM, 4 ST. PAUL'S PARADE, SHEFFIELD, 10 QUEEN VICTORIA ST., LEEDS, 10 PARAGON SQUARE, HULL, 25 BERNARD ST., SOUTHAMPTON 30 NARROW WINE ST., BRISTOL or direct from HOBBIES LTD., DEREHAM, NORFOLK.

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