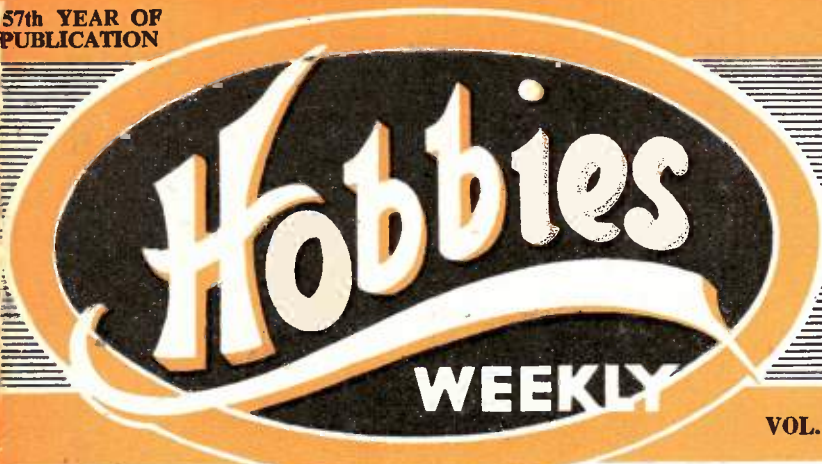
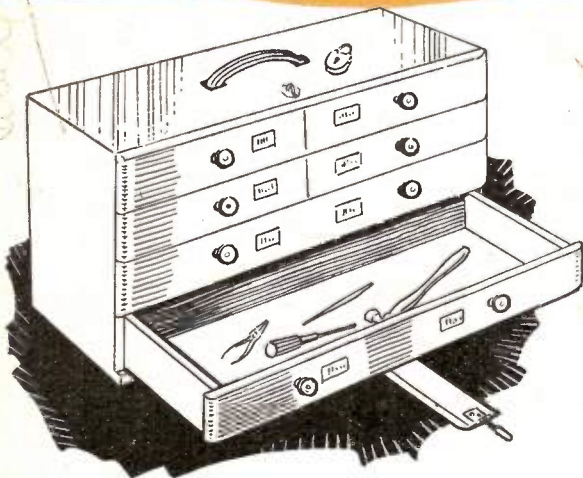




FREE INSIDE
A Design for
making a
Doll's Cot

VOL. 114
NUMBER 2954

Handymen should make a
**PORTABLE
TOOL BOX**



Complete with
lock and carrying
handle, this is
the ideal holder
for tools

by the way, is optional as will be explained later. See diagram 2 for correct positions of parts. The top, back and floor may each be made from two pieces if you wish; the sides, being one piece each, will hold them together. Nails should be driven in dovetail fashion.

TOOLS are too expensive to leave lying around. They are easily mislaid, sometimes lost, or even stolen. A good strong box, fitted with a lock that cannot easily be tampered with, will be a boon to the workman who has to carry several tools around with him.

The toolbox in the illustration measures 18ins. by 7½ins. by 12ins. high and the drawers are held in place by the bar on the front. The bar is hinged, and the hasp fixed, in such a way that the drawers are inaccessible while the lock is in place.

Making the Box

All the diagrams are grouped together and numbered, so that all you have to do is follow them step by step with these instructions. The diagram 1 shows the overall measurements as 18ins. by 12ins., so taking the width as 7½ins. you will need the following boards.

One piece, top, 18ins. by 7½ins. by ½in.;
one piece, floor, 18ins. by 7½ins. by ½in.;
two pieces, 11½ins. by 7½ins. by ½in.;
sides; one piece, 17½ins. by 11½ins. by ½in., back; and one piece 18ins. by 11½ins. by ½in., front. This latter piece,

The Drawer Partitions

We must now decide on the number of drawers required. We suggest four small and two large as shown. The correct spacing of the drawer partitions are shown in diagram 1, and the upright centre partition should be halved into the first partition as shown in diagram 3.

The support for the first long drawer may either be a partition stretching right across as shown in diagram 1, or two ½in. square stripwood runners as in diagram 3. Partitions or runners are all 7ins. deep and can be nailed to the back and sides of the box. Cut the cross partitions from ½in. wood and the upright centre partition from ½in. Notice, too, that a recess must be cut centrally to take a 1½in. butt hinge.

The upright wooden bar is cut from ½in. or ¾in. wood 2ins. wide and is shown in detail in diagram 4. An ordinary hasp is fixed at the top as

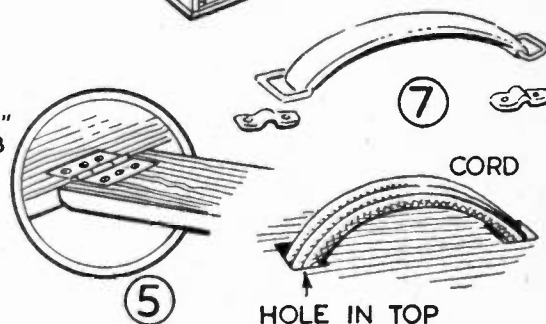
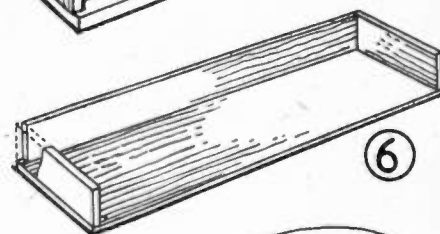
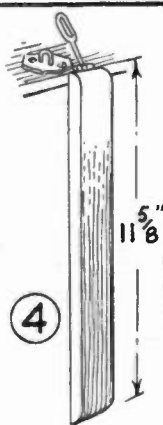
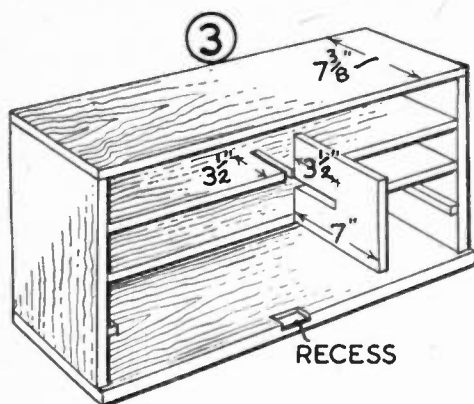
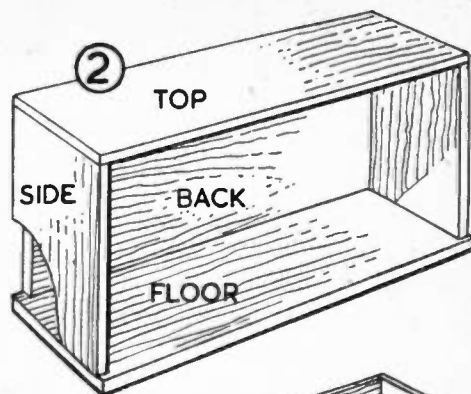
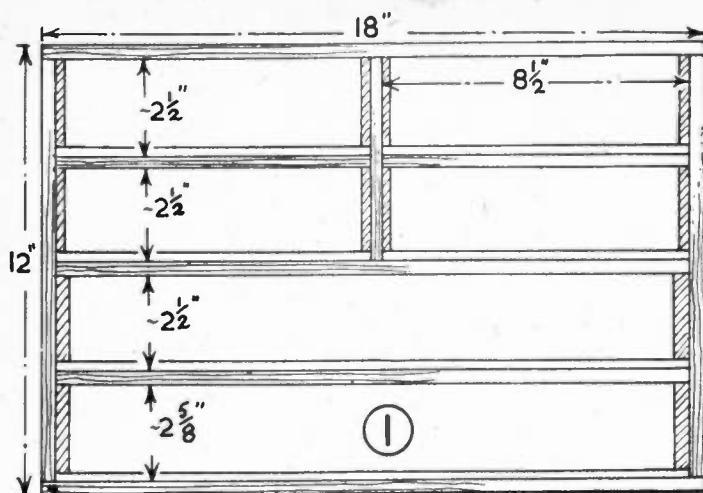
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All correspondence should be addressed to The Editor, Hobbies Weekly, Dereham, Norfolk.

THE MAGAZINE FOR MODELLERS,
HANDYMEN AND HOME CRAFTSMEN





shown. Fix on the inside to prevent the screws being tampered with, and screw the staple part to the top of the box. The catch of the hasp will cover at least one of these screws. The inset, diagram 5, shows how the hinge is recessed into both box and bar.

The Drawers

Diagram 6 shows the method of construction. The measurements for the small drawers are, back, 8ins. by 2 1/2ins. by 1/2in.; sides, 7ins. by 2 1/2ins. by 1/2in.; floor, 8 1/2ins. by 7ins. by 1/2in. For the large drawers, back, 16 1/2ins. by 2 1/2ins. by 1/2in.; sides, 7ins. by 2 1/2ins. by 1/2in.; floor, 17 1/2ins. by 7ins. by 1/2in. For the lower drawer the sides and back will be 2 1/2ins. high.

When the drawers are in place you will see that they are flush with the front. Now the fronts of the drawers are cut so that they cover the whole of the front of the box with the exception of the projecting floor, as indicated in the picture of the finished thing. What it amounts to is that the fronts are cut from one board, 18ins. by 11 5/8ins.

by 1/2in., which is divided into six pieces and pinned to the drawers. It will thus overlap the drawers all round. Fronts for the top small drawers will be 9ins. by 3 1/8ins.; for the second pair, 9ins. by 2 1/2ins.; for the first long drawer, 18ins. by

2 1/2ins.; and for the last, 18ins. by 2 1/2ins.

Alternatively each drawer could have a separate front, made in similar fashion to the back. In this case, however, it would be on the sides, and not between them. Small erinoid knobs can be screwed into the fronts of the drawers. Our No. 707 1/2in. knobs would be suitable. They cost 5d. each, post free, and can be obtained direct from Hobbies Ltd., Dereham, Norfolk.

The Handle

The most suitable handle is one from an old attaché case, but one could be easily constructed from strong cord. Make two holes in the top and thread several lengths of strong cord through, as in diagram 7. Knot heavily on the underside to prevent them from pulling through. In this case the back of the top drawers will have to be shortened to allow them to open.

The drawers will not be touched in any way, but the box itself can be painted dark green or grey. Small labels can be stuck on the drawers to add the finishing touch.

(425)



A BIRDHOUSE is always an intriguing thing to have in a garden, and the one described here gives almost the impression of a cottage.

The base (A) is a piece of $\frac{1}{2}$ in. (or

photograph and Fig. 2. This is made up of the two uprights (H) and a 12 in. length of pliable basket wood. The latter is bent round into a semi-circle and its ends inserted in slots taken out of the back tops of the uprights with a

going through to the uprights.

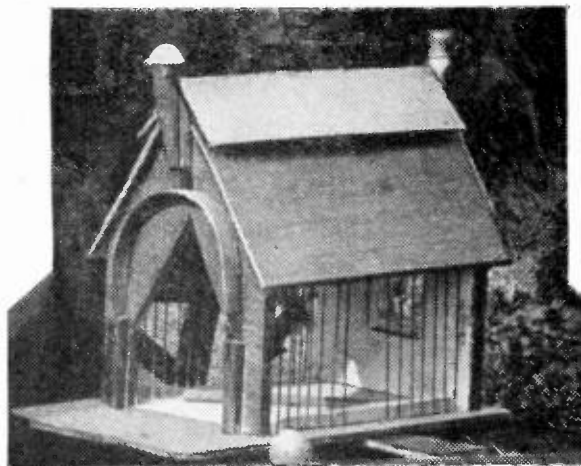
Although not as firm as when the roof boards are in position, the frame so far erected should be pretty rigid, and at this juncture drill fourteen holes $\frac{1}{16}$ in. in diameter in the strips (E). They are

How you can make A DECORATIVE BIRDHOUSE

thereabouts) material, 1 ft. 6 ins. by 9 ins. and this should be obtained first, as everything is built up on it. (B) and (C) are the front and back respectively. Both are 10 ins. high, 8 ins. wide and 6 ins. to the eaves. Out of the front is taken the door (D) which is 5 ins. wide, 7 ins. to the peak and 3 ins. to the beginning of the slope.

The back section (C) has a small opening 3 ins. by 2 ins. in its centre as (R). Over this, on the inside, is fitted a rectangle of glass—an old $3\frac{1}{2}$ ins. by $3\frac{1}{2}$ ins. negative cleaned off will do well. Fix with four small screws, the glass

A photograph showing the distinctive appearance of the finished article



saw. The ends of the strips are angled away as shown. By this method the curved strip will hold without further securing, but greater firmness if desired can be given as described in a moment.

Now start assembling by fixing the two uprights to the base-board spaced at 11 ins. apart, the back being about $\frac{1}{2}$ in. from the edge, thus leaving a fair amount of board at the other end in front of the upright. Secure these pieces with screws up through the base into their lower extremities, boring for a fair amount of the distance first of all. Fit

grouped in two lots of seven, leaving a space in the centre and are $\frac{1}{16}$ in. apart. Drill right through.

Next, with some care, insert a wire in each hole and mark the positions directly below where they touch the base. Holes have to be drilled here also but not right through in this case. To drill these lower holes it will be necessary to remove the (E) strips temporarily. The (E) pieces refitted, now insert all the lengths of wire. If they have to be slightly tapped into position so much the better, but there will be no danger of the wires working up when the roof is on.

Centre Gap

This arrangement of wires leaves a gap of about $2\frac{1}{2}$ ins. in the centre which just comes above a cross perch set here between the base and the top of the post that holds the house. From this cross-piece the birds can hop into the sanctuary for food through the gap—thus meaning that they can enter from either side or the front opening.

The roof boards are then put on, the upper one over the lower. There is no special arrangement at the ridge except that the boards are slightly bevelled, so as to come together in a tight seam. Again fixture is obtained by screws going right through into the edges of the uprights.

To give a rather 'Norwegian' finish to the ends, peaks are attached. These can be anything to hand, the ones in the photograph being cut-down wooden soldiers. To bring these peaks outside the roof boards, which overhang a little,

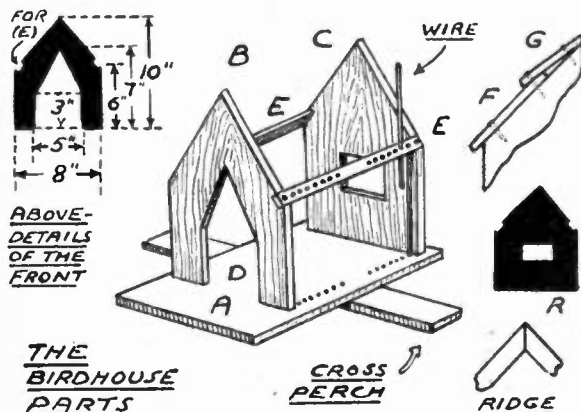


Fig. 1—Details of the house

being held under the heads and neatened by running putty all round. From the outside this arrangement makes a very realistic window.

Both back and front are cut from $\frac{1}{2}$ in. material, as several screws have to go into them edgewise and the thickness prevents any danger of splitting—as well as giving general solidity. Prepare also the strips (E) which go along the eaves—12 ins. by 1 in. by $\frac{1}{2}$ in.—and the roof boards (F) and (G) which are 13 ins. by 6 ins. and 13 ins. by 3 ins. respectively. Required also are fourteen 7 in. lengths of $\frac{1}{16}$ in. wire for the sides.

Before assembling, the porch must be fitted over the doorway as seen in the

the strips (E) by cutting out recesses on the top slope as shown—screws again

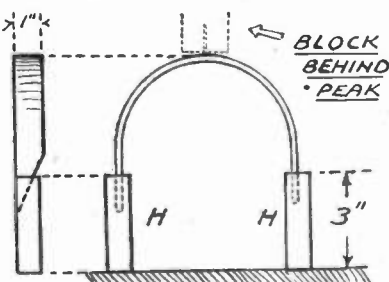


Fig. 2—How the porch is constructed

Final instructions for making A CAMERA FOR A SHILLING

Figs. 8 and 9 show how the magazine compartment is added to the open end of the lens compartment. Two side strips 5ins. by $1\frac{1}{8}$ ins. cut from $\frac{1}{4}$ in. sheet balsa are cemented in place as shown, leaving exactly $\frac{1}{8}$ in. between the rear vertical edge of these and the rear of the lens compartment. This $\frac{1}{8}$ in. difference is accounted for by the frame built on the back which locates the back properly. The magazine compartment is completed by cementing in the other rectangular pieces cut from $\frac{1}{4}$ in. sheet to the dimensions shown in Fig. 8. Small triangular

from the spool in the top compartment to another spool in the lower compartment. Where the film actually passes over the back of the lens compartment, protect these edges with strips of velvet tape or similar soft material cemented in place. This will also help to make a proper light tight seal between the area of film being exposed and the rest of the film still unexposed. If you have two old film spools and a length of backing paper, you can check this accurately.

The final stage in the basic assembly consists of making the back. This is a

is then fitted with a frame of $\frac{1}{8}$ in. square balsa strip, cemented in place, and so arranged that the frame fits snugly inside the outline of the back of the camera assembly. In other words, the back panel proper should be a nice plug fit in the back of the camera assembly. Additional frame strips corresponding to the position of the two velvet strips supporting the film will exert gentle pressure here and keep the film properly in place.

It may be necessary to relieve part of the frame at points corresponding to

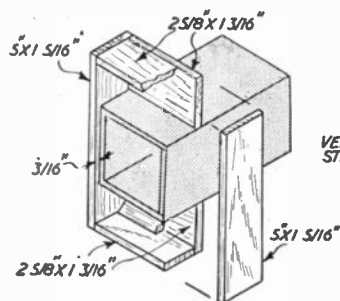


Fig. 8

strips of scrap balsa can be cemented over the corner joints to strengthen the assembly, if desired.

You can now check the assembly for size, using an old film spool. The film spool should fit snugly into each of the end 'pockets' or compartments of the magazine. In the top compartment, which is the one in which the loaded film is first placed, the spool simply rests in place and is retained by the back. In the bottom compartment the spool should be located on the right-hand side by a short length of $\frac{1}{8}$ in. diameter dowel which is pushed through and glued to the side. The other side of this spool is engaged by the winding lever, which is made later.

When a new film is loaded in position, the film on its paper backing extends

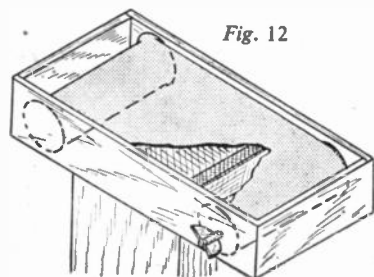


Fig. 12

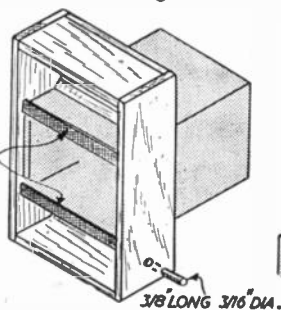


Fig. 9

rectangle 5ins. by $2\frac{1}{4}$ ins. and $\frac{1}{4}$ in. thick. This can be cut from $\frac{1}{4}$ in. sheet balsa, or formed by two $\frac{1}{4}$ in. sheet pieces cemented together. One side of the back

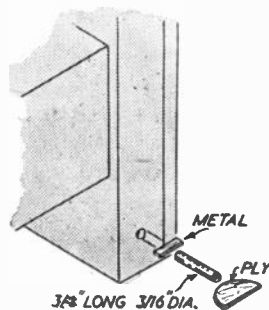


Fig. 11

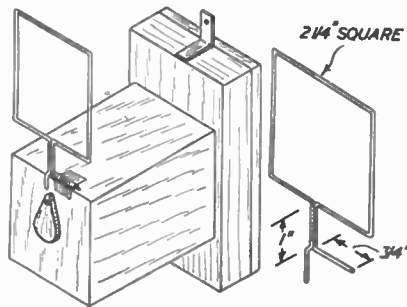


Fig. 13

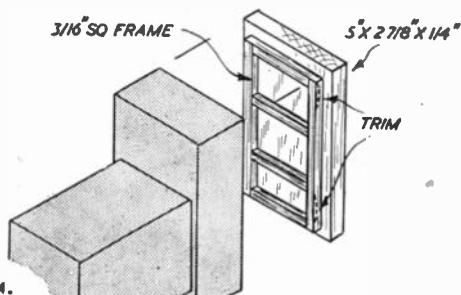


Fig. 10

the position of the metal ends of the spools. This you can check with a spool fitted in place. The back must not foul the spools when in place.

Now you can plug the back in place, and rub the whole assembly down smooth with fine glasspaper. Round off the edges to improve the outer appearance and generally make the job look properly finished. It is a good plan to give the whole assembly a coat or two of grain filler, glasspapering down lightly between each coat. Alternatively, cover the whole of the assembly with tissue paper, applied with photographic paste. The complete camera, inside and out, should then be given two or three coats of matt black dope or paint. Check also that it is absolutely light tight.

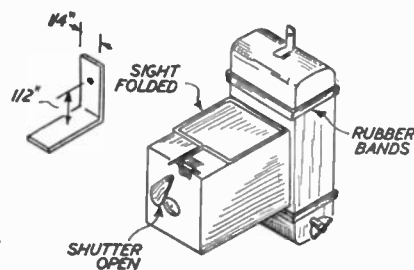


Fig. 14

The winding handle which engages the bottom film spool and so enables the film to be wound past the rear window — and thus positioned in the camera correctly — is shown in Fig. 11. It is simply a short length of dowel which fits a hole drilled through the side of the bottom spool compartment, in line with the centre of the spool when in place. You can bush this hole with a metal tube for longer life, if you wish. The inner key is a small strip of metal pushed into a slot in the end of the dowel — fitted after the dowel is located in the side. The winding 'knob' itself is a small semi-circle of ply glued into a slot in the other end of the dowel.

Make a corresponding slot on the inside of the spool compartment so that the metal key can be withdrawn flush with the inside. The bottom spool can then be easily removed. It is engaged simply by pushing in to fit in the slot in the spool. Check against an actual spool in place to get this detail correct. It is important, too, to make this winding fitting light-tight.

With Back Removed

Fig. 12 shows how the camera should look when the back is removed with a film in place. Normally, of course, the back would stop on until the film has been completely wound through. The back would be removed merely for loading and unloading the film spools. The arrangement, in fact, is exactly the same as in an ordinary camera. The window hole cut in the back should correspond to the very centre of the film, so that the appropriate 'frame' numbers appear. The window is covered with a small square of red cellophane or thin transparent red plastic sheet cemented in place. It is a good plan, incidentally, to cement a piece of cellophane both inside and outside the actual cut-out.

Fig. 13 shows how a simple viewfinder

can be attached to the finished camera. The front sight consists of a frame bent from thin wire, as shown. If this is passed through a short length of metal tube, which in turn is bound to the front of the camera with a strip of silk or bandage well cemented and pressed in place it can be hinged to open up or fold down flat, as required. The back sight is simply a strip of metal bent at right angles with a small hole pierced in it. If this hole comes exactly $\frac{1}{4}$ in. above the top of the magazine compartment it will line up accurately with the centre of the wire front sight. The rear sight can also be cemented in place.

A view of the completed camera is shown in Fig. 14. The back is here shown held in place with two rubber bands — simple and very effective. You can hinge the back if you prefer, but a simple rubber band fixing is quite effective. After all, this is a simple camera we are making.

As to taking actual photographs with the camera, well, the best guide here is experience. After a number of trial shots you should begin to appreciate just what exposure a particular subject wants under certain conditions. But a roll of film is quite expensive, so here are a few general rules to start with, so that you should not 'waste' even your very first shots. After all, the film is costing you more than the camera!

The ordinary box camera with a fixed focus and single shutter speed generally takes photographs at an exposure of $\frac{1}{25}$ to $\frac{1}{50}$ second. The actual aperture or corresponding f number is about $f/8$. This works with most films of ordinary speeds. For poor light or difficult subjects better results are generally obtained by using 'faster' films, like Verichrome and Selochrome.

Now the exposure time required is dependent on the f number of any camera (and the film speed). The f

number of a pinhole camera is very much higher than that of a corresponding box camera and hence the exposure time is also very much higher. If we adopt the box camera figures mentioned as a 'standard' then the corresponding exposure times for our pinhole camera are:—

Average film — exposure time 60 seconds.

Faster film (Verichrome, etc.) — exposure time 30-45 seconds.

This should be sufficient to start with. You will soon find whether you are under or over-exposing and can adjust exposure times accordingly. That is one point where you can score over the ordinary box camera. You can adjust exposure time on a pinhole camera. You also have the advantage that exposure time is not at all critical. You can go over or under without spoiling the picture.

Measuring Time

Now a word about measuring the exposure time. If possible, use a watch to check the time. If called upon to estimate a certain time in seconds, most people usually underestimate and the longer the period the more marked the error in underestimating. If you have no watch, then count the seconds, one by one. Say, fairly slowly, 'one, second, two, second, three, second', and so on. With practice this can be a very reliable guide.

Finally, a further tip on taking photographs with the camera. Since exposure times are long it is important that the camera should not be moved whilst a picture is being taken. Make sure that the camera is resting securely on or against a suitable object before opening the shutter. You will not be able to hold a pinhole camera still enough in the hands to take a satisfactory sharp photograph. (396)

Replies of Interest

Painting a Push Chair

I WISHED to change the metal work on a push chair from red to dark blue. I did this carefully, applying two coats but find the least knock makes the paint chip off. Can you tell me how I can get a good hard-wearing surface? If I glass-paper all the paint completely off, would I need to under-coat it, and after applying the glossy paint, would varnish make the surface more reliable? (R.G.H. — Neasden).

REMOVE the paint and scrape off the original colour as well, then cover the surface with emery cloth to clear away any trace of paint and smooth the surface. Wash over with strong soda water and then paint, when dry, with a pink priming colour.

Finish with colour of the desired shade, preferably a flat paint, and coat with copal varnish or enamel. If a black or silver effect would suffice, there is no need for the pink priming, just apply Club enamel, jet glaze or Berlin black, or for the silver effect, aluminium paint.

Uneconomical

I HAVE heard of a gadget known as a water motor or engine, driven solely by pressure from the water main, and incidentally using very little water. Is it manufactured by any particular firm? I am interested as I live in one of those areas where electricity and gas are hard and expensive to come by. I have a generator which I hope to use as an auxiliary supply, but no prime mover.

The generator is a small 12 V. one and should require only a small force to rotate it. (F.J.B. — Rainham).

THE type of turbine driven from a small stream of water at high pressure, is known as a Pelton Wheel, but it is not very likely that you would be able to obtain one of these in so small a size. A jet of water is directed on to turbine blades of such shape that the water is turned back through 180 degrees, the reaction thereby driving the turbine. In addition to its cost, such a turbine requires water at high pressure, and in fairly large volume. The usual type of 12 V. generator, such as found in a motor car, etc., will require almost $\frac{1}{2}$ h.p. to drive at full speed. It does not appear likely that your mains water supply would be of sufficient pressure, or available in sufficient quantity, economically, to provide such power.

Any little girl would like AN ATTRACTIVE DOLL'S COT

THE doll's cot illustrated is guaranteed to delight the heart of any small girl. With the exception of the two figures of Humpty Dumpty, and the floor, the cot is made entirely of stripwood and dowelling.

Some 16½ins. long, 9½ins. wide and 14ins. high, it is big enough to take a really large doll, yet not so big as to be cumbersome and difficult to store.

Preparing the Rails

Begin by preparing the side and end rails (A) and (C) (two of each), and the four uprights (B). The rails and uprights are drilled as shown by the dotted lines on the design sheet. Take care with this work as it will affect the finished appearance of the cot. The main essential is that each hole should be drilled vertically.

Now trace off the two Humpty Dumpty figures (E) on to suitable wood, and cut them out with the fretsaw. This done, shape the pegs (G) to the section shown on the design sheet and in Fig. 1.

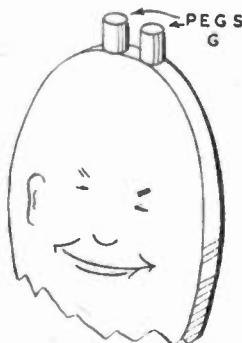
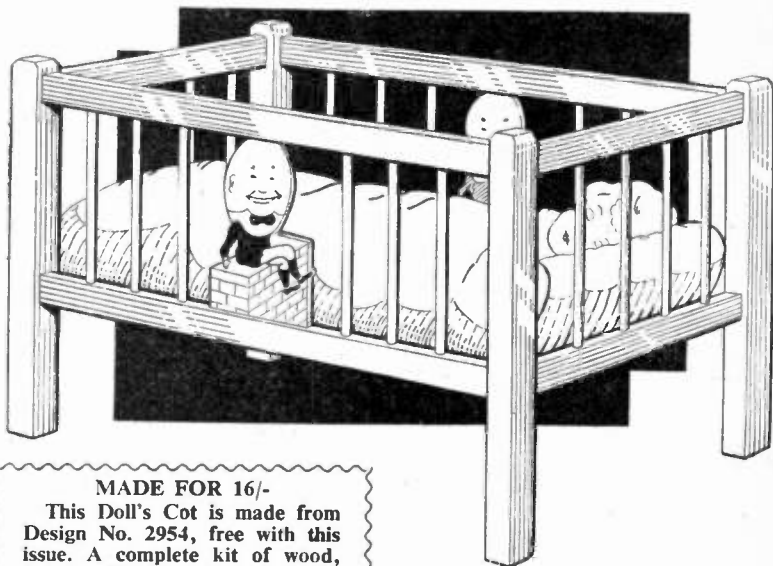


Fig. 1—How the pegs (G) are rounded

Next cut 20 pieces of ¼in. dowelling 7ins. long, with which to build up the two sides and ends. Also cut the 1in. long pieces of dowelling required for fitting the ends and sides to the main uprights. 16 of these pieces will be required. The main side and end rails



MADE FOR 16/-

This Doll's Cot is made from Design No. 2954, free with this issue. A complete kit of wood, and dowelling for making it can be obtained from any Hobbies Branch, or direct from Hobbies Ltd., Dereham, Norfolk, price 16/-, including tax, and post free.

should, of course, be drilled to accommodate part of these small dowel pieces as shown in the detail of the frame joints on the design sheet.

Commence assembly by making up the two sides and ends separately. The ends of each dowel should be coated with glue before insertion into a rail, and the pegs (G) on the figures should be similarly treated.

While the ends and sides are still sufficiently pliable, complete the main assembly to the corner uprights with the aid of the 1in. pieces of dowelling. If the sides and ends are left to harden prior to this assembly, it may be found that, owing to discrepancies in the depths drilled for the 7in. dowel rods, the frames will not fit accurately to the

corner uprights.

When this work of assembly is complete, the whole thing should be properly squared up, using a flat surface for checking, and left to harden thoroughly.

Fitting the Floor

Once the framework is properly dry, the floor supports (D) can be cut and glued and pinned into place. To complete the cot, the floor (F) is cut and either glued and pinned to make a permanent job, or just laid into the framework so that it can be removed for cleaning at any time.

These cots always look well in pastel shades of enamel, and the choice of suitable colours is left to the worker. The Humpty Dumpty figures, of course, should be painted more elaborately, making the clothes gaily coloured to contrast with the red bricks of the wall. The facial part should be pink with the features picked out in black.

ATTRACTIVE BIRDHOUSE

(Continued from page 163)

a small block is placed behind the ornament. This is also useful if the porch strip is not too firm, for a small sprig can be taken up through the middle of the strip into the end of this block, thus making everything rigid.

The sanctuary should finally be painted in bright colours, a red roof with green uprights and green wires

looking well. The finished house is fitted to the top of a suitable post or in a tree with two angle irons. This house looks particularly well if set up among branches, but, of course, it should not be so high as to make the placing of crumbs and other food difficult. Incidentally, always remember that a bird sanctuary should be supplied with water

as well as more solid refreshment. (385)

FRETSAW HOLDER

Here is a useful hint which saves you losing your fretsaw blades. All you need is three or four cotton reels. Glue them together, cut a piece of wood the size of a half-penny and glue this to one end. Put your fretsaw blades in the other end and a small cork to stop them falling out.

Detailed instructions for carving a SET OF CHESSMEN



THE carving of a set of chessmen is an unusual and fascinating exercise and one which is well within the capacity of the average craftsman.

Contrary to common belief, a lathe is not an essential tool for work of this kind and the designs on this page have been specially prepared so that the set of chessmen shown can be made with the simple hand tools normally found in the amateur's tool kit.

Making a Start

Reference to the diagrams will show that the chessmen are made from short lengths of dowelling, some from $\frac{1}{2}$ in. and $\frac{3}{4}$ in., and others from $\frac{1}{2}$ in. and 1 in. dowel. 3ft. of $\frac{1}{2}$ in. dowelling will be needed, 4ft. of 1 in., about 1ft. of $\frac{3}{4}$ in., and about 6ins. or 7ins. of the $\frac{1}{2}$ in. size. These quantities allow for some wastage but are calculated on the assumption that the dowels obtained will be straight, free from obvious faults and usable for most of their length.

The first job is to cut the dowels to a convenient size for working: sixteen pieces of $\frac{1}{2}$ in. diameter, 2ins. long for the pawns; eight pieces of 1 in. diameter, 2 $\frac{1}{2}$ ins. long for the bishops and knights and eight pieces of the 1 in. diameter, 2 $\frac{1}{2}$ ins. long for the four rooks, two queens and two kings. Mark out and score the three lines which ornament the base of each piece, noticing when doing this that the space (a) must be left at the lower part of each piece of dowel to provide a surface by which the piece may be held during the process of carving. The cuts are scored by running a knife edge across the dowel while it is rolled along a level surface. Fig. 1 shows a piece of dowelling correctly marked and cut.

Carving will be facilitated if a cutting block is made on the lines shown in Fig. 2. Any scraps of wood will do for this, but it is an advantage if the end block can be of hard wood. The block can be either secured in a convenient position on the bench or set up in a

vice, but whichever is decided on, it will be found that the block is a safe and efficient aid to the carving work required.

Carving

Fig. 1 shows the way to carve the dowels, and it is a great help to mark the centre point (d) and the carving line (e) on the end of the dowel as shown in the diagram. The carving lines are $\frac{1}{2}$ in. diameter in the case of the pawns and $\frac{3}{4}$ in. diameter for the other pieces. Take the curve out carefully, working the chisel by hand rather than with the mallet, and finish off with glasspaper.

When the work on the dowels is complete, a start may be made on the wooden collars. These are also made of dowelling and are cut, scored with lines and finally drilled out to $\frac{1}{2}$ in. diameter

the pawns and kings, an easy solution lies in making these from a small quantity of plastic wood which can be pressed to shape and fixed in position with glue.

Finishing

When all the component parts are carved to shape they should be finished off by giving a rub down with glasspaper. Saw the pieces proper from the holding parts (a), which have now served their purpose, and glasspaper the saw cut to ensure a nice smooth level base for the piece to stand on.

Glue the parts of each of the pieces together so that they take the shapes shown in Fig. 5, arranging the collars so that they cover the joints between the upper and lower pieces. Leave the pieces undisturbed for forty-eight hours after gluing to allow them to set.

Finishing is a matter of personal choice. If the wood from which the pieces are made is of a suitable colour for the 'white' pieces, or is capable of being stained to the desired shade, the wood can be clear varnished. If, however, the natural shade of the wood is unsuitable, it will be as well to treat the 'white' pieces in the same way as the 'black', namely, by giving them two (or more) coats of enamel of the desired shade.

It is common practice in finishing chessmen to colour the ball on the top of the king and the spike on the top of the queen with the opposite colour to that of the piece, i.e. white on the black pieces and black on the white pieces.

(421)

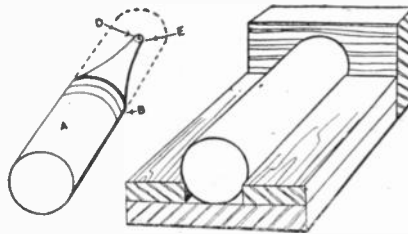


Fig. 1

Fig. 2

for the pawns and $\frac{3}{4}$ in. diameter for the others. Fig. 4 shows what one of the collars should look like. The 'battlements' of the rook can be made in one with the collar.

The upper parts of the pieces are carved to the shapes shown in Fig. 5—the bishops, kings and queens from pieces of dowel and the knights from any suitable pieces of wood available. If difficulty is experienced in carving the balls which surmount the tops of



Fig. 3



Fig. 4

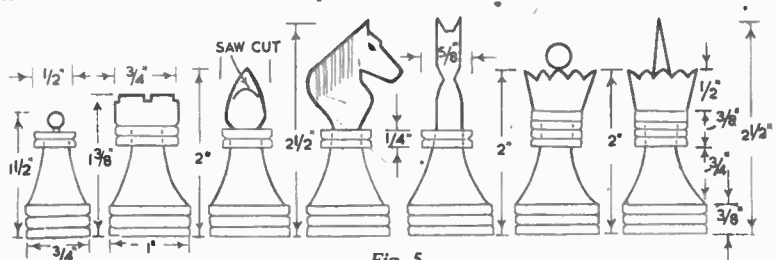
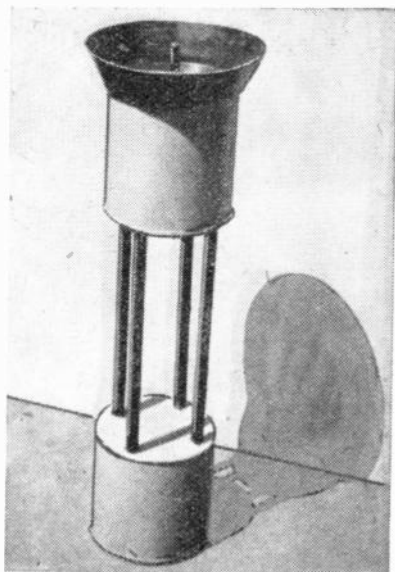


Fig. 5

During the warm days YOU CAN HAVE FUN



The general appearance of a Hero's Fountain

same time, the bigger the apparatus, the more room needed for storing it. The basin, in the photograph, is of comparatively small diameter for this reason. If the basin is made larger, steps must be taken to ensure that the whole apparatus does not overbalance, i.e. by soldering on a special base.

As a matter of interest and for the benefit of those who feel more confident when presented with actual dimensions, it may be stated that, in the model photographed, the main reservoirs were of tin cans $3\frac{1}{2}$ ins. deep and $3\frac{1}{2}$ ins. diameter, and the top basin was 5 ins. diameter. The tubes were $\frac{1}{2}$ in. outside diameter and 7 ins. of them were showing between the cans though, as will be seen, the tubes are actually

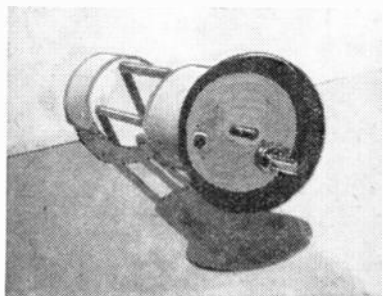
used, though the seams must be soldered.

As already mentioned, the basin and top reservoir form one part, and are soldered together. The basin can well be a round cake tin. The down tube extends from an opening in the basin, right through the upper reservoir, down to a point about $\frac{1}{2}$ in. from the bottom of the lower reservoir. The up tube extends from within $\frac{1}{2}$ in. of the top underside of the lower reservoir to $\frac{1}{2}$ in. of the top underside of the upper reservoir. A study of the diagrams will make this point quite clear.

If old tins are used, the lower one will, of course, need a new top.

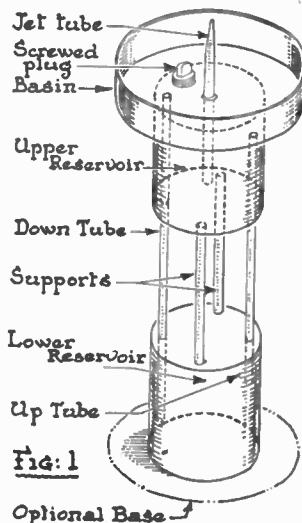
The Joints

It cannot be too strongly emphasised that where the tubes pass through the cans, joints must be water and air



Hero's Fountain showing screwed plug, down hole and fountain tube in top

longer than this. If ready-made tubing is not to hand, metal peashooters can be



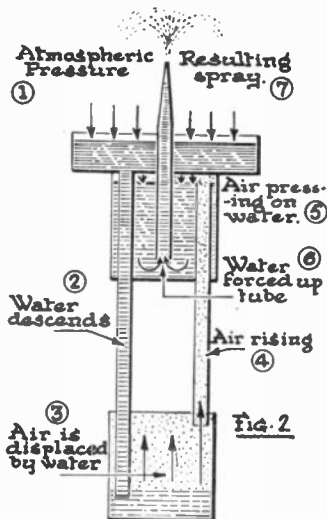
VISITORS to the South Bank Exhibition and the Battersea Festival Gardens have been much impressed, among other things, by the ornamental fountains, and, indeed, fountains have long been a feature in public gardens, squares, etc., all over the country during the summer months.

Whilst it is not at all difficult to arrange for a small fountain in one's own garden pool, it would require a pretty long purse, and would be a decided luxury. We will describe, however, two ornamental 'water works' that can be made chiefly from discarded tin cans by anyone who can use a soldering iron—and that should include every handyman worthy of the name.

Hero's Fountain

The first is a *Hero Fountain*—named after the ancient Greek scientist. The actual appearance of this is illustrated in the photograph, whilst Fig. 1 shows a diagrammatic view of the parts. Readers may remember a simplified version in a recent issue. It will be seen that there are essentially two parts, an upper reservoir and a lower reservoir. The basin at the top is merely an extension of the upper reservoir. Though four tubes are shown, two are merely for support and play no part in the working. The other two tubes can be designated the down tube and the up tube. There is a jet tube as shown, coming from the upper reservoir, whilst an air-tight plug is provided for filling and emptying.

The size of the cans in no way alters the principle of working, though it might be said that the bigger the cans, the longer the fountain will play. At the



The Principle of HERO'S FOUNTAIN

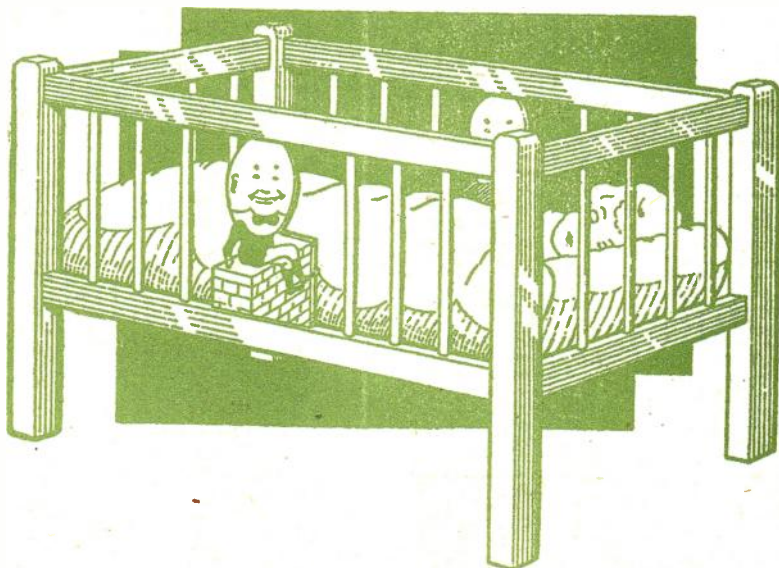
tight, since the whole thing works by air and water pressure.

The jet tube extends from about $\frac{1}{2}$ in. from the bottom of the upper can to a point just above the level of the sides of the basin. This jet will present, possibly, the only difficulty, as it must be very finely drawn. Too open, a tube will give a half-hearted bubbling over instead of a fine spray. The writer, rummaging in his scrap box found and utilised the tapered end of a propelling pencil. The end of a ball-pointed pen (minus the ball) may be tried. It is possible to utilise a fine gas jet, screwed to the end of a suitable tube. Merely for experimental purposes, it is possible to utilise, laboratory-fashion, a piece of

SIZE:
16 $\frac{1}{2}$ ins. LONG.
9 $\frac{1}{2}$ ins. WIDE.
14ins. HIGH.

SUPPLEMENT TO HOBBIES No. 2954.

A DOLL'S COT



PIECE D. SUPPORTS FOR FLOOR. CUT TWO 1 $\frac{1}{2}$ in. SQUARE STRIPWOOD

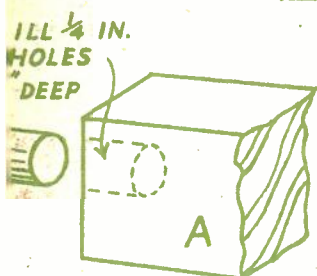
NOTE — This design sheet is only presented free with the current issue of Hobbies and not with back numbers. Further copies may be obtained.

PANELS OF WOOD REQUIRED
FOR THIS DESIGN

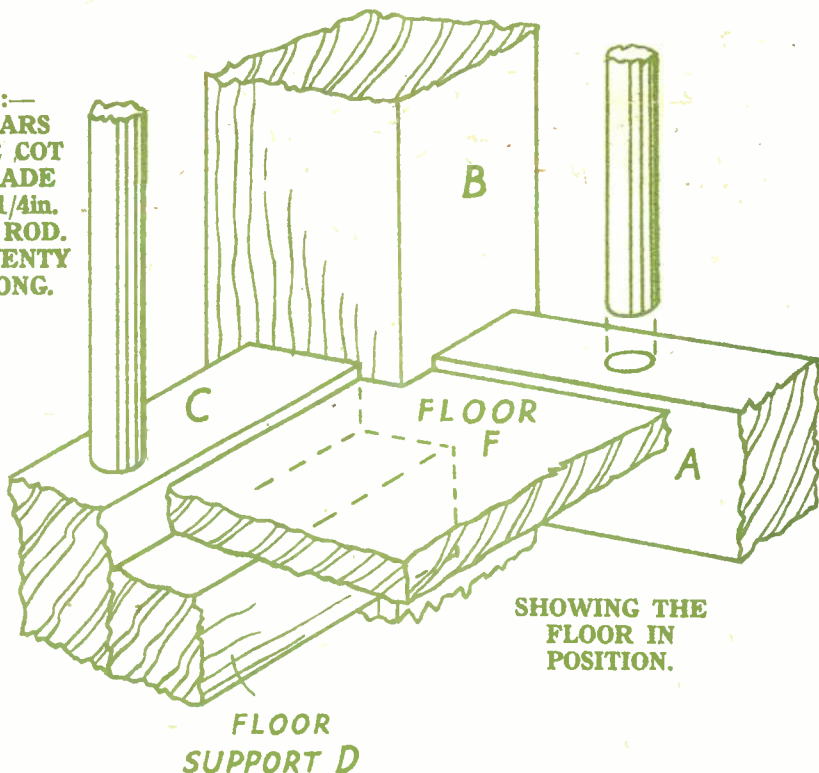
ONE K3 TWO G4

Materials for making this design are supplied by HOBBIES LIMITED, Dereham, Norfolk.
Price on application.

NOTE:—
THE BARS
OF THE COT
ARE MADE
FROM 1 $\frac{1}{4}$ in.
ROUND ROD.
CUT TWENTY
7ins. LONG.



1 $\frac{1}{2}$ IN. PIECE OF
1 $\frac{1}{4}$ IN. ROUND
ROD



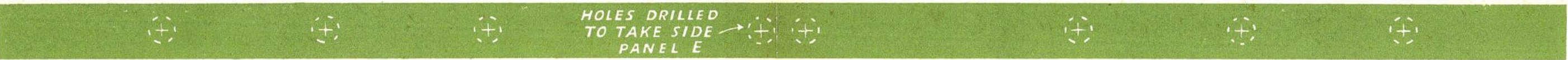
SHOWING THE
FLOOR IN
POSITION.

THE ARROWS INDICATE
THE DIRECTION OF
GRAIN OF WOOD.

FLOOR F. CUT ONE
3 $\frac{3}{16}$ in.

D TO 15 ins.

FULL WIDTH OF PANEL
(APPROX 8 ins)



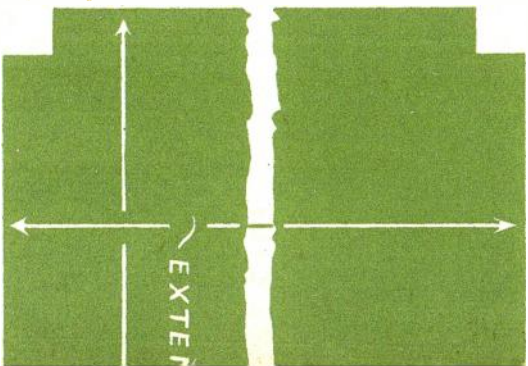
PIECE A. CUT FOUR 1/2in. by 3/4in. STRIPWOOD. DRILL HOLES, AS INDICATED BY DOTTED LINES, TO TAKE 1/4in. ROUND ROD.



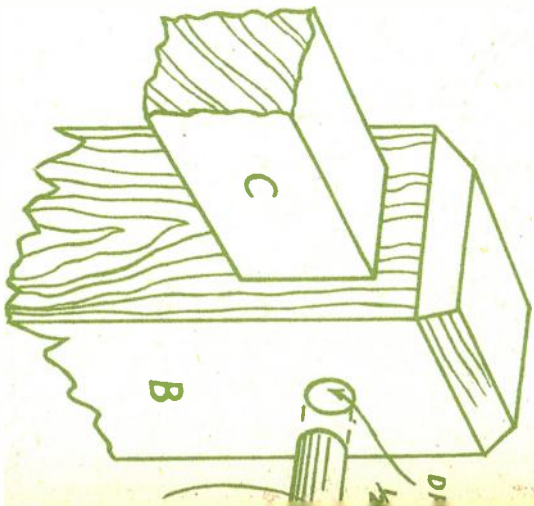
PIECE B. CUT FOUR 1in. SQUARE STRIPWOOD.



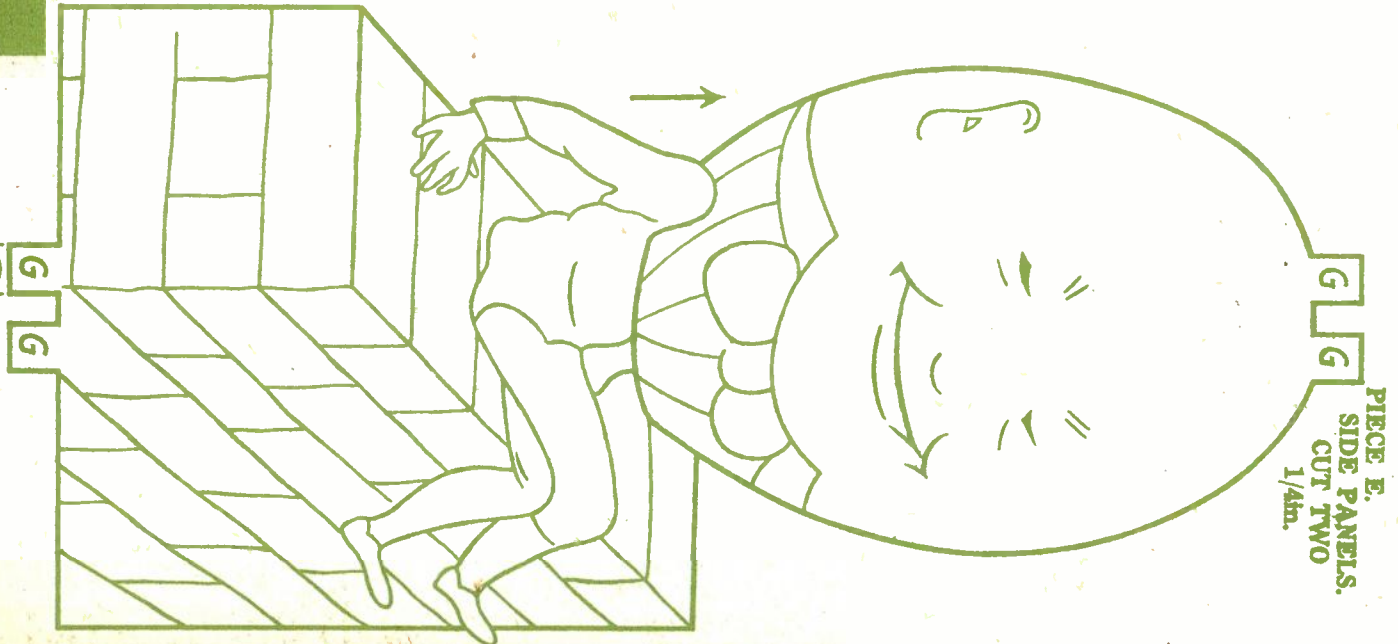
PIECE C. CUT FOUR 1/2in. BY 3/4in. STRIPWOOD.



DETAIL, SHOWING THE FRAME JOINTS.



SHAPE PEGS G TO SECTION



PIECE E. SIDE PANELS. CUT TWO 1/4in.

WITH A FOUNTAIN

glass tube, heated and drawn to a very fine point, and inserted in a rubber stopper, a suitable hole being made for this. The joint here, as elsewhere, *must* be water and air tight. A glass jet, however, would be extremely fragile.

The screwed plug can be obtained at any well-stocked ironmongers or tool shop. It should be well washered.

Provide yourself with a spare tin can of the size used on the model, and also a funnel. Open the top plug and, by means of the funnel, pour in a can full of water. Ideally, the water, at the start, should come up to the level of the top of the up tube. Hence the measure. Now replace and screw down the plug and fill the basin with water. The

drawn off by unscrewing the plug again. The apparatus is well shaken and, preferably, warmed so as to dry off all inside moisture which, if left, will rust the apparatus.

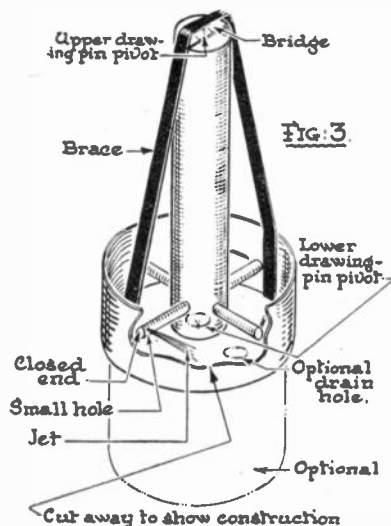
All the outside parts are gaily enamelled, say, in red and blue. Instead of two support tubes, only one need be used, making three tubes altogether instead of four, and these arranged in triangular form.

The model made for this article has been well tested and found to work perfectly well.

The *Barker Mill*, named after its deviser, is a fascinating piece of apparatus which can be made of old tins, though if required as a permanent piece of laboratory apparatus, it is best to make it in a non-rusting material such as zinc, brass or copper.

It consists of two parts: (a) a base, (b) a rotor.

The base can be a cake tin, whilst the main part of the rotor can be a tall tin such as is used to pack carbide, lavatory cleaner, etc. It is closed one end. Near the closed end, four holes are made, equidistantly round, and in these, four short lengths of tube are inserted and soldered. These tubes are capped one

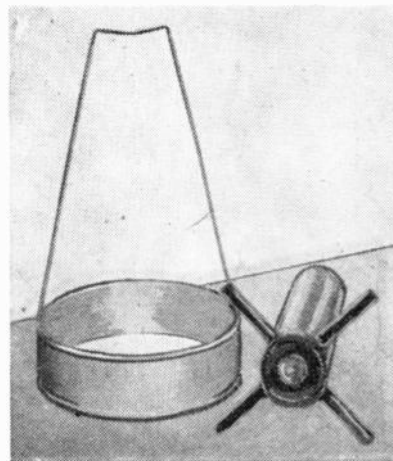


fountain now begins to play, and continues for some time.

How It Works

The reader will want to know *why* the apparatus works. For this he is referred to Fig. 2. When the basin is filled with water, some of it, by gravity and atmospheric pressure, goes through the down tube into the lower can. This can, however, is not really empty. It is full of air, and the descending water forces this air out, up the other tube, and as more water descends, the air, trapped, is compressed a little. It is pressing on the surface of the water in the upper can and when the pressure is sufficiently great, it forces the water out of the upper can by the only escape route—up the jet tube.

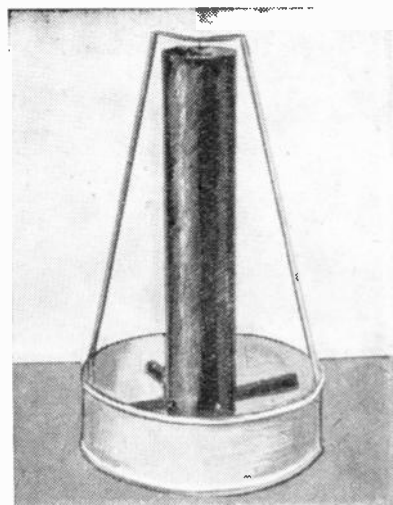
When the 'show' is over, the water is



The parts of a Barker Mill separated, showing the drawing-pin at the bottom

end. Small holes are made in the sides, as shown, in such a way that all face the same way. (Thus, in the diagram, only one hole can be seen). If the can is filled with water, the water can escape only through the hole at the side of the tube ends.

To the bottom of the rotor tube, a large good-quality drawing pin is



How a Barker Mill appears

soldered—one with a substantial head and a steel point, not one of a cheap penny-a-dozen variety. A very slight punch mark is made in the exact centre of the tin that forms the base, to accommodate the aforementioned drawing-pin point.

To the open end of the rotor, a bridge of strip metal is fixed and on this, another drawing pin is soldered, point up. For neatness sake, the head of the pin can be filed to suit the bridge, as shown in the sketch.

A long strip of metal is arranged, as shown, to form a main support. This also carries a punch mark to take the upper drawing pin. It is a simple matter to adjust this main support so that the rotor can spin freely but not fall. In the photo, for example, the top of the bridge is shown bent slightly downwards.

If the rotor is filled with water, the jets of water, pressing laterally on the air, cause the apparatus to spin merrily round, ever faster.

Alternative

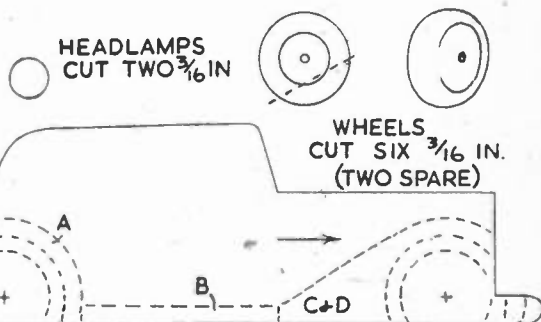
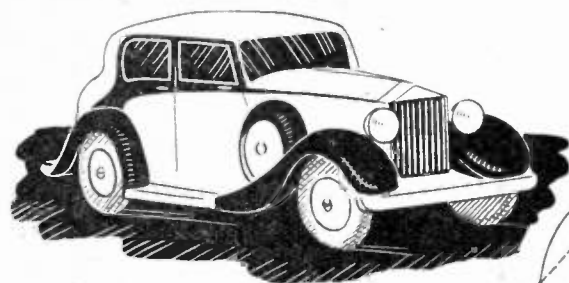
As described, this is a comparatively 'neat' and compact version. Instead of a tin at the base, however, one can have a flat circle of metal. The apparatus can be stood in a sink and a stream of water from a tap directed into the top of the rotor, which would thus spin round indefinitely.

For children, however, the model as first described, is much less sloppy and less wasteful of water. As the sketch shows, it is possible to have a hole in the bottom of the basin, and to stand this over another tin, so that water runs through and is collected in the second basin. It can then be returned through the top of the rotor by means of a funnel.

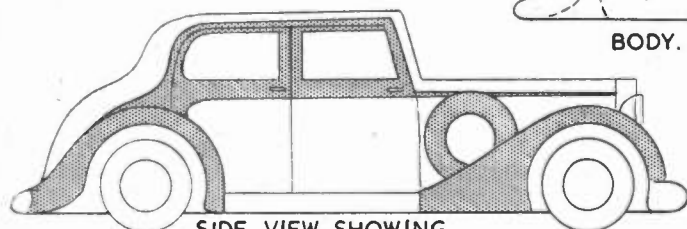
(383)

Another Miniature Toy Car

FROM ODDMENTS OF WOOD



BODY. CUT TWO $\frac{1}{2}$ IN. AND GLUE TOGETHER



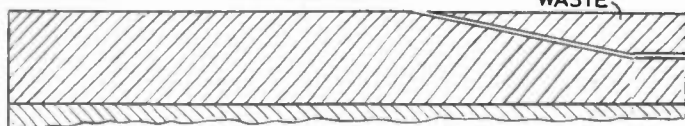
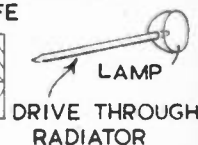
SIDE VIEW SHOWING MARKINGS



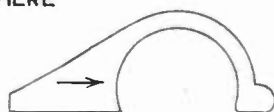
▲ PARE AWAY THIS PORTION WITH A PENKNIFE



CUT HERE SECTION



SHOWING HOW FRONT IS CUT TO MAKE THE CORRECT SHAPE

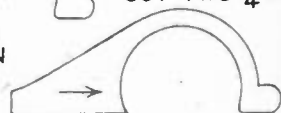
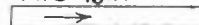


MUDGUARD, D CUT TWO $\frac{1}{4}$ IN.



MUDGUARD, A CUT TWO $\frac{3}{16}$ IN

STEP B CUT TWO $\frac{3}{16}$ IN



THIS small replica of a pre-war car is the second toy in our new series of motor transport. These cars may seem exceptionally small at first glance, but we would point out that to include lorries, coaches, and other large vehicles, we must necessarily keep the scale on the small side. In any case, larger toys take up too much room in the average house.

Cutting Out

The shapes are all shown full size, so all you have to do is to trace them off direct on to the appropriate thickness of wood, using carbon paper face downwards between the page and the wood. After cutting all the parts, glue the two body pieces together.

On the left of the page is a shaded diagram showing how front is cut to make the correct shape. Compare this diagram with the body, stood upright, looking down on it. You will see that it is necessary to cut away a piece from

each side to make the bonnet slope inwards. Cut away the waste portion with a fretsaw.

Mudguards

Glue the shapes (C) and (D) together in pairs, one (C) and one (D). Then cut away as shown in the picture of the finished car. Cut out and shape the rear mudguards (A) and glue them all to the body as shown by the dotted lines. See that the mudguards are nicely rounded and the bonnet and roof shaped slightly. The projecting pieces on the mudguards and body form the bumpers.

The wheels are cut from $\frac{3}{8}$ in. wood, or from $\frac{1}{2}$ in. round rod cut off in $\frac{3}{8}$ in. lengths. Round off the edges to represent the tyres. Two of the wheels (representing the spares) have a piece cut off as shown by the dotted line. They must be shaped slightly to fit the bonnet and mudguard.

If you wish to include headlamps, cut

them from $\frac{3}{8}$ in. wood, shape, and push on to a pin driven crosswise through the bonnet. Push them up close to the bonnet and add a touch of glue.

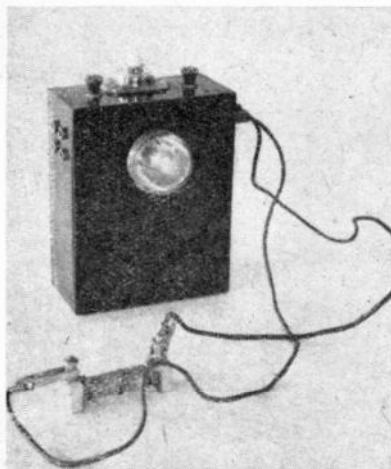
Painting

Windows and windscreen are black and the body colour light grey. Mudguards, spare wheels (which are supposed to be in covers), and markings, could be maroon or black. Bumpers, lamps and radiator would look well in aluminium. Fix the wheels to the body by means of thin $\frac{1}{8}$ in. round-head screws and the car is complete. (424)

PAINT REMOVER

To remove paint from doors, furniture etc., take 1oz. of common washing soda and $\frac{1}{2}$ pint of water. Mix the two and add soda until a jelly is formed. Then put on the article to be treated, and leave for half an hour before wiping away.

You'll find it easy to Make a Battery Test Lamp



The finished tester checking a resistance for continuity by either pressing the push or raising the right hand switch

DURING the blackout of the late war many torches were used which are now lying useless in some drawer. Coming across one some time ago, and having a $4\frac{1}{2}$ volt electric door bell battery, I decided to make a battery test lamp.

The result was interesting, as the battery, bulb and switch can be used together; or the battery and a switch; or just the bulb on its own. All have their uses, and such a tester—if intelligently used — can do almost anything.

About the Case

No attempt is made to give constructional details of the case, as one usually goes one's own way in this matter. The case, however, should have a hinged or detachable back in order to get at the battery and to store the wander leads, plugs, spare bulbs and the odd screwdriver in a compartment

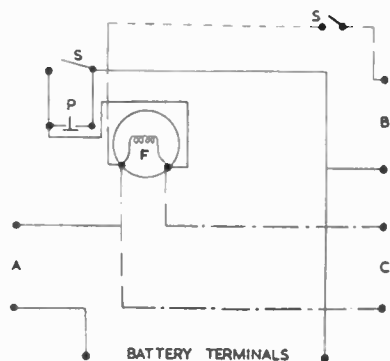
below the battery. In the front of the case a hole is cut with a fretsaw to give a tight fit to the torch case. The only part of the torch which is required is about 1 in. at the bulb end, the rest can be cut

- LIST OF COMPONENTS**
- 1 scrapped torch
 - 1 $4\frac{1}{2}$ volt bell battery—terminal type
 - 1 bell push
 - 2 wireless push-pull switches
 - 2 crocodile clips
 - 6 wireless plug sockets
 - 2 wireless plugs to suit sockets
 - Plywood for the tester case and some wire

off and thrown away. The part of the torch remaining is soldered on to a base plate which is screwed into the inside of the case front, the torch end showing through the cut hole.

Switches and Bell Push

On top of the case the two switches and the bell push are fitted, while at the top of the sides, sink the wireless sockets, four on one side and two on the other.



The wiring diagram, showing the various circuits

An external link, which is removable, should be made to link the pair of



A rear view of the tester with back removed

sockets, which are on the side by themselves.

Now the tester is ready for wiring. The wander leads are made up of insulated flexible wire with a wireless plug at one end, and a crocodile clip at the other. Plug into (A), (B) or (C), attach the clips to the component under test, and we are using the tester.

Invaluable

For testing radio components, car and housewiring, I have found the tester invaluable and just as efficient as many an expensive meter instrument.

WOOD CLEANER

Tea leaves make an excellent cleanser for varnished woodwork. Just soak them in water for half an hour then strain the liquor off and use it for your cleanser.

Some of the Uses of the Tester

- SOCKETS (A).**
1. Continuity tester. With the link removed and using the switch or bell push (which are in parallel).
 2. Torch. With the link in position and using the switch S.

- 3. Lamp, used for signalling.**
Link in position and using the bell push P.

SOCKETS (B).

1. Bulb tester.
2. Condenser or high resistance tester. To be used in series

with a pair of headphones.

- SOCKETS (C).**
1. Testing batteries. Altering the size of the bulbs gives a greater range.
 2. Checking if small voltage circuits are alive. (411)

Mother would appreciate having an AUTOMATIC EXTENSION PROP

MANY ingenious devices have been invented to alter the length of a clothes prop, but some of these are rather cumbersome and often require two people to fix them. The automatic extension prop described in this article is light to use and can be quickly moved to the height required.

When at its lowest position it is 6ft. high and it can be raised by easy stages until it stands 10ft. 6ins., which should be sufficient for any situation.

Two pieces of wood are required—one 6ft. 3ins. long for the top part and the other 6ft. for the lower part; both of which are 2ins. wide and 1½ins. thick. Any kind of wood can be used provided it is straight and free from knots. Make sure that they are both planed up exactly to size, otherwise they will not slide up and down easily.

When giving a final smoothing to the pieces, it is a good idea to take off the sharp corners with glasspaper so that they have a slightly rounded finish. This will aid the smooth running of the prop. Cut a V shaped notch in the top piece to take the clothes line as shown in Fig. 1.

The slot in which the pawl works is cut near the top of the lower section of the prop. The distance is not important but 6ins. is quite a good position for the top of the slot. The side view of Fig. 2 shows clearly the shape and size to make it.

It will be seen that the base of the slot is cut square but the top part slopes upwards so as to accommodate the tail of the pawl when the prop is being raised. The size of the slot on the side where the two pieces slide is about 3½ins. long, while the opposite side is only 1½ins. Make the slot about ¼in. wide, and after cutting this part out with drill and chisel, another cut is made to remove the pointed edge of the top of the shortest side. About ¼in. is cut away but the exact amount cannot be determined until the pawl is made and fixed.

Further reference to Fig. 2 shows that when in use the pawl must be horizontal and this cut away piece acts as a stop and takes the weight of the top of the

prop. Make the inside of this slot quite smooth with glasspaper.

The pawl is cut from a piece of hardwood for preference, and is 3½ins. long, 1in. wide and ¼in. thick. Reduce the thickness slightly so that it moves easily in the slot. Fig. 2 is a scale drawing and shows the shape of the pawl and the exact position for the pivot hole, and your measurements can be taken from this.

A wire nail will make a good pivot for the pawl, and so long as the holes for it in the prop are made fairly tight, it will not need to be riveted or the end bent over. It will be necessary, however,

irons as shown in Fig. 3. It is not important what metal is used provided it will bend up to shape easily without cracking. Sheet iron, brass or copper are all suitable and a good thickness is 16 S.W.G.

Cut two pieces 8ins. long and 1½ins. wide and bend them to fit round the posts. Do not make them too tight a fit nor should they be too loose. If a piece of thin cardboard like a postcard is placed between the metal and the post while bending, it should give just the right amount of freedom. Make the bends as sharp as possible and if necessary these may be filed just a little

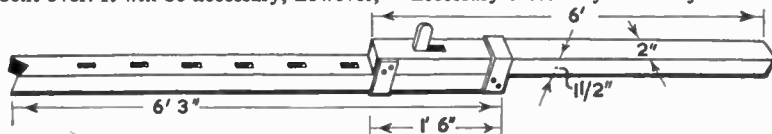


FIG 1

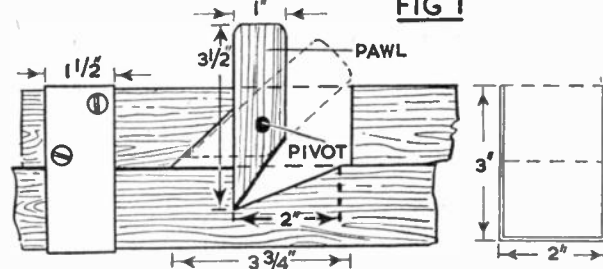


FIG 2

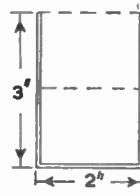


FIG 3

All the necessary constructional details are given in these drawings

to make the hole in the pawl larger so that it may move up and down easily.

The adjustment notches in the top part of the prop are easily cut with a sharp chisel. The drawing, Fig. 2, shows that they are wedge shape and go into the post about half way, and then taper down for a distance of about 2½ins. They may be placed at any distance apart, and this will depend on the adjustment required, but something between 6ins. and 9ins. will be found quite good spacing. Make the width a little more than ¼in. so that the pawl will drop in to the slots quite easily.

There now only remains the job of assembling the prop, and the two pieces are held together by two angle

pieces on the insides to make them smooth.

Two holes are drilled in either side to fasten them to the posts with ¼in. screws, one angle piece being fitted to each post as shown in Fig. 1.

When raising the top piece of the prop it is necessary to lift the projecting end of the pawl in order to let it lock in the slot. In lowering the prop you simply lift the top piece about 2ins. to allow the pawl to drop and then it will slide down by its own weight.

If the prop is to be kept out of doors it is a good idea to give it a coat of paint, or even a coat of varnish to prevent the wood from swelling if it gets wet and thus preventing it from sliding up and down easily. (417)

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DESIGNING AND BUILDING MODEL RAILWAYS

By E. F. Carter

IF the previous constructional work has been carried out thoroughly, there should be no need for the reader to have to worry about the levelness (vertical alignment) of the track, so all his care and attention can be devoted to producing nice flowing curves and 'straights' which are really straight.

This matter of horizontal alignment is not given anything like as much consideration as it needs, and this is one of the major reasons why so many amateur model railways do not look quite 'right'.

Consider the appearance of a length of real railway track as seen from a bridge. If it is supposed to be straight, not the vestige of a wobble can be detected in it; and if it is a curve, then that curve will flow smoothly without any nasty kinks and 'dog-legs'. This is shown clearly in the accompanying picture, which the writer took whilst walking the track.

It will also be observed that there is a subtle sense of simplicity and geometrical perfection which all model railwaymen should try and emulate in their track-work—whatever scale they adopt.

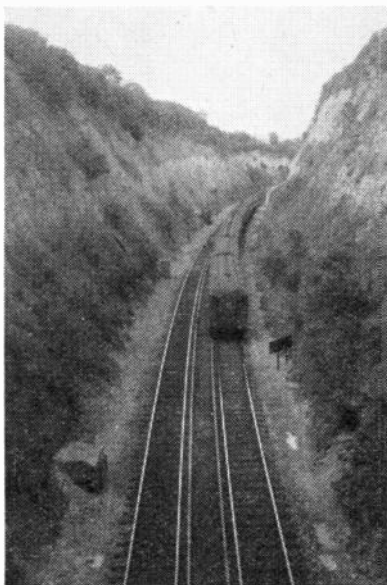
One of the greatest aids to good track-laying is the lavish use of fishplates, which should be fitted to *all* rail-joints. To try and economise in their use spells failure with a capital 'F'. Far too many people regard fishplates as an unnecessary luxury on a model railway, whereas, in point of fact, they are just as important to the building of perfect model track as they are to the laying of the full-sized road. So no economy here, please.

Another matter worthy of mention is that of the desirability of using as long lengths of rail as possible. This applies particularly in cases where a turnout is being incorporated into a straight run of track.

Supposing it is desired to accommodate the junction turnout at a position, say, 6ins. from the end of a 3ft. length of track. This would necessitate the inclusion of a 6ins. length between the straight run and the point. In any scale the use of such disproportionately short lengths of track is always likely to be a

source of future running troubles.

The best way is to use two 21ins. lengths in place of the 3ft. plus 6ins. lengths, and so permit the maximum lengths of rail to be fitted in on both



An example of real track laying

sides of the turnout.

Now as to realism in general track arrangement—after the basic plan has been drawn up. Many readers may think that there is some ultra-cunning way of achieving this extremely desirable feature, but this is very far from the truth. In point of fact, one has only to remember that the older buildings of a town were in place long years before the real railways were laid, and thus, where demolitions could not take place, the line of track was often, perforce,

dictated by the position of existing structures. This is the general reason for the sinuosities of railway tracks in and around our older and larger towns and cities.

If a model railway is designed with such ideas in mind, it cannot help but be more spontaneous and real in appearance. Here is a marvellous opportunity would rationality not be destroyed to provide a straight run for the railway. Or again, a siding road could snake realistically under the side arch of a three-span bridge over the main-line, and thus give the impression that the siding extension was an afterthought, built at a later date than that of the main-line.

Translating these ideas into terms of model railway construction, it at once becomes apparent that a line should rightly deviate at times to clear a church, an alms-house, or other building which would rationally not be destroyed to provide a straight run for the railway. Or again, a siding road could snake realistically under the side arch of a three-span bridge over the main-line, and thus give the impression that the siding extension was an afterthought, built at a later date than that of the main-line.

Little variations like these, from the normal will add greatly to the picturesqueness of a model railway, and there is no need for them to be obtrusive to achieve this end. If during construction, but before the tracks are actually fixed into position, the available stock of stations, buildings, signal-boxes, and other lineside accessories are tried in various positions to see how they fit in with the general scheme of things; a rationally 'right' layout design will be found to come to life almost without any effort at studied planning.

The reader is earnestly advised to pay a visit to his local railway station (if it is not overwhelmingly large) and study the track layout together with the placing of the multitudinous structures associated with a station. If a note-book is kept, and, if possible, a few photographs taken (this is permissible providing you keep to the platforms or over-bridges), the record will be found of inestimable value at home on the model line. (398)

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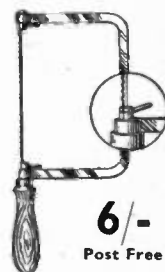
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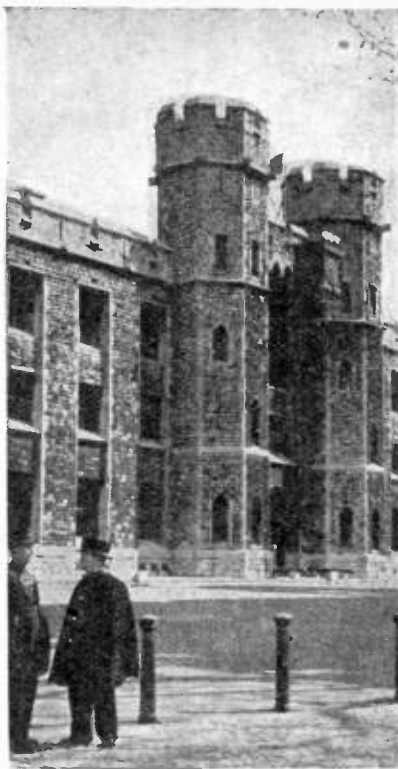
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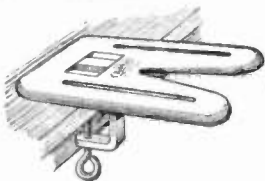
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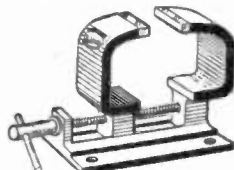
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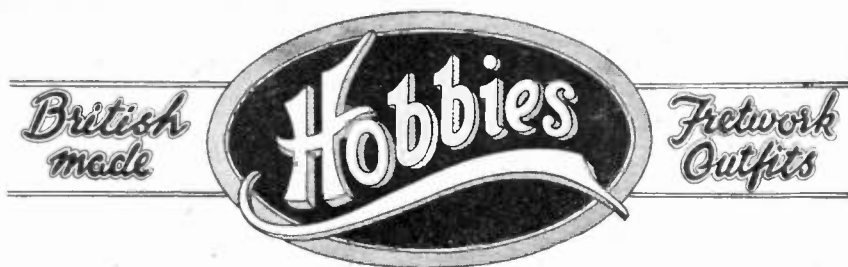


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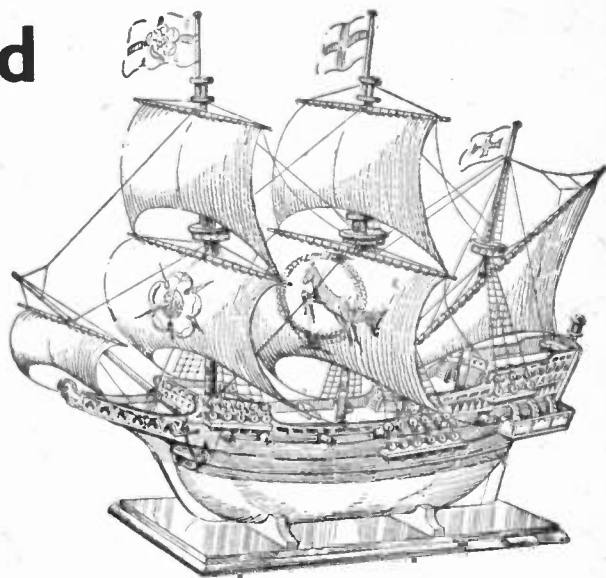
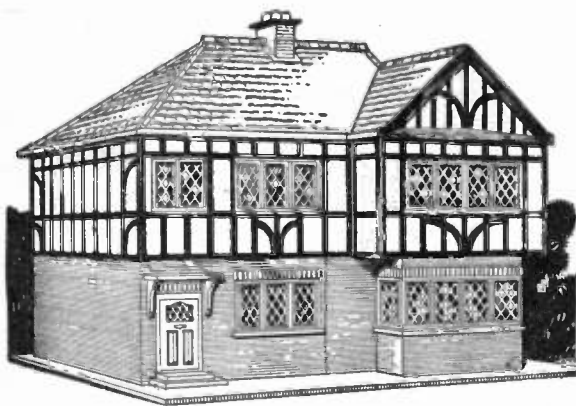
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