

HOBBIES WEEKLY

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Make these for the youngsters

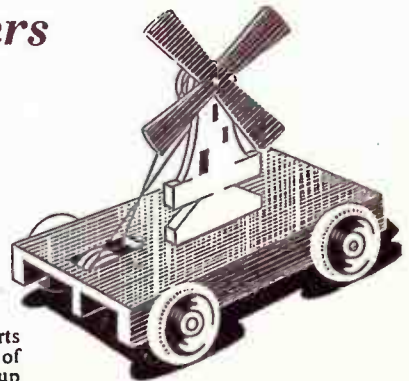
EITHER of these models would make excellent gifts for children, and are ideal designs for making up for sale at bazaars, etc. Brightly painted, they are calculated to attract the attention of youngsters, particularly as the sails of the windmill go round as the toy is moved along, and similarly the sea lions on the see-saw bob up and down. Of simple construction, they can easily be made up in an evening.

Hobbies kit No. 3186 contains all the wood, wire and wheels, etc., necessary for making up the two designs, and a kit for one toy only is not supplied.

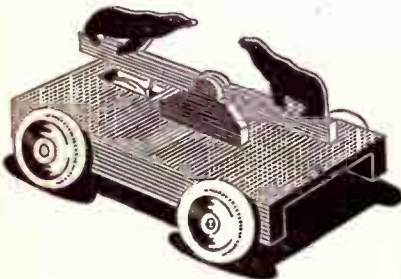
★ **FREE design**
inside for
Christmas gifts

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆
☆ **Windmill** ☆
☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆

For the windmill, trace the various parts on to their appropriate thicknesses of wood, cut out with a fretsaw and clean up



PULL-ALONG TOYS



thoroughly. To commence assembly, glue pieces 2 and 3 under the base (1) and the mill (4) in the slot provided on the platform. The assembly thus far can now be painted.

The mechanism which activates the sails is obtained from one wheel only,

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆
☆ **See-Saw** ☆
☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆

and this can be made up next. Glue piece 14 under the platform, then make

up the pulley which consists of one piece 11 glued between two pieces 12. Now enlarge the hole in one of the wooden wheels supplied in the kit, and insert and glue the axle (16). Push the other end of the axle through the side 2 and piece 14, and glue the pulley on to the other end as shown in the detail on the design sheet and in Fig. 1.

Glue a short piece of round rod (15) through the centre of the sails, and then paint them. Make up another pulley as already described, and fix the sails in position as shown in Fig. 1, noting the

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For Modellers, Fretworkers
and Home Craftsmen

4 1/2^D

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FOR KIDDIES

thin washers, which can be cut from post card. Glue this pulley in position, ensuring that it is aligned with the pulley on the driving wheel.

An elastic band of suitable tautness, or a piece of cord round the pulleys, will rotate the sails as the toy is pulled or pushed along.

The other three wheels, after painting, are screwed in position and a round-head screw inserted under the base at either end on which to tie the string for pulling along.

See-saw

The make-up of the base for the see-saw is exactly the same as for the windmill, and it can again be painted on

completion. Assemble the driving wheel and axle as described for the windmill, but in place of the pulley, it will be seen from the design sheet that the drive to the animals is taken up by pieces 12 and 13 glued together, to which a connecting rod is attached by the screw B.

Piece 9, on which the see-saw pivots, is glued into the slot provided in the platform, and after painting the see-saw can be attached to this with a screw.

The connecting rod (17) is fixed by screw (A) approximately in the position shown on piece 10. Paint the remaining three wheels before screwing in position.

Note that the length of the wire connecting rod may have to be experi-

Two Toys — 6/11
Sufficient wood, wire, wheels, etc. for making both the Windmill and See-saw are contained in Hobbies Kit No. 3186, costing 6/11. Kits obtainable from branches, etc., or post free from Hobbies Limited, Dereham, Norfolk.

mented with to give an easy up and down movement of the see-saw. Again a screw can be added underneath the base on which the string for pulling along can be tied.

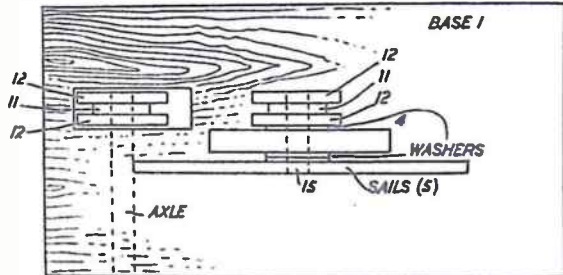


Fig. 1

This 'Match' Model is his first — and last



Mr. Etherton at work on his model of Eastbourne College. The full dimensions are 32" x 18" x 9".

FIVE years of intricate workmanship and patience have gone into the building of a 32in. model of the Eastbourne College, constructed entirely out of used matches. The builder of this fine replica is Mr. Lionel John Etherton of Eastbourne.

No sections have been built separately and therefore, the process of construction has been very slow for each match has been laid individually as in brick laying. The back of the model is to be left open so that the interior details can be viewed easily. These include doors, staircases, cloisters and cavity walls and flooring throughout. The window panes have been cut from transparent X-ray plates.

Mr. Etherton is very proud of the fact that he has never had to buy a box of matches for building purposes and that all the matches, which must run into many thousands, have all been 'dead' ones.

With regard to tools, Mr. Etherton has only used a chisel, cutting knife, glasspaper, pencil and ruler, glue — and a great deal of patience.

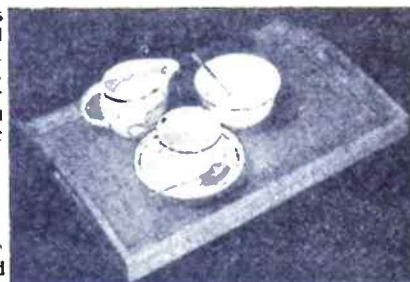
When the last touches have been made to the model it will be coated with clear varnish and Mr. Etherton hopes that it will then be exhibited in Eastbourne and eventually in London.

Five years ago, Mr. Etherton just had an idea that he would like to build a model out of matches, but when he was asked recently about his next model he replied, 'This is my first, and last.' (K.J.)

Always handy for the housewife

A 'UTILITY' TEA TRAY

THE unusual feature about this tray is the base, which is made of glass. This material is very cheap and it provides a surface which is easily cleaned; an important consideration in an article of this nature. In addition, it can be decorated in a variety of ways to give an attractive finish.



By K. Blackburn

Plane the handles to 2½ins. wide and ½in. thick, and the sides to 1½ins. by ½in. Put the two handles together, in the vice and mark out as shown in Fig. 1. Take the wood from the vice, and square each line right round. Mark out the two sides in the same manner to the measurements given in Fig. 2. Saw off all waste.

Fig. 3 shows the marking of the dovetails on the side pieces. Measure ½in. from each edge, and square lines across the ends of the wood. Slope lines down with a sliding bevel set to a slope of 1 in 7 (Fig. 4). Next, set a marking

LIST OF MATERIALS	
2 handles	12½ins. by 2½ins. by ½in.
2 sides	18½ins. by 1½ins. by ½in.
24-ounce glass to fit.	

which is placed under the side piece to support it while a sharp pencil is used to draw round the tail. At this stage, number the two corresponding parts of the joint. In order to avoid error, it is

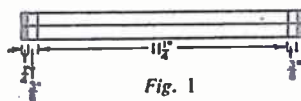


Fig. 1

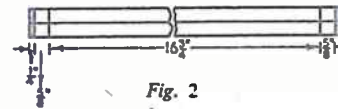


Fig. 2

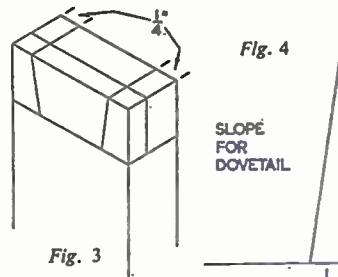


Fig. 3

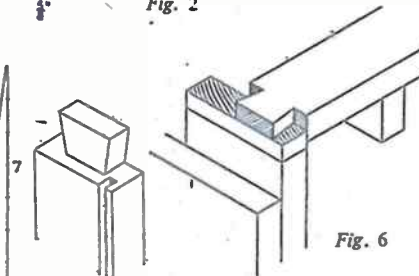


Fig. 5

gauge to ½in., and gauge round the end of the wood down to the shoulder line. Make sure that the stock of the gauge is pressed against the same surface when marking the joint at the other end of the wood.

Saw down the sloping lines first, then saw away ½in. off the thickness of the wood, as marked by the gauge line, and finally remove the remaining side pieces. The finished dovetail can be seen in Fig. 5. It is necessary to make the dovetail in this way in order to hide the end of the groove which must be made to house the glass base.

The marking of the pins is shown in Fig. 6. Notice the piece of waste wood

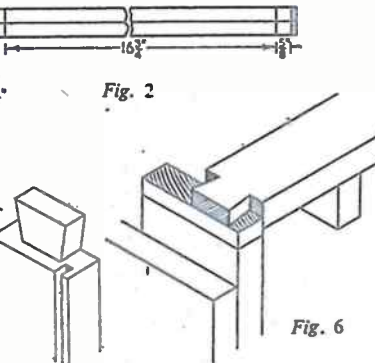


Fig. 6

advisable to complete and fit one joint before marking out the next.

Remove the handle from the vice, and square the lines down to the shoulder line with a try square. Shade in the waste, and saw down to the shoulder line with a tenon saw. Remove some of the waste with a coping saw and finish to the line with a chisel. Mark and fit the other joints in the same way.

The tray assembly

Assemble the tray, and pencil in the correct positions for the grooves. While the tray is assembled, make sure that the lower edges of the four pieces are level. This must be trueed up, if neces-

sary, with a smoothing plane before the grooves are made. These are cut with a plough plane fitted with a ½in. blade, and made ½in. deep. The distance of the groove from the edge of the wood is ½in. As the wood is too thin to be held in the vice while the grooves are made, it must be held in a sash clamp, which is in turn held in the vice. An alternative method is to clamp the wood to the bench with a G-cramp, so that the edge of the wood overlaps the side of the bench.

The shape of the handles is largely a matter of personal taste. If a compound shape like the one in the photograph is decided upon, cut a piece of paper to the same size as the handle first, fold it in half across the middle, and draw in one half of the shape. Cut round the shape, unfold the paper, and transfer the shape to the handle. Cut round the outline with a coping saw, and finish off with a spokeshave and chisel.

To make the cut-out for the handle, find the centre of the wood, and square two lines across 1½ins. each side of this point. Measure 1in. down these lines from the shaped side of the handle, and at these points bore two ½in. diameter holes. Draw curved lines between the holes and cut out the waste with a key-hole saw. Smooth off with a rasp and glasspaper.

Before gluing, the inside surfaces of the parts should be cleaned up with a smoothing plane and glasspaper. The top edges of the side pieces must also be cleaned up at this stage. Wax polish all these cleaned surfaces.

The next job is to have the glass cut to size. If you are not doing this yourself, take the tray along to the glazier's so that it can be fitted accurately. Make sure that it is not cut too big, or it may crack when the tray is glued up.

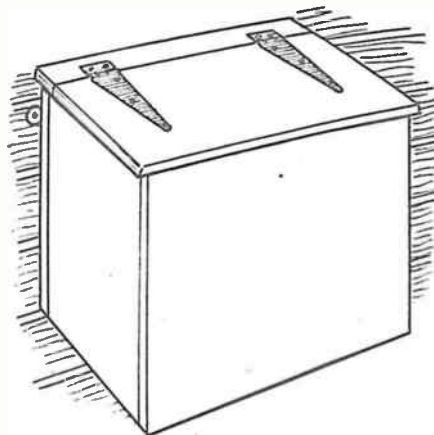
It is advisable to use cramps when gluing. Place two of them on a flat surface, set to the correct size. Apply glue to the joints, put in the glass, and squeeze up the joints gently in the cramps. The pressure of the cramps should bear along the line of the handle, so that there is no tendency to bend the side pieces.

When the glue is dry, clean up the outer surfaces with glasspaper, and finish with wax polish. The underneath of the glass in the tray shown in the photograph was finished with silver paint. Whatever type of paint is used, it is not necessary to use a glossy variety, as the glass gives the effect of a gloss finish. The use of poster paint is effective, and the scope for those who are artistically inclined is unlimited.

TRADESMAN'S BOX SAFE

MANY housewives who are away at work and are, therefore, absent from home when tradesmen call will welcome a box where goods may be safely deposited. The box, illustrated, is capacious enough to hold bread and two bottles of milk, and could easily be enlarged when the family became greater. It is provided with a

A fitment for
the
householder
described by
W. J. Ellson



CUTTING LIST

Box sides. (2).	8ins. long by 10ins. by 1in.
Back.	1ft. 1in. by 10ins. by 1in.
Front.	1ft. 1in. by 9ins. by 1in.
Bottom.	11½ins. by 8ins. by 1in.
Lid.	1ft. 2½ins. by 8ins. by 1in.
Lid.	1ft. 2½ins. by 2ins. by 1in.

FITTINGS

1 pair 6in. strap hinges.
1 large screw eye.
1 small screw hook.
1 dozen 1in. screws.
Pair brass wall plates.

simple catch, easily operated when the secret is known, and will provide reasonably safe guarantee against pilfering.

Almost any good wood can be used to make up the box, a thickness of ¾in. or thereabouts being suggested as strong enough. The quality of wood known as shelving, which can be bought in

a gentle slope at the top, just enough to allow any rain to flow off. The top edges of back and front of the box are bevelled off to correspond to the slope. The whole is strongly fitted together with glue and nails, but before doing so, the locking arrangement, to be mentioned later on, should be fitted in. Cut the bottom as a close fit inside the box, and from the front edge saw out an opening, 4ins. long and 1in. wide, shown in Fig. 1 (part of the front of the box being cut away to reveal it). Fit in, but defer permanently fixing the bottom in place until the locking arrangement is tested and found satisfactory.

The lid is made in two parts and

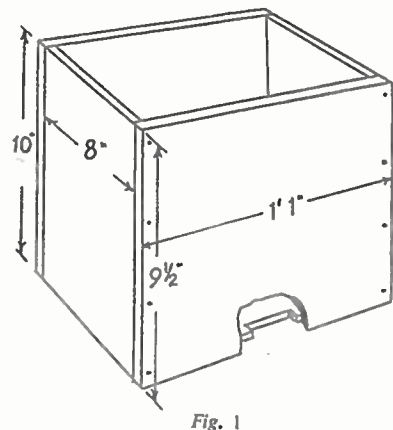


Fig. 1

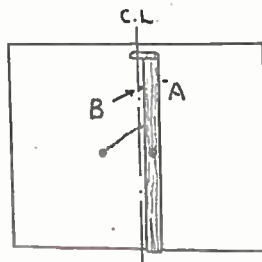


Fig. 2

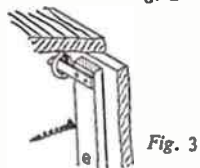


Fig. 3

widths of 1½ins., is ideal as the sizes given will render unnecessary the business of gluing boards together. Alternatively, the wood mentioned could be employed for the ends and ¾in. plywood for the remainder.

The box, minus the lid, is shown in Fig. 1, with suitable dimensions. It will be noticed that the ends are cut to form

should overlap the box some ¾in. a sides and front. One portion, 2ins. wide, is nailed or screwed to the box at the rear, the other part being hinged to it to form the lid. A pair of 6in. strap hinges serve better here than the butt kind, being stronger, help to prevent the lid warping under damp conditions inseparable from exposure to the weather.

The locking arrangement

Now remove the bottom of the box and close the lid down. In the centre of the front part of the lid, on the inside, drive in a large screw eye, positioned so that when the lid is closed the screw eye comes just inside the box, almost touching the front.

An interior view of the front is given in Fig. 2 to show the locking arrangement. This is a strip of ¼in. by 1in. wood (A) fitted to the front with a single round-headed screw, situated about midway, upon which it can swing sideways. To the top of this a metal catch filed up from a piece of sheet metal and measuring 2ins. in length and ¾in. in width, is screwed. This metal piece passes through the eye of the screw eye and locks the lid, as in detail sketch, Fig. 3. Some little adjustment between the positions of strip (A) and the screw eye will be necessary to ensure the locking arrangement working satisfactorily. Make sure (A) is long enough to pass through the bottom of the box and project a trifle, say, ¼in. below.

To keep the metal part in place a length of helical spring, which can easily be made by winding a foot or so of thin steel wire round a knitting needle, is stretched between a screw hook in (A) and a round-headed screw a short distance away. As a substitute for the spring a strong rubber band could be used, but, of course, would not last as long. Note that strip (A) is fitted a little distance to the right of the centre of the front, and to prevent the spring pulling (A) too far, a nail (B) can be driven in to act as a stop.

Now fix the bottom of the box in with screws, not nails, as in case of anything jamming the locking device, the bottom could be removed without damage to the box. It should now be possible, by inserting the finger in the hole in the bottom, to quite easily pull off the catch back and free the lid. For

Continued on page 133



IN all our ship models we can show all or part of the steering gear, according to the scale to which we are working.

Some time ago on a miniature model I wanted to show the wheel on deck, but owing to the size of the model, it was not practical to construct an actual model wheel, the diameter over the spokes was only 3/32in. I solved the problem by drawing the wheel to size on a piece of clear celluloid, cutting out a circle containing the drawn wheel, and gluing in place. If the drawing is done with Indian ink it will stand out and the celluloid is not noticeable.

A method useful when small diameter wheels are required is one I used many years ago when I had no lathe.

STEERING WHEELS By 'Whipstaff'

painted. The paint will thicken the spokes and help to make a firm job of the assembly. See Fig. 1.

A method much favoured by modellers is to cut a wheel with the fretsaw out of thin wood or thick celluloid, merely painting to represent a wheel. A better way of using this

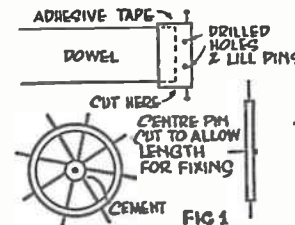
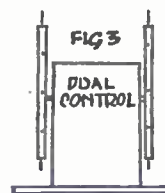


FIG 1



Take a piece of dowel slightly smaller than the finished rim you want. Wrap a moistened piece of linen mending tape, the type used for mending sheet music, around the dowel at one end. This must project over the end of the dowel sufficiently for the rim of your wheel, three turns being usually enough. Mark around the positions of the spokes and drill for them with a No. 74 twist drill. In the exact centre of the dowel drive a lill pin around which to mould the hub. The spokes consist of lill pins pushed through the holes in the rim to meet the centre pin, a blob of balsa cement being dropped in the centre and left to harden. When set, the wheel can be cut off the dowel with a razor blade and

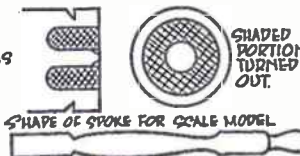


FIG 2

FOR METHOD 2. TURN WITH DOWEL END TO FIT HUB.

method is to cut the wheel out of thin wood and add rims cut from thin celluloid, afterwards filing the handles and spokes to shape with a small file.

A perfect wheel can be modelled by turning on the lathe. Those who possess a Hobbies lathe will have no difficulty.

The actual turning is shown in Fig. 2. First mount the stock in the lathe. This can be dowel or square stock of the right size. Turn this to a cylinder of the same size as the rim of the wheel you are making. Turn out the inside as in Fig. 2, leaving the boss in the centre, and drill the holes for the spokes through the rim into the hub. The spokes can be turned if the scale allows us to do so, or small dowels driven in position and glued in place. Small dowels are easily made from bamboo and are very strong, the spokes being shaped after fixing by filing if the scale is small.

A quite good imitation wheel can be made in all-metal construction, if preferred. First file or cut to shape the hub from brass rod and drill to take the spokes. The rim is made from thin brass sheet and also drilled to take the spokes. The spokes are turned from

brass rod and made a tight fit for the holes in rim and hub.

Dual control consists of two wheels, usually mounted as shown in Fig. 3. This merely means that we have to make two wheels instead of one.

For a really high class scale model wheel, where our model is large enough to allow of real detail, the following method will be found to be very near full scale practice.

The hub is turned in hardwood and drilled for the spokes, two circles slightly smaller are cut from brass shim and fixed in position, one on either side of the hub. Next the rim is cut out in thin wood, using holly or a similar close grained wood for this, and the spokes. Cut two circles from brass shim slightly smaller and turn the spokes.

To assemble the wheel, place one brass ring and the hub in position after using the tang of a small file to tap the holes in the hub square to fit the ends of the spokes and fitting the spokes to the hub. The wood rim is then cut in sections to fit between the spokes and secured with a spot of cement. The other brass rim is then cemented on top of the assembly and left to set. Finally drill equally spaced holes, two between each pair of spokes, with a No. 74 drill, and rivet with lill pins cut to length.

Continued from page 132

Box Safe

fixing purposes, screw a brass wall plate each side. Give the box one or two coats of a good exterior paint as a protection against the weather, and fix to the door or wall through the plates.

It is unlikely that goods placed in the box may jam the locking device, but as a precaution a piece of thin plywood might be fitted across it, being nailed to wood strips each side, to box it in as it were. Be sure, however, that sufficient room is left to operate the lock. Division in the box to separate the bread and milk bottles may be left to the discretion of the reader.

Next week's issue will contain details for making a games table—so handy for Christmas parties—and articles showing how to make your own crackers, cards, decorations, etc.

Terminal Station Layouts

NEWCOMERS to the model railway hobby more often than not start off on layout planning by laying down a terminal station of some sort or other. It may be a modest affair, but usually it is an over-ambitious assembly of as many points, crossings and sidings as can be crushed into a given length of baseboard.

Needless to say, such a start is all wrong. It may be true that a terminal station offers a rational start for a model line, but it is just as well to remember that a terminus should only be of such a size that it fits well into the general scheme of the rest of the railway. It should not be made overpowering, and if this point is borne in mind whilst it is being designed, an undue amount of trackwork will not be required to enable all the necessary train and engine movements to be carried out expeditiously.

Small, simple stations — terminal or

arrangements — with and without the incorporation of a single-slip point.

It is obvious that even a single-line terminal station must consist of something more than a simple dead-end with an adjacent platform, unless it is to be exclusively worked by a 'push-pull', a diesel rail-car, or an electric train capable of being driven from either end. If a separate locomotive is to be used, a 'run-round' road must be provided to

By E. F. Carter

allow the engine to get from one end of its train to the other. Such a loop road is marked in Figs. 1 and 2 as (RR), in which Fig. 1 represents probably the most usual arrangement to be found, and which is quite satisfactory from an operating point of view, without the inclusion of a turntable; whilst if freight

The layout of New Romney station on the Southern Region shown in Fig. 2 shows all the facilities required in a small terminal station. A 'run-round' loop, a single platform with only one face in use, and provision for freight traffic made before entry into the station. The track extension at the rear of the station across the level-crossing gates is there to enable the engines and rolling-stock of the miniature-scale Romney, Hythe and Dymchurch Railway to be moved to and from Ashford locomotive works for overhaul. It is not essential to the workings of the main terminal station.

Another track example is shown in Fig. 3, in which the train on arrival draws to a stand between points (A) and (B), and after detrainning its passengers is propelled by its engine to (C-D), where the locomotive is uncoupled and run round its train by way of the loop (E); the train being then propelled back

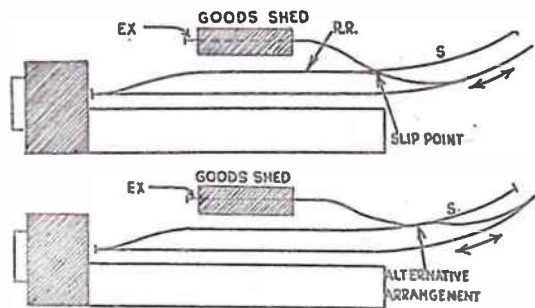


Fig. 1

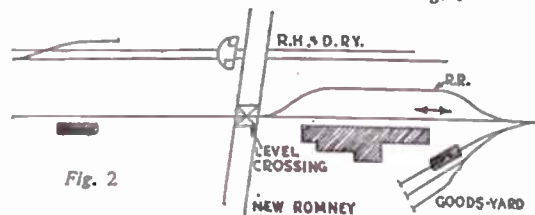


Fig. 2

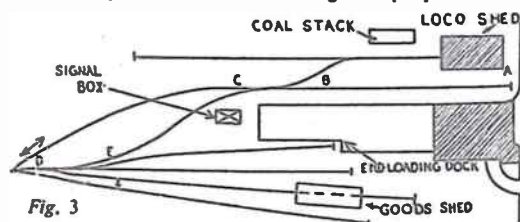


Fig. 3

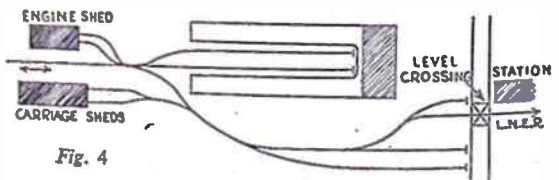


Fig. 4

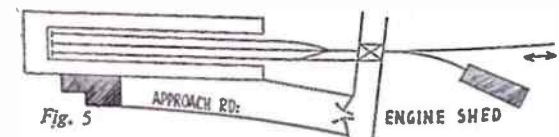


Fig. 5

through — never boast unnecessarily complicated track layouts, which latter, in any case should only be used when there is no better or simpler way of making adequate provisions for stock movements.

The very smallest type of terminal is, of course, that located at the end of a single line of track, and three prototype stations of this character are shown schematically in Figs. 1, 2 and 3, of which Fig. 1 gives two alternative

trains have also to be accommodated at the same time as passenger ones, a long siding (S) will have to be laid so that the 'run-round' loop is left generally clear of standing stock and is not used for storage. If, however, it is desired to be able to house more goods stock, then the siding may have to be duplicated and the extension (EX) to the goods shed made as long as possible without running into the precincts of the next station down the line.

to the station ready for ultimate departure. Naturally, such a station layout could equally well accommodate a 'push-pull' train or a diesel rail-car.

Taking next Figs. 4, 5, 6 and 7, which are slightly more complex terminal layouts, Fig. 4 has some similarities to Fig. 3, but includes an engine shed and carriage sheds, both of which are both useful and becoming a small railway such as the Nidd Valley Light Railway;

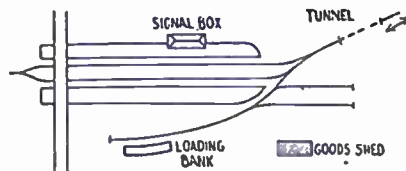


Fig. 6

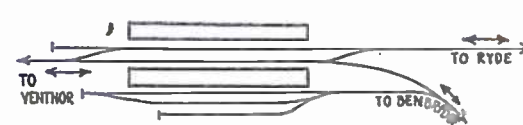


Fig. 7

and here again the connection to the main-line over the level-crossing gates can be deleted if desired.

Fig. 5 shows a three-road terminal in which the centre platform road can be used for passenger or freight vehicle storage, but the layout is only suitable for working with a diesel rail-car or a 'push-pull' train, there being no run-round facilities. Fig. 6 shows the track layout at Killiecrankie, in Scotland, and it will be seen that, over and above the rather oddly-arranged goods storage sidings, run-round is provided for by running the two platform roads into one beyond the point where the buffer-stops

are normally placed. This layout is interesting also by reason of the station being entered almost directly from a tunnel.

Lastly, in Fig. 7, which is of a small station on the Isle of Wight, an arrangement is shown whereby a branch 'terminal' station can be incorporated into a through station. In this particular instance, trains run from Ryde to Ventnor, whilst a 'shuttle' service, entirely separate from the 'main-line' traffic is maintained from Brading to Bembridge. The reader will be able, no doubt, to find a use for one or other of the terminal layouts shown, but if

unsuccessful, it will be found possible to combine the best features to produce a fictitious layout, which will, however, be none-the-less founded on full-scale practice

Once again, however, the writer would stress the absolute inadvisability of trying to get the proverbial quart into a pint pot by illogically snatching at the slightest opportunity of making unnecessary track complications. It is a great temptation, particularly when baseboard area and the requisite track parts are ready to hand, but the reader will be well advised to resist the impulse, and plan carefully with a prime view to realism and ultimate workability.

Odd jobs around the house

Attractive Covering for Flex

DECORATIVE glass globes for the electric light are the vogue in many homes today. But their pretty effect is often marred by the orthodox twisted flex above the globe, leading to an unsightly ceiling rose. Metal fittings can be bought to cover these but they are rather expensive and even then their harsh brightness does not appeal to everybody.

Drawing Tube

Fig. 2 shows how, with the aid of some cardboard, card tube and some plastic wood, an original and attractive fairing or sheath can be made and fitted over the light flex.

The cardboard tube is cut from a 1½ ins. diameter tube used to contain drawing paper. These tubes are tough and rigid and can be obtained from a drawing office supply stores, or from first-class stationers.

The tube is glued to a cone shaped fairing. This is made from a piece of thick supple cardboard. A circle approximately 8 ins. diameter is drawn on a card in the middle of which is drawn another circle about 2 ins. diameter. A 'V' cut-out is then drawn as shown in Fig. 3, after which the shape is cut out. To form the cone the edges of the 'V' are butt-joined and secured by gluing a 'strap' of 1 in. wide card along the joint on the inside of the cone. The tube is glued in the hole in the cone and the joint faired with plastic wood.

When set the whole unit is given a

liberal coat of size and enamelled to any colour or colours desired. Cream hard gloss enamel was used on the original and can be recommended.

As seen from Fig. 2 the unit is clipped between the ceiling and the terminal piece by the screw ring on the latter.

Perspex Alternative

An even more attractive (and more expensive) fitting can be made by utilizing coloured Perspex tubing and sheet. The sheet is cut into slender triangles which are levelled and joined with perspex cement to form the cone. Alternate toning colours for the triangles provide a pleasing touch.

A hole is then fretted out and filed to receive the tube, which is secured with Perspex cement. (G.A.)

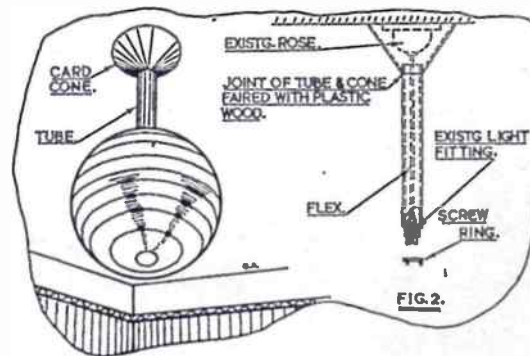


FIG. 2.

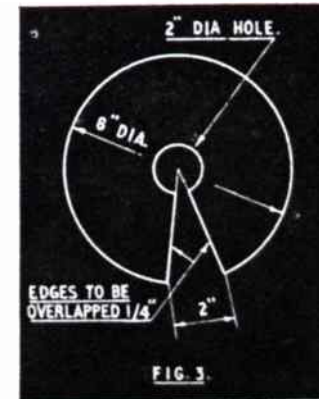
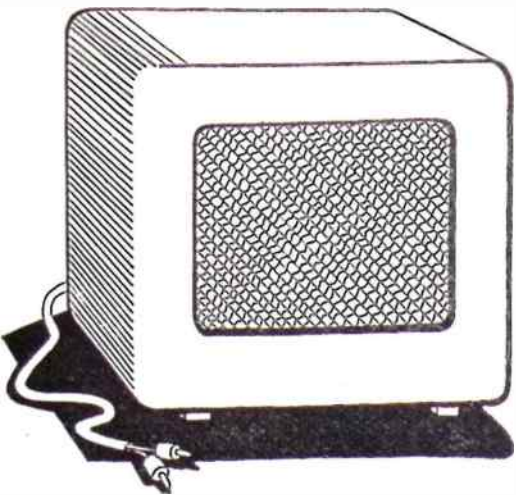


FIG. 3.



MODERN SPEAKER CABINET

Described
by
F. G. Rayer

A LOUDSPEAKER cabinet of simple construction and pleasing design can be made from the details given here, and will prove very satisfactory for extension purposes, or for use with a home built receiver which has no cabinet. A suitable cabinet or baffle board should always be used with a loudspeaker, as best quality and volume of reproduction cannot be achieved without. Bass reproduction is particularly improved by a cabinet, and that dealt with here is of suitable dimensions for all ordinary purposes, and for speakers up to 8ins. in diameter. It is equally satisfactory for small or midget speakers, and will allow these to give better results than when used with a very tiny cabinet.

Construction will be simplified if the pieces are sawn out first. This should be done as accurately as possible with a fine toothed tenon saw, to the following dimensions:—

Top.	10½ins. by 9½ins. by ½in.
Two Sides.	9½ins. by 4½ins. by ½in.
Bottom.	9½ins. by 4½ins. by ½in.
Front.	10½ins. by 9½ins. by ½in.
Baffle.	8½ins. by 7½ins. by ½in.
Corner Pieces.	4½ins. by ½in. by ½in.
Back.	9½ins. by 8½ins. by ½in.
Two Feet.	4½ins. by 1in. by ½in.

Construction

Top, bottom and sides are best fixed together first, one of the four corner pieces fitting inside each corner, as shown at (A). Glue is applied to the various surfaces before joining, screws providing additional strength and holding the parts together until the glue has set.

To begin, a corner piece is screwed in place flush with each end of the bottom, three screws being used for each piece. The remaining corner pieces are screwed upon the upper ends of the sides. These

surfaces should now be checked for accuracy, and trued up with a rasp or glasspaper block, if necessary. More glue is then applied, and the top, bottom and sides screwed together as at (A). (B) shows one corner in detail, further screws passing through the corner piece at right angles to the one driven into the cabinet top.

The aperture in the front is marked out, using a compass set to 1in. radius for the corners. After careful sawing, the edges are finished with glasspaper, to remove any roughness or irregularity. Glue is then applied, and the front fixed in place by about four ½in. panel pins along each edge, the heads being punched slightly below the level of the wood.

When the glue has hardened the cabinet should be very strong, and final shaping of the corners, and glasspapering, can be undertaken, to get a smooth finish. The panel pin holes are filled with plastic wood or other filler, and the feet, with front ends rounded as at (C), are fixed on with two counter-sunk screws each.

The cabinet can now be varnished, two very thin coats giving the best finish. The tone used depending on personal choice.

Speaker Fitting

When the cabinet is dry, a piece of art silk about 8ins. square is taken, and a little glue applied to the inside of the cabinet front, round the aperture. The silk is then stretched over the aperture, taking care to get no glue on the material which is visible from the front of the cabinet. It should be pulled quite tight in all directions, and can be held with a few drawing pins, lightly pressed in, until the glue is dry.

The loudspeaker itself is mounted on the baffle board (D). A circular hole is

cut in this board, to equal the diameter of the cone of the loudspeaker used. This is simply done by measuring the cone diameter with a ruler, setting compasses to half this distance, and drawing the circle with them. The speaker is screwed to the baffle, taking care that the points of the screws do not project right through the wood.

Baffle and speaker are now placed together inside the cabinet, and the baffle is fixed to the front of the cabinet by four screws, these being chosen so that the points do not project through cabinet front.

To keep out dust, which tends to clog the magnet gap with some speakers, a back is necessary, and this is shown at (E). It fits inside the cabinet, being held in place by screws driven into the corner pieces, which are ½in. shorter than the depth of the cabinet inside.

The back must have a fairly large cut-out, or a number of holes ½in. to 1in. or so in diameter, and a piece of thin material is glued on inside, to cover these in exactly the same way as the aperture in the front of the cabinet. The flex leads from the speaker pass through a small hole as shown.

Speakers

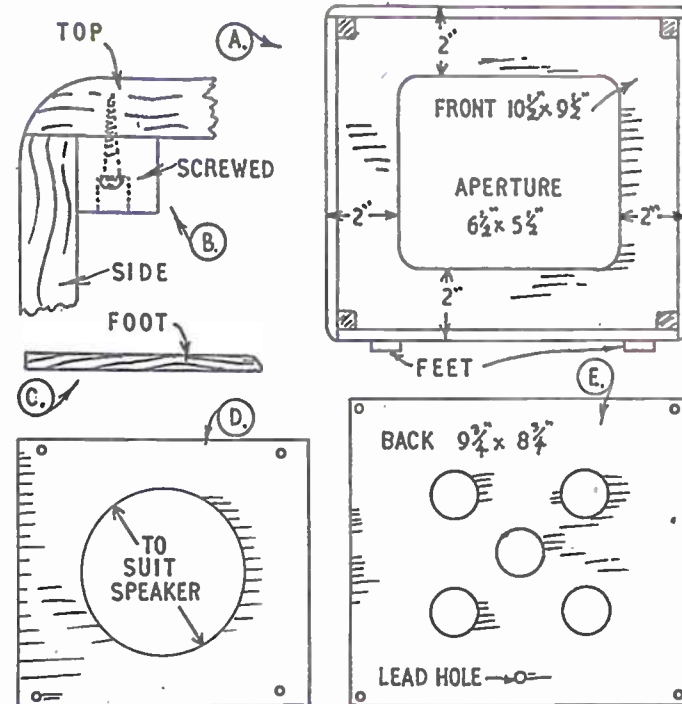
If the cabinet is to be used for an extension speaker, a model about 5ins. in diameter will do well, and this is also suitable for the cabinet when it is to be used as the main speaker for a home constructed set. A 'Permanent Magnet' speaker is required. 'Mains Energised' speakers are not satisfactory, even if mains are available, as they need a special circuit. They are not suitable for extension purposes with a mains receiver. The permanent magnet type can, however, be used as extension or main speaker with any battery or mains receiver.

Almost all modern receivers have extension sockets, usually for 2 ohm to 3 ohm speakers, or 15 ohm speakers. This will often be marked or given in the operating instructions provided with the receiver. It is then only necessary to buy a 2/3 ohm or 15 ohm speaker, as the case may be, and wire it to the extension sockets by twin leads of ordinary flex.

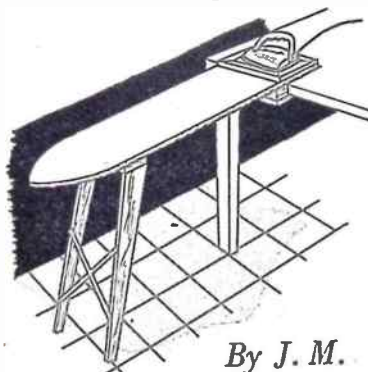
When the speaker will be the only one used with a receiver or amplifier, a speaker matching transformer must be used between output valve and speaker. With battery sets, this transformer is usually included in the speaker cabinet, and if a speaker with transformer is purchased, it may be mounted on the frame of the speaker, with its secondary ready connected to the speech coil. It is then only necessary to take two leads from the transformer primary, to output valve anode and H.T. positive.

With mains equipment, the transformer is often fitted to the receiver or amplifier chassis, so that the two leads from the speaker do not need to carry H.T. voltages. If so, connections are exactly the same, except that a length of twin flex will be required between transformer secondary and speech coil. So long as the transformer is present, and properly wired, it does not matter whether it is on the receiver or amplifier chassis, or in the speaker cabinet.

For maximum efficiency, the transformer should be intended for use with the speaker, and chosen to suit the type of output valve. Output valves are normally divided into Mains Triodes, Battery Triodes and Mains Pentodes, and Battery Pentodes, and the speaker will give of its best if the transformer is designed for the type of output valve with which it will be used.



Ironing Board Fits Table

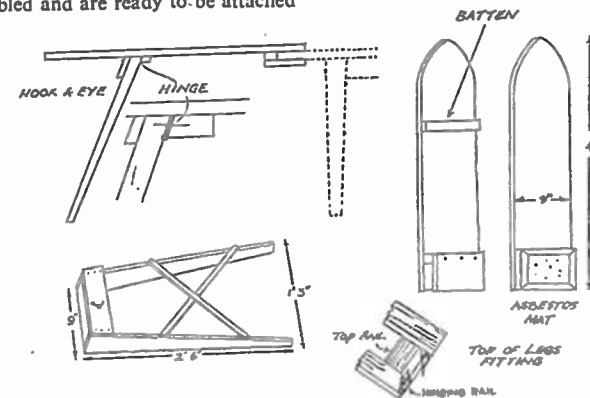


Commence by measuring and shaping the top of the ironing board. At the table end of the board is an asbestos sheet for holding the hot iron. The asbestos is held in position by a simple wooden frame as illustrated. This frame should now be cut to size and nailed on. Asbestos sheeting is available from most ironmongers.

Next, the various leg pieces are sawn to size. After they have been completely assembled and are ready to be attached

to the underside of the ironing board, the batten should be fitted. Two hinges hold the legs to the batten.

All that remains to be done now is to cover the ironing board top with some suitable material as a base on which to iron. Almost any material folded into two or three thicknesses and firmly nailed to the board will do. Large round brass-headed nails will keep the covering in position. The material is first nailed along one side of the board, then stretched tightly across and nailed down on the other side.



FOR the small home with its limited kitchen space this handy collapsible ironing board will be very welcome. Designed to fit over the edge of a table it can be very quickly and easily stored away.

The various pieces of the ironing board are simple to cut and easy to assemble. A study of the illustration will show all the required measurements and the average handyman should experience little difficulty in constructing it.

Experiments with Lead Nitrate

AS lead nitrate is one of the commonest of the lead salts, it is a good starting point for preparing other useful and interesting lead compounds.

If your stock of lead nitrate consists of easily visible crystals and not crystalline powder, it is interesting to note the crystal shape. Where a crystal is not broken or distorted it looks like two square based pyramids stuck base to base, so as to form a crystal with eight faces. A curious fact about lead nitrate crystals is that they are milk white and opaque if they have been deposited from a hot solution, whereas if lead nitrate solution is allowed to evaporate at room temperature, the crystals are transparent.

Decrepitation

They are also well adapted to demonstrate the term *decrepitation*. Place a few crystals in a dry test tube and heat gently over a flame. They crackle sharply and fly to pieces, many bits being thrown out of the tube. The crystals of most other substances do not do this.

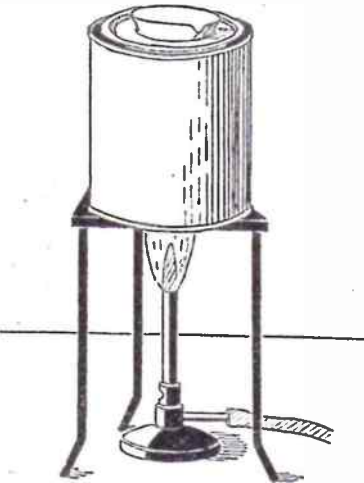
Heat will also cause decomposition of lead nitrate. Once more put a few small crystals in a dry test tube, but this time insert a loose plug of woolly asbestos about 1 in. above the crystals, so as to prevent decrepitation throwing out fragments. Heat the tube. Soon red-brown vapours appear. These consist of a mixture of the gases nitrogen peroxide and oxygen.

When no more vapours appear, let the tube cool. The residue left in it is lead monoxide. As nitrogen peroxide is poisonous if breathed in quantity, this experiment should only be conducted on the small scale indicated.

The commonest lead compound we meet in everyday life is white lead, much used as a paint base. Chemically, this is basic lead carbonate. You can prepare a specimen by making separate solutions of lead nitrate and sodium carbonate (washing soda) in water. To some of the lead nitrate solution add sodium carbonate solution, stirring well. A white precipitate of basic lead carbonate appears. Continue adding sodium carbonate solution until a drop of the mixture turns red litmus paper blue. This shows that a slight excess of sodium carbonate has been added and that the reaction is finished.

Filter off the precipitate and wash it well with water. Open out the paper on to a porous brick to dry at room temperature. As every painter knows, white lead is poisonous and affects those who use it a lot. Why then is not some

non-poisonous white pigment used instead? Grind a gram of your basic lead carbonate with 2 c.c. of boiled linseed oil. Also grind 1 gram of chalk with 2 c.c. of boiled linseed oil. Now paint a piece of wood with each. You will find the white lead based paint covers a much larger surface than does the chalk based paint. No other cheap white pigment has such a good covering power as white lead. Further, it helps the oil to dry better and so form a hard non-tacky surface.



Making chrome orange

A salt of lead not often prepared is lead sulphite. To a solution of lead nitrate add sodium sulphite solution. A white precipitate of lead sulphite appears in the liquid. Continue adding sodium sulphite solution until no more precipitate forms. Filter off the precipitate and wash it well on the filter. Then open out the filter paper on a porous brick to dry. It may then be bottled for your stock.

Two other lead compounds which are used in paints are lead chromate and basic lead chromate. Both are easy to make. To a solution of lead nitrate add either a solution of potassium chromate or potassium dichromate. A brilliant yellow-precipitate forms. This is lead chromate, or, as it is known to the paint trade, chrome yellow. When no more precipitate forms, filter it off, wash it thoroughly and dry on a porous brick.

Basic lead chromate is made from lead chromate. To 6.46 grams of lead chromate contained in a beaker add

enough water to make a thin paste. Then pour in 8 c.c. of a 10 per cent solution of sodium hydroxide. Stir well and suspend the beaker in a syrup tin of boiling water by means of a hole cut in the lid, as shown in the diagram. The yellow of the lead chromate rapidly passes to a fiery orange.

After about fifteen minutes, remove the beaker, thin the contents with water, and filter off the whole. Wash the residue on the filter until the wash waters run through colourless (they are at first yellow). Dry the residue on a brick, as before. This brilliant orange powder is the pigment known industrially as chrome orange.

If you rub a little of both chrome yellow and chrome orange with boiled linseed oil, you will find they make paints of excellent covering power. Like all lead based paints they tend to darken in town air. The reason is that hydrogen sulphide in the air combines with the lead pigments and forms black lead sulphide.

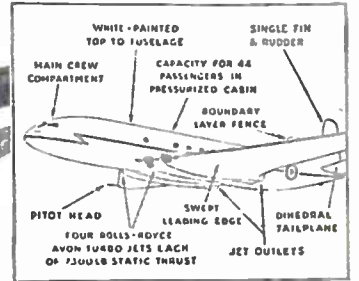
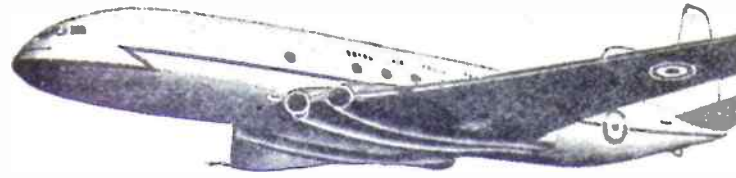
Golden rain

Another coloured salt of lead is lead iodide. Though not used as a pigment, it can be used for a rather lovely crystallisation experiment. You can make this salt by stirring potassium iodide solution into lead nitrate solution until no more precipitate forms. This bright yellow precipitate is lead iodide. Filter it off and wash it by filling up the filter twice with water.

Take up a little of the moist salt on the end of a spatula and stir it into about 50 c.c. of boiling water contained in a beaker. All or most of the lead iodide dissolves, forming a colourless solution. Now let the solution cool — preferably in sunlight, for the effect is then very pretty. Soon tiny golden spangles start to fall through the liquid as the lead iodide crystallises out. These increase and the effect is one of a lovely golden rain. Dry the remainder of the salt in the filter by opening out the paper on a porous brick.

A silver rain may be seen by using lead chloride. This salt you can make by adding dilute hydrochloric acid to lead nitrate solution until no more white precipitate forms. Let this settle, pour off the upper clear liquid and add just enough boiling water to dissolve the whole. The cooling solution then deposits small shining crystals as the lead chloride is thrown out of solution. Before filtering off and drying these for your stock, let the solution cool overnight so as to allow the maximum crystallisation to take place. (L.A.F.)

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Take these precautions

Garden Pond Fish in Winter

WHAT can be done to keep goldfish and other species such as golden orfe safe in winter? Many good pond-keepers, beginners with this fascinating hobby, fear the effects of frost, and ask if they can do anything about stopping the water from freezing during winter's severe period. Actually, there is little one can do about this matter. However, the question should not arise if your pond is of a fair depth, say, 3ft. to 4ft. It is only in shallow ponds that there is a risk of the water freezing nearly solid down to the bed in extremely cold weather conditions.

Provided there is some portion that is at least 18ins. in depth to which the fish may retreat if the surface of the pond becomes frozen over, they will be quite safe. However, in winter's worst weather with temperatures below freezing point, any ice forming on the surface of the pond should be broken in several places, and kept broken. It is as well to remember that unless the cement sides of your pond are of a substantial thickness, a severe frost is liable to cause cracks and these may develop into leakages.

Depth is important

In making a pond it is always advisable to go at least 6ins. deeper than is actually required. To dig down to a depth of 2ft., will give the extra inches which will help the fish to get below the frost line during very hard weather.

Of course, it is important to note the kinds of fish in the garden pond. They should be of the hardy varieties, such as

Goldfish, Golden Orfe, Rudd, Golden Tench. Less colourful are roach, perch, carp, and pond hybrids. All these will withstand the cold very well, but there must be water of sufficient depth for them in winter-time to retire to, and remain more or less in a torpid condition.

Pond fish require but little food in winter. Uneaten foodstuffs are a danger to your pond, as any such surplus is left

As the weather becomes colder, fish kept out of doors in a pond tend to grow sluggish and, of course, demand less food. At the same time, well-fed fish have a much better chance of getting through the winter than those poorly-nourished. Some pond-keepers prefer to give their pets a certain amount of food, live worms in particular, in winter, but take great care to see that the fish consume every scrap in due course, and that anything left to decay is taken out of the pond.

If quantities of fallen leaves have been swept by the wind during autumn into your pond, it is a duty to clear the collected rubbish out of the water, for these dead leaves quickly rot if left lying on the bed of the pond and in time foul the water. A long-handled rake will be found useful in clearing a pond.

A job for the winter

Winter is a good time to plan and construct a garden pond, so that by next spring the same will be quite ready for receiving the necessary plants and the stock of fish. If the task is left until after the winter, the best part of the year will have passed before the pond is fit to be stocked, thus much valuable time is wasted.

It is wiser, moreover, to do the excavating and the attendant upheaval of the garden or lawn during the winter season whilst the flower beds are in a condition of repose, so that they are less likely to suffer from the necessary disturbance. A really well-planned and neatly constructed home for fish pets is always a most attractive garden feature.

~~~~~  
By A. Sharp  
~~~~~

to decay and will in course of time foul the water. Therefore, feed very sparingly during winter, once a week, say, except during very severe conditions, when the fish will not eat at all for days.

It is only in shallow ponds with no deep places — ponds liable to freeze solid or nearly so in times of extreme frost that it is dangerous to leave your fish. The alternative to risking your pets' lives during Arctic-like spells is to transfer them from the pond to a large tank kept indoors for the winter, if you have such a receptacle that will accommodate them, returning the fish to the pond when danger from freezing is past. There is little danger that fish will die owing to ice covering the water, provided that there is live green weed in their pond, but the surface of the pond must be kept cleared of snow, to allow light to penetrate to the weed.

For 2/- make a Brush worth 10/-

FOR lime-washing a worn down whitewash brush is recommended, because a certain hardness is an advantage, and lime can spoil a good article.

This being so, it seems a pity at any time to have to buy a good brush for a limewash job, especially as one can pay up to half a guinea for even a 6in. or 7in. article.

The writer, however, made quite a satisfactory brush for the purpose from a decorator's 'flattener'. These are about 9ins. wide and sell at 2/-; but they have no handle, being used by gripping the wood just above the bristles.

For lime-washing a handle is essential and one can be provided with very little trouble.

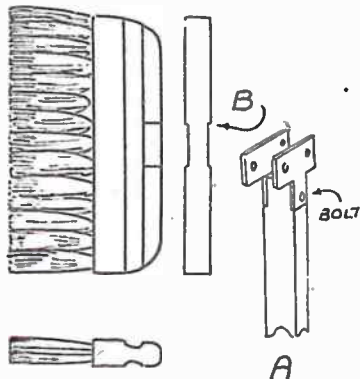
Obtain two 'T' angles, 1½ins. by

1½ins., three ¼in. diameter bolts, and a 13ins. strip of wood of ½in. square section.

One end of the strip is taken down to a width slightly less than the thickness of the brush grip. On either side of this top the T-pieces are placed and secured by one of the bolts going through the holes in the metal (see A). The nut, taken home, a very firm connection is given.

Two recesses (B) are cut in the top edge of the brush grip wide enough to take the cross-bar of the angles and arranged so that the grip fits tightly between the angles when tapped into position.

The brush is set in, and the wood drilled through at the location of the other holes in the angles. Bolts are inserted and tightened up. (H.A.R.)



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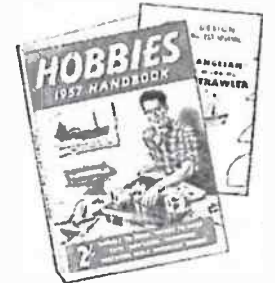
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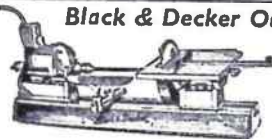


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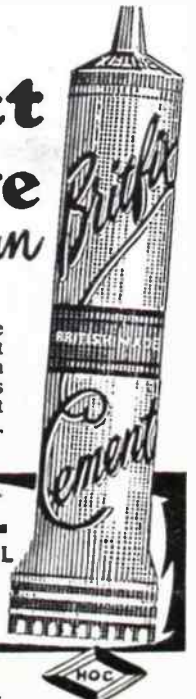


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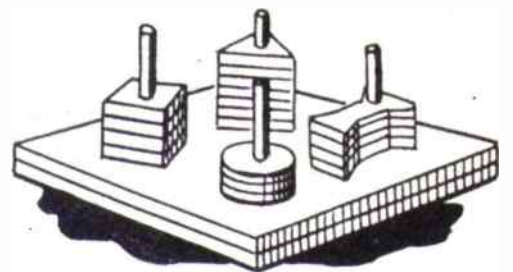
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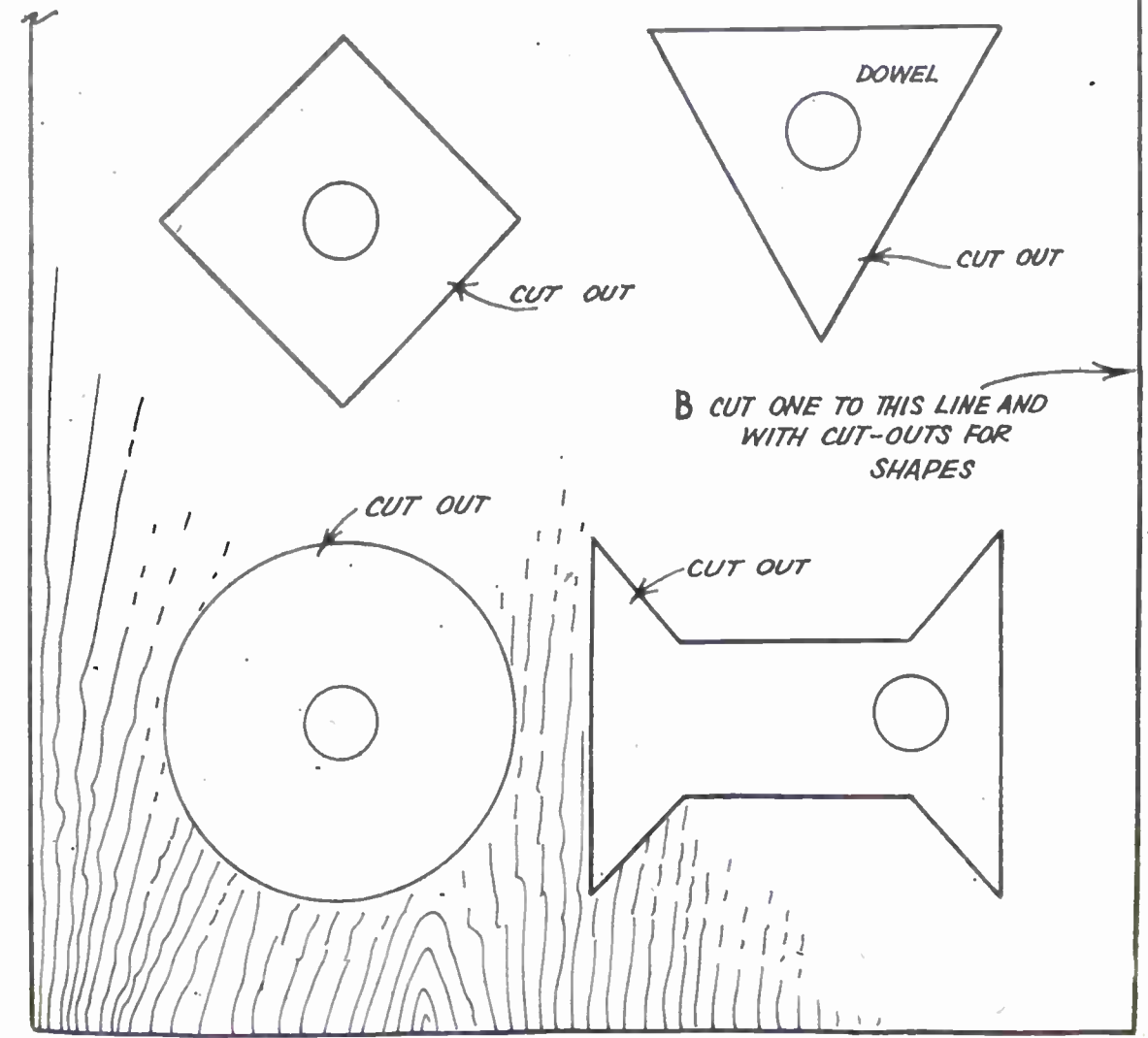
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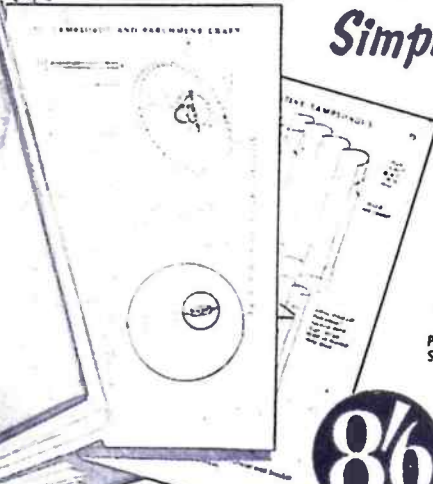
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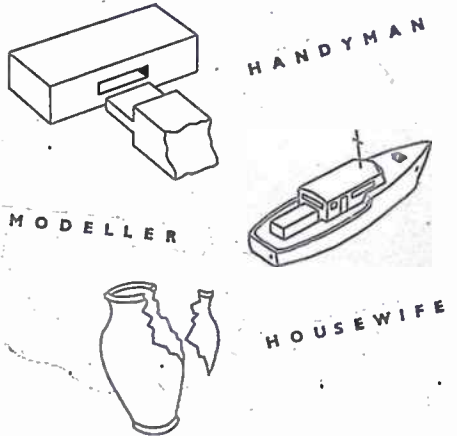
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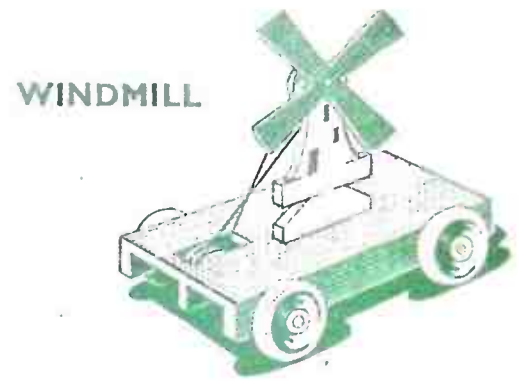
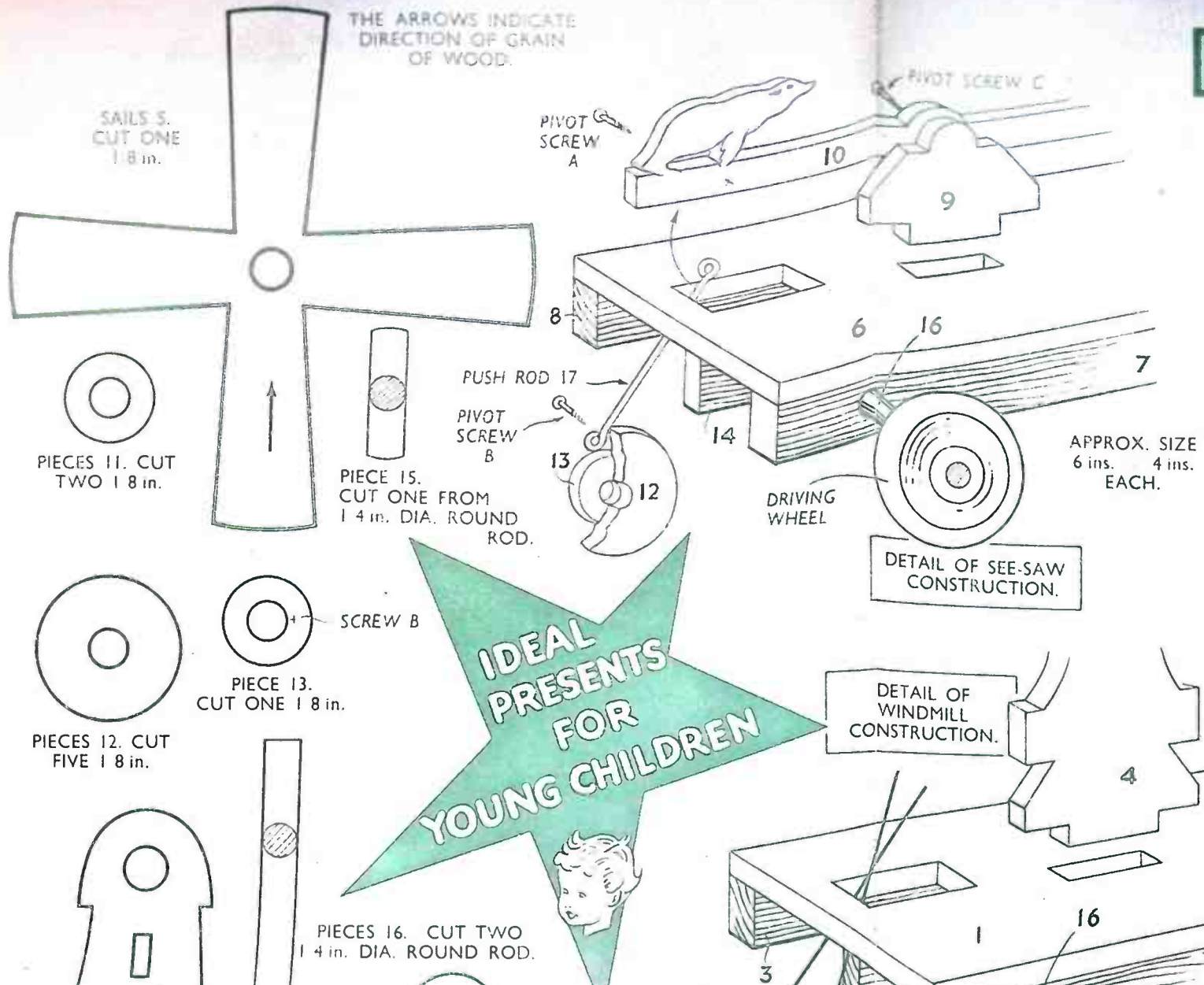
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