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THE ORIGINAL
'DO-IT-YOURSELF'
MAGAZINE

HOBBIES *weekly*

FOR ALL
HOME CRAFTSMEN

Instructions for making . . .

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A TWO VALVE
PORTABLE RADIO

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PAPER SCULPTURE

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FOR ORNAMENTS

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BACK RESTS

(FOR COMFORT ON THE BEACH)



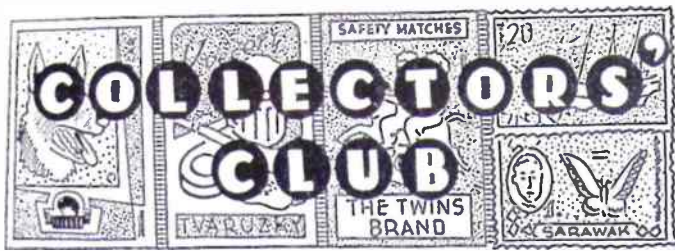
Up-to-the-minute ideas

Practical designs

Pleasant and profitable things to make

World Radio History

5^D



AMONG the clocks frequently found in the home and the shops are the cuckoo variety, and so-called 'Dutch wag-on-the-wall' clocks. These are popular among collectors. They have a long and interesting history, parts of which have never been published.

Many German crafts and industries were disrupted in the period that followed the end of the Thirty Years War in Europe. Particularly affected was the clock-making industry of Augsburg and of Nuremberg, which were famous throughout Europe for their timepieces.

In the Black Forest

Gradually, however, the making of clocks sprung up anew, but in another section of Germany. The industry came to life again in the Black Forest, in that corner formed by the natural boundary of the Rhine River where it flowed southward from Strasbourg to Basle in

Switzerland and then eastward to Lake Constance. It was in this region of the Schwarzwald or 'Black Forest', that clock-making began as a country craft at the turn of the eighteenth century. It remained no more than a craft of the countryside for more than a century and a half.

The clocks produced were of primitive workmanship, made by the farmers during the long winters, working with simple tools in their own homes.

The materials at hand were employed in the construction of the timepieces. The greater part of the clocks were constructed of wood, which could be worked easily and was inexpensive. Oak was used extensively. Different individuals specialized in specific aspects of the craft. One man might be skilled at cutting wheels and he devoted himself to that alone. Another would be skilled at painting the dial plates, etc.

The farmer-clock-makers were not progressive, and the style and mechanical

features of their clocks did not change over a long period. Consequently, the Black Forest clocks remained as much as fifty years behind the times, while innovations in timepieces and improvements were being made elsewhere in Europe.

The earliest of the Black Forest clocks were of the simplest construction. The clocks were all weight-driven, with a foliot in the form of a wheel with a heavy rim. The weight drum carried a wheel of 108 teeth which drove another wheel for the hour hand by means of a pinion of four leaves on a wheel of forty-eight teeth. The drum's wheel also drove the escape wheel of forty-five teeth by means of a pinion of six leaves. These early escape wheels were carved from wood with a ring of pins on one face close to the axle, serving as teeth for the verge pallets.

CLOCKS—1

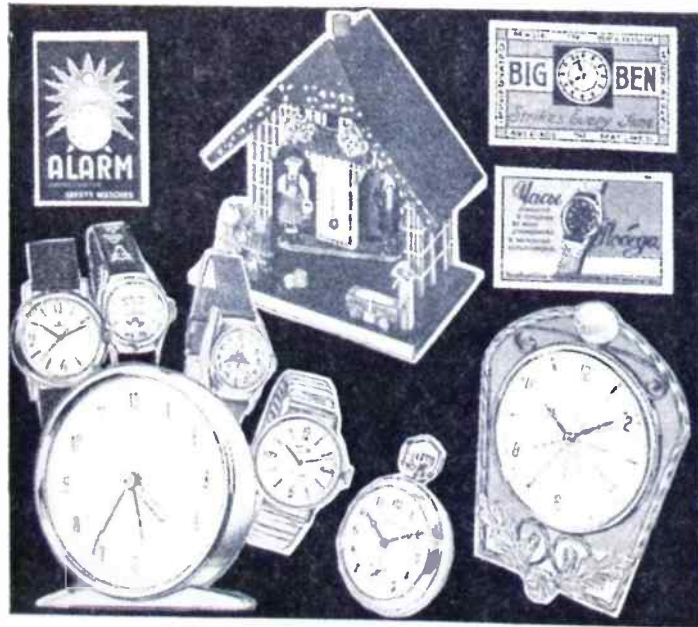
The pinions were made of iron pins wrought by hand. The weights at first were smooth stones collected from the river beds, suspended by cords. The dial and front plate was a thin sheet of wood, shaped only to a degree. The front was painted with the chapter ring and hour numerals in water colours and the corners were decorated with floral motifs popular among the peasants. As the industry developed, the painting of the dials became a craft apart. Although the artists were generally untrained, many of their products had definite merit.

As early as 1667

Tradition relates that the first Black Forest clock was produced by a man named Krewz who lived near Furtwangen. There is record of a clock made locally that was owned by a parish priest in Neukirchen in 1667. Still another legend states that a wood carver of St. Maergen copied a clock that had been brought into the region by a glass peddler in 1685. The facts are lost in the mists of time, and all that remains in the way of evidence indicates that clock-making began as an industry about 1700.

Clocks are depicted on many match labels and cards — see illustrations.

Barry Hayes is now known to many readers of *Hobbies Weekly*; his father is an expert on clocks. So if you need a good pen friend or advice on this subject, write to — Mr William Hayes, 2 Fourth Avenue, Slade Park, Headington, Oxford.



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A TURBINE TOP



LOW air pressure is responsible for the terrifying destruction wrought by a tornado. This is due to the fact that the pressure within a gas or liquid in motion is much less than the pressure inside the same fluid, when static. Consequently, as the raging 'twister' spirals upwards, a partial vacuum is produced, into which the force of normal atmospheric pressure pushes all manner of heavy objects, including trees and large buildings. A simple scientific toy, which you can make up very quickly, will enable you to prove for yourself the theory of the tornado.

The turbine-driven top is constructed from thin, though fairly stiff, cardboard. Mark out a circle having a diameter of 4 in. Cut out six little cardboard rectangles measuring 1½ in. by ½ in., and fold these longitudinally down their middles to make six angular tabs, which will serve as vanes for the turbine.

Glue the six vanes evenly round the diameter disc, being careful to fix them in positions pointing obliquely outwards towards the circumference as in the diagram. It may be advisable to draw concentric circles upon the disc, with radii of 1½ in. and 1¼ in., in order to provide guide lines for the proper placing of the vanes. Thus the leading and trailing edges of the vanes will just touch the outer and inner circles, respectively.

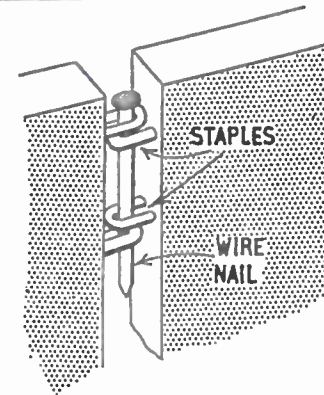
Cut out a small disc, from thick cardboard or balsa wood, and glue this to the centre of the underside of the large disc, and force a pin through the middle of the turbine, to provide a spindle for the completed top.

Remove all traces of the paper labels from a cotton reel, and test your toy, as follows: Place the top upon a smooth table or plate, and hold the cotton reel lightly against the cardboard surface, in such a manner that the pin head will be inserted in the hole in the reel. Blow through the cotton reel until the top is spinning rapidly, then, whilst continuing to blow hard, lift up the cotton reel. The rapidly spinning top will be lifted with the reel, as if by magic. Stop blowing, and the top will fall on to the table, where it will keep spinning for a while.

When you blow into the cotton reel a partial vacuum is produced over the surface of the top, and the pressure of the atmosphere, which acts upwards on the underside, forces the rotating card against the reel. The same flow of low pressure air drives around the turbine vanes and so spins the top.

This difference in pressures will explain the partial vacuum over an aeroplane's wings which helps to lift the machine into the air, and the antics of a ping pong ball supported upon a jet of water, used as a rifle target in a shooting gallery. (A.E.W.)

STAPLES FORM A MAKESHIFT HINGE



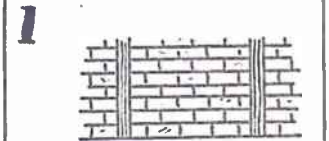
A TEMPORARY hinge may be constructed from four staples and a wire nail, as seen in the sketch.

Insert two staples to form one side of the hinge, mark off with a pencil, and insert staples for the remaining side. Drop the nail in position and add a drop of oil. The hinge will work quite smoothly. (M.h.)

TWO MINUTE QUIZ

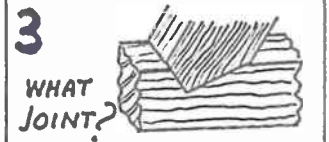
by Ed Capper

Answers on page 246

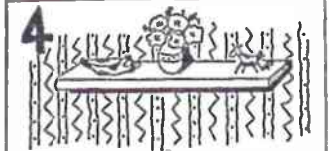


1 NAME THE BRICKWORK BETWEEN TIMBER STUDS.

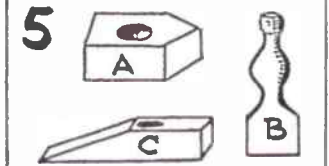
2 HOW MANY LINES ARE THERE IN A BRITISH TV PICTURE?



3 WHAT JOINT?



4 NAME THE UN-SUPPORTED WALL-SHELF.



5 WHAT HAMMER-HEADS?

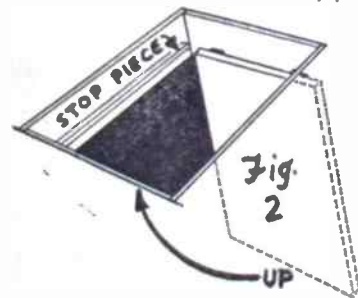
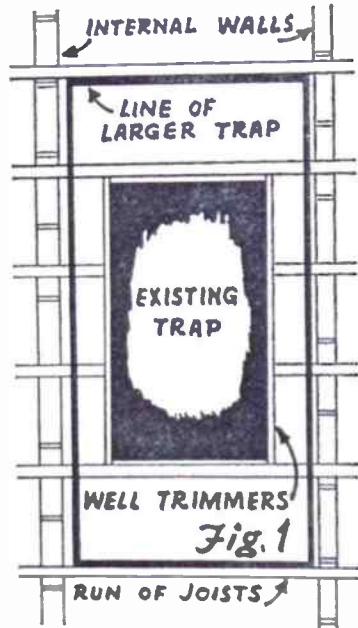
REPETITION WORK

When marking out items of joinery and all the pieces are similar in shape, make a pattern first and mark out the repeats from this original. This prevents cumulative errors being carried throughout your work.

IS your trap into the attic large enough to pass furniture through it? Most likely it is not. On the other hand you will not need a trap so large that a 6 ft. wardrobe can be passed through. The decision to make is whether you want a 'comfortable' trap or a perpetual tight-squeeze, with all its disadvantages.

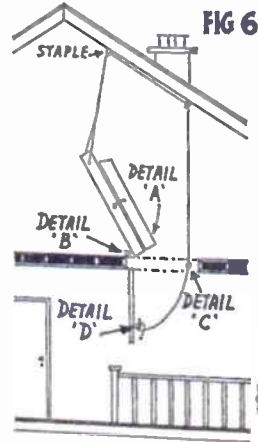
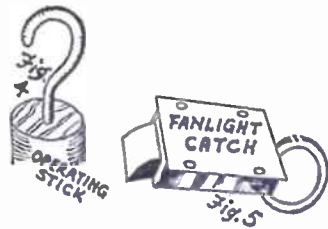
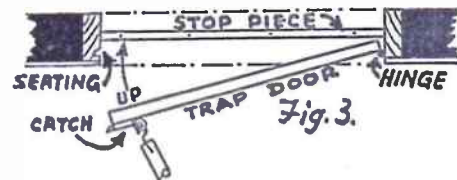
2—The Trapdoor and Loft Ladder

Enlarging the trap is a comparatively easy job. Fig. 1 shows a plan from the attic side, looking down. You will see that the joists have been cut where necessary and enclosed with trimmers, usually of 1 in. thick timber. You will note also, that the trap has been wisely sited between internal walls that are not



very far apart. This is a safety measure, ensuring that the cut joists do not overhang the support of a wall top for more than is necessary.

The trap can usually be extended in both directions by cutting back still further the already cut joists and ex-



tending in the other direction to the next pair of joists, as shown by the heavy black outline.

It can be a messy job due to the plaster being disturbed. To minimize this, first nail a surround of 2 by 1 in. battens, on the ceiling below, occupying the rectangle to which you wish to extend the trap. This surround will hold the plaster whilst you cut away the joists, preventing repatching later. It also acts as a guide for the sawing.

New and longer trimmers will have to be fitted, and an enlarged trap door made. The latter can be constructed from a framework of 1 in. square batten, with cross supports and faced with a sheet of hardboard.

The trap door Usually the trap door into the attic is one of two designs, i.e., a sliding door that is pushed away inside the attic, or a hinged door that also opens into the attic. Seldom is a door found that is hinged to hang downwards, yet this will be found to be the most useful.

To open most of the doors, a chair or steps must be used to enable you to reach it. A door that can be opened downwards without aid is much preferable, even if you do not intend to build an attic room.

Fig. 2 shows the arrangement of a downward door, whilst the operation of it is shown in the section at Fig. 3. The door is hinged with twin butt hinges, towards the bottom end of the trimmer piece. It is held in a level position, when closed, by abutting on to twin stop pieces, nailed at the correct position along the trimmer.

The door is held by a fanlight catch of the type shown in Fig. 5. Pulling the ring downwards pulls back the catch. The four holes on top are screw-fixing holes.

The catch must locate into a seating, cut in the side trimmer piece, as shown in Fig. 3. It should be cut to the form of the plunger on the catch.

A simple operating stick to reach the catch without the necessity of standing on steps is shown at Fig. 4. It consists of an ordinary shelf hook screwed into the end of a broom handle.

Rope and pulley

Perhaps the easiest loft ladder to construct is the rope and pulley type, especially if you are content with build-

ing only a non-habitable attic room. It can be made even simpler by providing a solid ladder instead of the hinged type, as shown in Fig. 6.

The ladder should be made of at least 6 by 1½ in. planed timber. The steps should be rebated into the sides and firmly held by gluing and screwing. Its length should be such that it slopes at an angle of around 15 degrees when in use, and that it extends into the attic by at least 1 ft. Remember to cut the foot of it at an angle, so that it rests firmly on the floor when in use.

In making the hinged type, the ladder should be cut between rungs and hinged with at least 4 in. long leaf hinges, as shown in Detail A. It is hinged on the back slope or the opposite side to which you tread when mounting the ladder. This type of ladder is perfectly safe if hinged this way, the two cut edges pressing against one another. When folded, the ladder should be held together with a clasp and hook.

To ease the operation of hoisting and lowering the ladder, a roller is fitted near the well opening, as shown in Detail B. A metal roller is preferred to wood. It revolves on an axle made by a dowel of steel, passing through the top hole of an ordinary metal bracket. The return end of the bracket is screwed to the top edge of the nearest joist.

Use sash cord for the rope. It should be anchored to each side of the ladder top with a knot and hole fixing. A short length of the cord should be added to the main length by binding to give the required twin hold.

The cord passes through a pair of heavy duty staples, driven into the roof rafters. Alternatively, pulleys can be screwed into the rafters. The cord then drops down with sufficient length to reach the floor of the landing below.

When hoisted, the ladder should come to rest just below the level of the roller. If it passes beyond the roller it will swing into the attic space, causing much annoyance whilst it is recovered. To control this resting position, tie a knot in the cord, large enough to foul the staple immediately above it, so that the rope comes to a stop with the ladder resting in its correct position.

The free end of the rope is anchored, as shown at Detail C. The rope is forced apart, a metal eyelet inserted and held in place by binding the rope with thread on either side of the inset. The eyelet then locates over a shelf hook, screwed into the well trimmer piece. The remainder of the rope is kept tidy, as shown in Detail D, being wound around a large hook screwed into the trap door.

Next: A retractable, counterbalanced ladder.

A Magnifying Glass from Oddments

IT often happens that a piece of useful apparatus such as a magnifying glass, which costs quite a deal of valuable pocket money can be made from odds and ends found in the home, at no cost at all.

To make a magnifying glass take a

By E. Capper

strip of grease-proof paper, ½ in. wide, and roll it in a band around an ordinary round pencil. Let it encircle the pencil twice; then run a wisp of glue along the open edge and stick it down firmly.

When the glue has set, slip the paper band from the pencil, as carefully as you can, so as not to disturb the circling. Now take a small square of glass and place it across two boxes or something similar, so that it rests 4 to 5 in. above the table level. It is very important that the glass lies level.

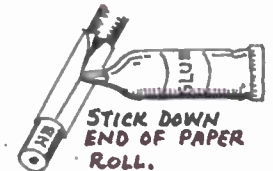
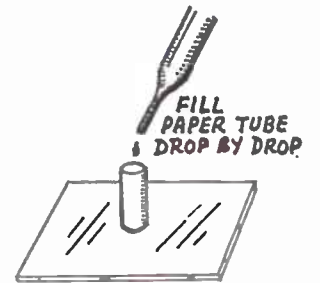
Now stand the paper band you have made centrally on the glass, end on, and with a fountain pen filler or an eye dropper, carefully fill the paper tube with clean water. Take your time over this operation, for you do not want water on the outside of the tube; therefore fill it drop by drop.

When the tube is full, add another drop of water, wait a few moments and then add another. You will see the surface of the water take on a convex shape, due to 'surface-tension'.

When a definite convex on the surface of the water is visible the magnifying glass is ready for use. On another and smaller sheet of glass (because it has to slip in the space between the two boxes supporting the top glass), place an object which you want to see enlarged, and slip it directly under the tube of water.

By looking down through the tube of water, and adjusting your sight accordingly, you will be able to see the object magnified at least three times its size.

Small insects, such as flies, show up very well under the glass, and fingerprints come out remarkably well.



BACK RESTS FOR BEACH COMFORT

IDEAL for the summer holiday by the sea or the week-end picnic, this back rest provides just that extra little bit of comfort. It folds flat and is,

therefore, easy to carry or to stow away in the car. If extra canvas is allowed for, as suggested, it also provides a dry seat on the sand or grass.

The side view in Fig. 1 and the front view in Fig. 2 give the main overall dimensions. Note that the rail A will be long enough to allow B to fold between.

Commence by making the frame shown in Fig. 3. Pieces B are of 1 1/2 in. by 3/4 in. wood, and pieces D of 1 1/2 in. square. Glue and pin them together, and round off both pieces D.

The second frame (Fig. 4) consists of two pieces A of 1 1/2 in. by 3/4 in. wood and a piece of 3/4 in. diameter round rod C. Glue them together after boring pieces A to take the round rod. A stronger joint will result from wedging the round rod at the ends. The two frames are now pivoted together by means of two round-head screws.

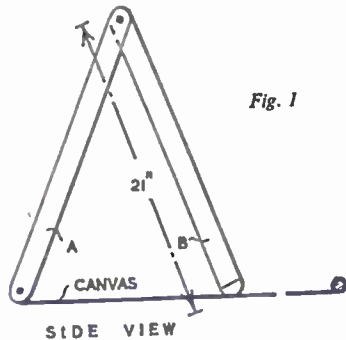


Fig. 1

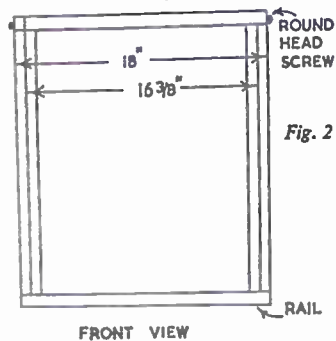


Fig. 2

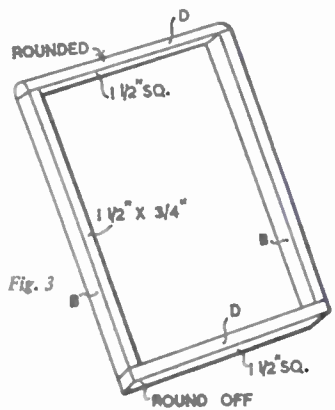


Fig. 3

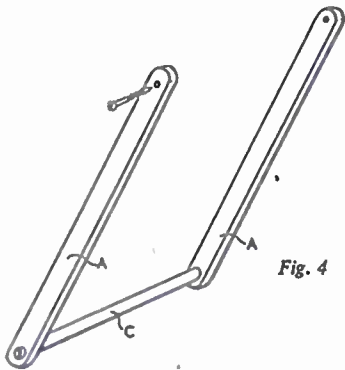


Fig. 4

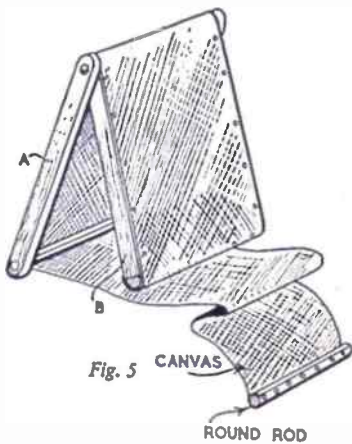


Fig. 5



The canvas should be about the same width as the smaller frame (Fig. 5). It is tacked underneath the lower rail D, then tacked along pieces B and also along the back of the top piece D. Without further tacking to the frames it is brought down and under to finish off at the front, as shown. The end may be tacked to a piece of round rod, or may be left plain.

It is used in the position shown in Fig. 5, with the loose canvas pulled flat and forming a mat on which to sit.

Finish off by giving all woodwork two coats of brush polish or varnish. (M.h)

• Continued from page 248

AIDS FOR PHOTO ENLARGING

the paper you may produce an image of the wire! A few experiments will quickly indicate what is required and how to handle these simple accessories.

Quite often we find that the sky or distant landscape does not print out as clearly as the remainder due to different exposure values between near and distant subjects, but these methods of 'dodging' will help. You may either use the accessories described, your hands or a rough piece of card cut to match the horizon line, giving more exposure to the sky areas of the picture. Remember to keep the paper moving in something of a circular fashion all the time, making the two areas blend together so that the control cannot be detached.

A further instance may be quoted where it is desirable to suppress conflicting interests. This can be achieved by darkening the areas immediately surrounding the subject. In such cases we prepare a suitable mask to shade the subject, allowing additional printing exposure to darken the remainder. It will be apparent that this may be carried so far that the background is entirely black, but more often than not it is sufficient to print a little darker.



DISPLAY SHELVES FOR M & W



 * Those amiable funsters, More- *
 * cambe and Wise, practise their *
 * ready wit on Ed. Capper, who, *
 * nevertheless, succeeds in giving *
 * helpful advice. *

Wise exploded: 'Hunting trophies? — what hunting trophies?' he spluttered.

Morecambe smirked: 'Are you kidding?' he asked.

I knew I would have to be firm. 'Do I gather you want to make some display shelves?' I said.

'Yes, from wood and with a hammer and things' was the reply.

I gave up. The next day I sent some advice to the famous comedians, through the post.

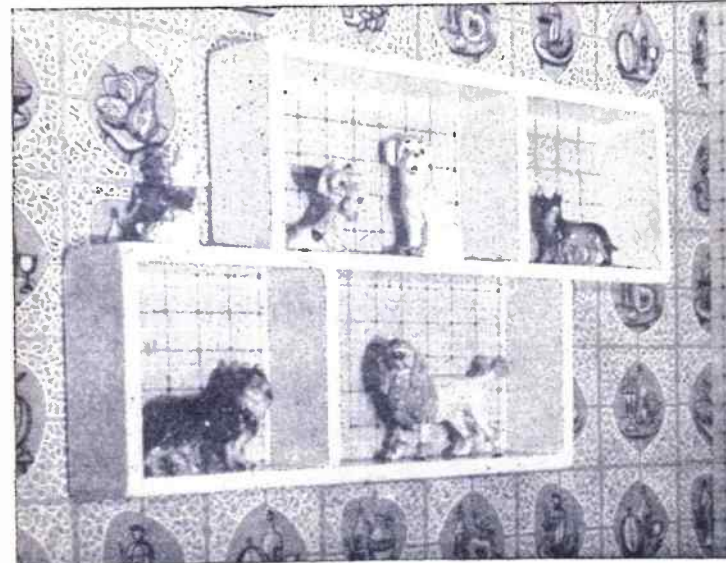
Contemporary display shelves need to be simple; the simpler the better. They should house a certain collection of keepsakes, not bits and pieces. The unit shown in the photograph is within the scope of any handyman.

The top and bottom horizontal pieces are of the same length, as are all the verticals. Timber used is 4 by 3/4 in. planed deal and butt joints can be used throughout. A back piece of 3-ply or hardboard keeps the framing firm and square.

The staggering of the compartments means that no complicated joins are used; there is space to nail everything together. A refinement is to round all the edges on the front. Nail heads should be punched below the surface and the holes filled with wood filler.

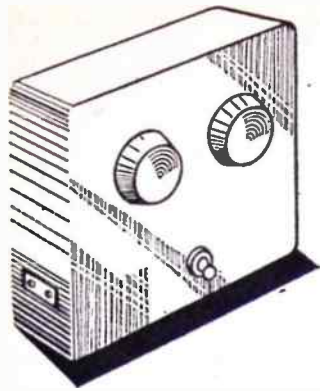
The finished unit looks best gloss-painted in white or off-white. It is fixed to the wall with screws, through the back piece and into Rawlplugged holes. The backs of the compartments should be papered or painted. If papering, use a vivid colour. Incidentally, the paper will conceal the heads of the fixing screws. If you prefer painting, again use something startling. A modern effect is obtained by painting the back of each compartment a different colour. It will look very old-fashioned if you paint the complete unit in one shade.

Another pleasing effect is shown in the photograph. The compartment backs have been papered with the contrasting paper used in the main decoration of the room.



Next week's free design will be for making a marquetry picture entitled 'Pansies', featuring a bunch of flowers, executed in brightly coloured veneers. Make sure of your copy.

A TWO-VALVE PORTABLE SET



inserted in either holder. The same type of output stage valve is fitted as in the detector stage because this needs less current than the various larger power output valves.

Valveholder wiring

The two valveholders are mounted on a small wooden chassis, or strip of wood

By 'Radio Mech'

about 3 in. by 1½ in., which is afterwards fitted behind the .0003µF variable condenser. Clearance holes can be cut for the valveholders with a fretsaw, and the holders are then screwed with the pin sockets in the positions shown in Fig. 2.

Thin insulated wire, such as single

The two leads which will go to the output sockets should not be soldered to these sockets until the socket strip has been screwed to the case. The portion of the receiver in Fig. 2 is fitted with two small brackets, when completed, so that it can be screwed inside the case.

Ferrite rod aerial

A ferrite rod 5 in. long and ¾ in. in diameter will be suitable, and two pieces of wood about ¾ in. by 1½ in. have ¾ in. diameter holes bored in them, so that they serve as mounting brackets for the rod, as in Fig. 3.

The windings are of 28 S.W.G. cotton-covered wire, but 30 S.W.G. is also suitable. Cotton-covered wire can be wound directly on the rod, but if enamelled wire were used instead, this should be wound on brown paper

plenty of turns to begin with, and reduce those on the larger winding, as necessary, until the receiver covers about 200 to 550 metres. If reaction is too violent, causing oscillation which is difficult to control, the number of turns on the small winding should also be reduced. If no reaction at all is obtained, this shows that the connections to leads 3 and 4 are reversed, or the small winding has too few turns, or is too far from the large winding.

Containing case

This needs to be about 5½ in. by 4½ in. by 1½ in. inside, so if ¾ in. thick wood is used, the bottom can be 5½ in. by 1½ in., the top 5½ in. by 1½ in., and each side 4½ in. by 1½ in. The front, 5½ in. by 5 in., is fixed with glue and panel pins.

Fig. 3 shows the inside of the receiver, seen from behind. The aerial is mounted as explained, the wooden brackets being fixed with adhesive. Lead 1 goes to the fixed plates tag of the tuning condenser, to which is also joined the .0002µF fixed condenser. Lead 2 goes to the moving plates circuit of both variable condensers, which is also the filament negative line. Wire 3 is taken to the fixed plates tag of the .0003µF reaction

condenser. Lead 4 should be long enough to go to the detector anode, shown in Fig. 2. When connections to the chassis are complete, the latter is fixed with two small screws through the brackets.

There is sufficient space in the receiver for an air-dielectric tuning condenser, provided this is not more than 1½ in. deep, and about 2 in. square, including the sweep of the plates. For reaction, however, there is only enough space for a solid-dielectric condenser, and there is no advantage in fitting an air-spaced type here.

Both condensers should have fairly large knobs, a pointer or scale being necessary with the tuning control. Small knobs are difficult to adjust carefully, because both tuning and reaction are critical, especially with weak stations.

Batteries

The two cells are removed from their card tube, and the zinc cases form the negative connection. A clip is made from aluminium or other metal, and fixed across the cells, as shown in Figs. 3 and 4. A piece of wood is glued to the inside of the case, as in Fig. 4, so that a screw will have plenty of grip without penetrating the front. The L.T. negative

COMPONENT LIST	
.0005µF	tuning condenser with knob.
.0003µF	reaction condenser with knob.
	On/off switch.
Two 1S5 valves,	or equivalents.
Two B7G valveholders.	
.0002µF	fixed condenser.
.01µF	mica fixed condenser.
.1µF	150V. or similar fixed condenser.
1 megohm resistor	(brown-black-yellow).
25 megohm resistor	(red-green-yellow).
Two 5 megohm resistors	(green-black-green).
	Or near values.
Ferrite rod, wire, etc.	(Home Radio [Mitcham] Ltd., 187 London Road, Mitcham, Surrey).

lead, from the filament negative circuit, is held under the head of this screw.

A long bracket cut from thin metal is screwed to the case, a lead from one screw going to the on/off switch, as in Fig. 3. The cells are so placed that their brass caps press against this bracket. The lead from the second switch tag goes to the filament positive circuit, in Fig. 2.

The two 22½V. batteries are joined in series with a short wire, as in Fig. 4. The positive and negative leads from the receiver are then soldered on, and a clip made from thin metal is screwed to hold the batteries in position.

More than 1½V. must never be used for the valve filaments. Two valves of the type mentioned are inserted in the holders. Medium or high impedance phones are fitted with small plugs, which will fit the sockets on the receiver.

Using the set

With a circuit of this kind tuning is sharp, so that the tuning knob needs to be adjusted slowly. The reaction condenser should be slowly closed until the set is almost oscillating. This will be apparent because the receiver will be at its most sensitive condition. For best reception, especially of weak stations, the reaction knob should be adjusted in conjunction with the tuning. Turning the reaction too far will cause poor reception, and the set will oscillate as it is tuned past a station.

If reaction is unsatisfactory, due to a different aerial being wound, this can easily be corrected as explained. That is, reduce the number of turns on the small winding, or move it away from the large winding, until smooth reaction is achieved over the whole waveband.

A ferrite rod aerial is slightly directive, so if the volume of a weak station is insufficient, the receiver should be turned round for best reception. The receiver case does not need to be standing vertically (as with a frame aerial), but it should not be placed on one side, so that the rod stands vertically, or reception will be poor.

A back, cut from thin wood, is attached by four small screws. A handle on top of the case will allow it to be carried easily.

THIS receiver runs from small dry batteries, and the current taken is very small. For filament supply, 1½V. will be needed. Ordinary torch battery cells are suitable, and as such batteries have two cells, both are used, connected in parallel with a clip. Each of these cells is about ¾ in. in diameter, and 1½ in. long, as used in a twin-cell 3-volt 3 in. by ¾ in. popular torch battery.

For H.T., 45V. will be necessary, and

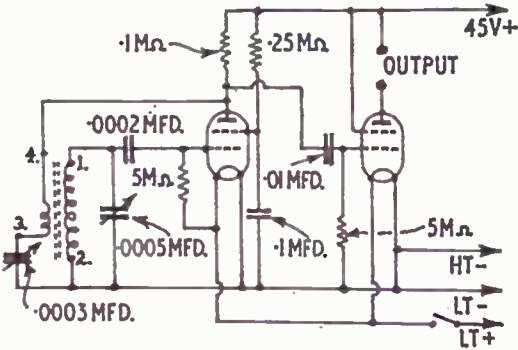


Fig. 1—Receiver circuit

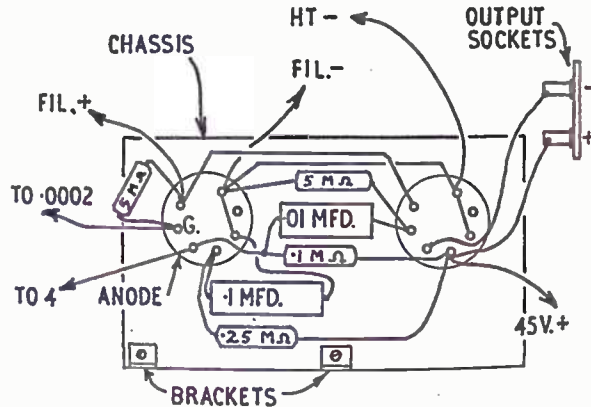


Fig. 2—Valveholders and wiring

can be obtained from two B122 22½V. batteries in series. As these batteries have a very long life indeed, in this circuit, leads are attached to them by soldering.

The circuit is shown in Fig. 1, and uses a self-contained ferrite rod aerial, tuning the medium wave band. No external aerial or earth is required. Internal dimensions of the case are 5½ in. by 4½ in. by 1½ in., including batteries, so the receiver can easily be carried. It is primarily intended as a compact, self-contained portable for headphone or 'personal' listening, and will give really good volume, for this purpose.

The two valves are both 1S5 miniatures, or any equivalents, such as the CV784, DAF91, 1FD9, or ZD17 may be

bell wire, will do well for wiring up. As this wire is sold in various colours, different colours can be used to identify the battery connections — black for H.T. negative and L.T. negative (marked Fil.- in Fig. 2); red for H.T. positive, and some other colour for L.T. positive (Fil. positive). The various resistors and condensers have wire ends, and these are soldered to the valveholder tags, as in Fig. 2.

Small fixed condensers usually have the values marked as shown. Resistors, however, are more often colour coded, so care is necessary not to use wrong values. The colour coding for the resistors is given in the component list. Slight changes in value, from those given, will not matter.

wrapped round the rod. Winding is commenced about ½ in. from one end of the rod, a few inches of wire being left to form point 1. A total of seventy turns is then wound on, side by side, and the wire cut to form lead 2. A very small space is then left, and five turns are wound on, beginning at lead 3, and ending at 4. These turns must be wound in the same direction as the larger part of the aerial. The ends of the windings can be secured with adhesive tape or thread. The windings must not be varnished, waxed or painted, and will remain secure without this, if tight.

If a larger ferrite rod or slab should be used, fewer turns will be necessary. In such cases, a suitable number can easily be found by trial. To do this, put on

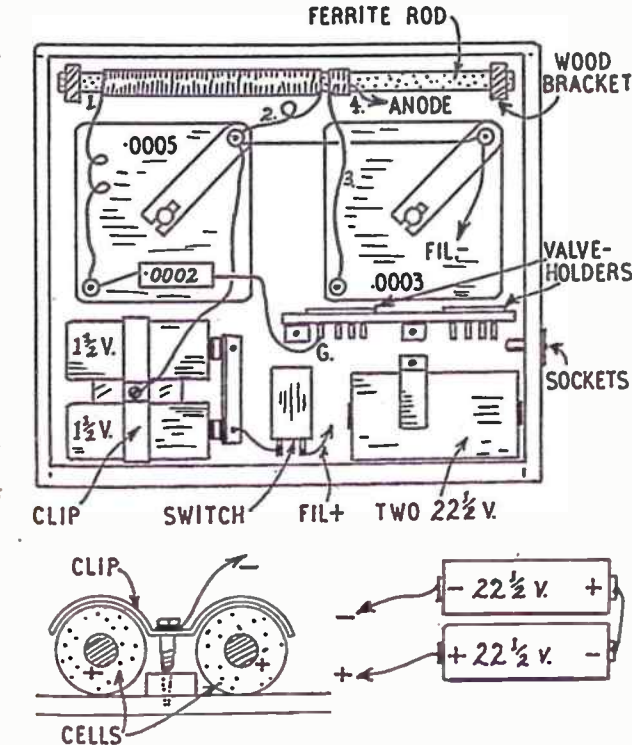


Fig. 3—Inside of the receiver

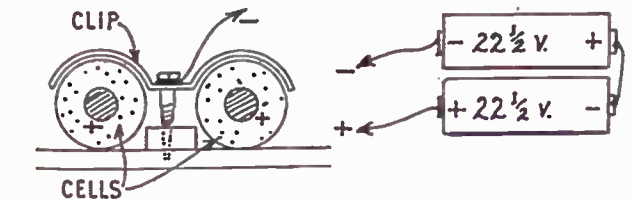
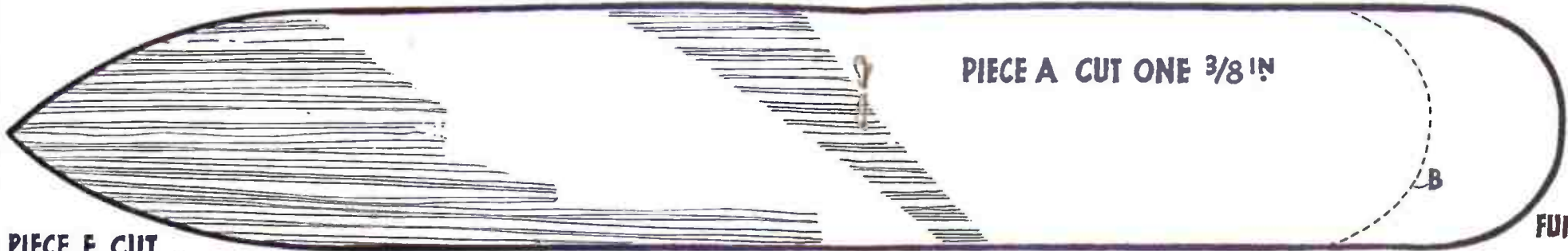
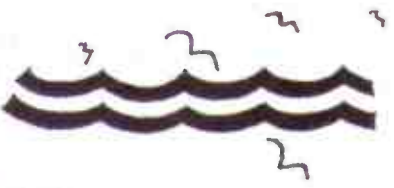


Fig. 4—Details of the batteries

MODES OF TRANSPORT = LINER

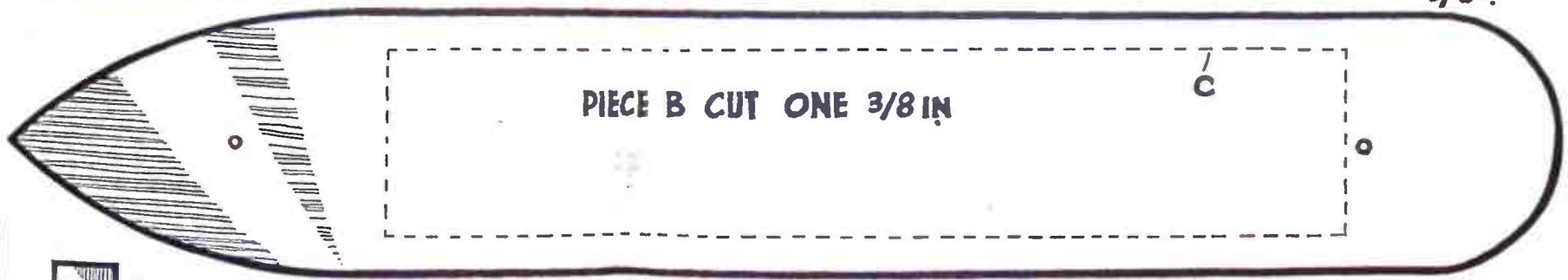
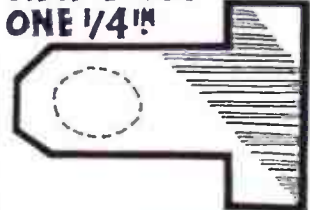


PIECE A CUT ONE $\frac{3}{8}$ "

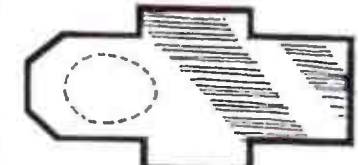


FUNNELS CUT TWO $\frac{3}{8}$ "

PIECE E. CUT ONE $\frac{1}{4}$ "



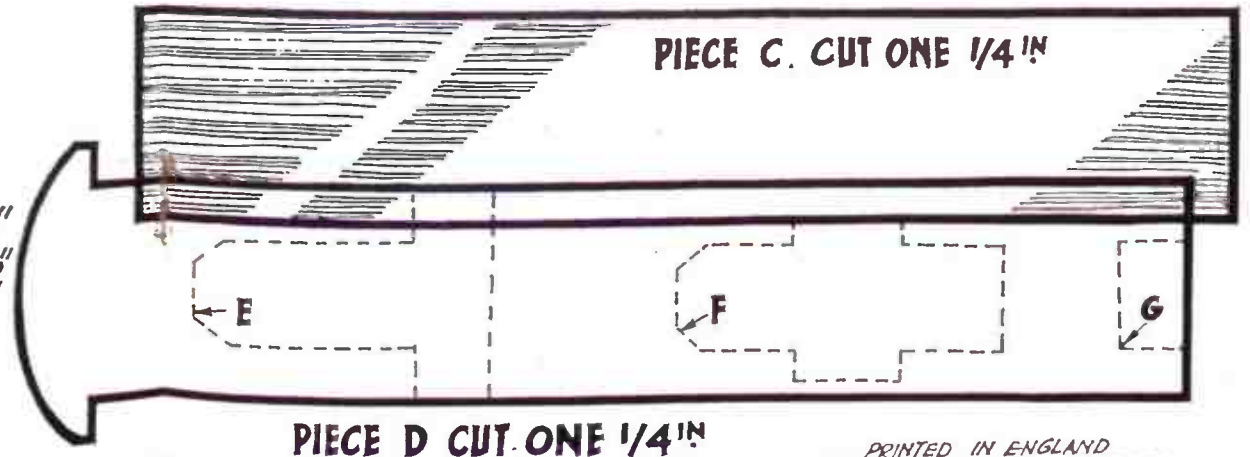
PIECE B CUT ONE $\frac{3}{8}$ "



PIECE F CUT ONE $\frac{1}{4}$ "



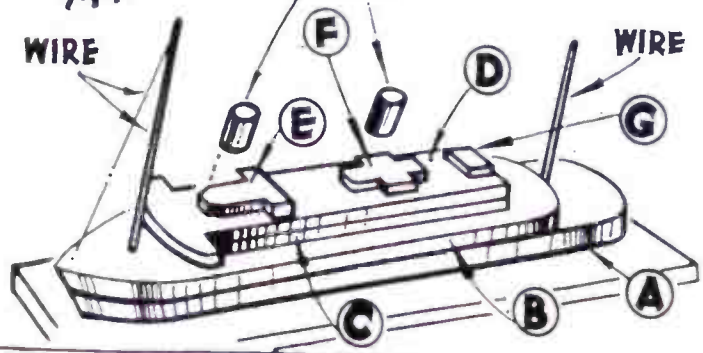
PIECE G. CUT ONE $\frac{1}{8}$ "



PIECE C. CUT ONE $\frac{1}{4}$ "

PIECE D CUT ONE $\frac{1}{4}$ "

CUT BASE
12" x 2 1/2"
FROM 1/2"
WOOD



PRINTED IN ENGLAND

An Introduction to the Hobby

MANY attractive examples are seen in shop windows of work carried out based on paper sculpture. In this form an attractive conventional or contemporary motif may be produced to assist in display of all kinds of goods and services. The handicraft, therefore, has a commercial future for the enthusiast.

At the same time in the evening institutes and clubs where amateur dramatics are staged, paper and board material in white and colour can form first-class stage backgrounds for sets. In the home it has an application for display and many decorative purposes. Paper and board material, suitably lacquered or varnished after make up, may be washed and immersed in water in the case of model making and is very durable.

Preliminary exercises

The first essential in paper sculpture is to understand the two simple methods which give roundness and solidity to the finished work, and these effects are obtained by folding or bending the paper or card. When bending paper it must be rolled the long way or grain direction of the material (that is the way the paper is made on the paper-making machine), for if it is rolled in the other direction, or against the grain, a perfect roll may not be possible, and cracks or breaks may occur or the paper may fold up in ridges. The rolled tube or cone is an example of the perfect job.

Paper may be bent to give an arc when desired. Card or cartridge paper may be folded to give a definite transition from one level to another, and such an angular break may be obtained by scoring.

Scoring and folding play an important part in paper sculpture. Another development of binding is curling and corrugation of material whereby paper is folded backwards and forwards to give effect. Notice, too, how the highlights give greater reality to such work.

Perhaps the best example is the paper sculpture fan. Such a motif is obtained by using a suitable piece of paper of about 15 in. in length by, say, 9 in. in width. $\frac{1}{2}$ in. spaces are drawn with a pencil and ruler on top and bottom sides of the paper or card. Now use a scoring instrument or knife, with the assistance of a metal ruler.

Alternate lines are scored on one side of the paper only. Now the sheet is treated on the reverse side, the remaining lines being scored. By punching together one end of the pleated sheet, a popular and useful fan is completed.

Students should practise this simple exercise several times in order that they may become expert in this operation, as it involves the basic principles of paper sculpture. It brings in the operation of pleating obtained from scoring and folding paper and card. Greater strength is

By F. T. Day

given to paper that is folded or pleated, and this may be demonstrated by actual handling.

Paper folding is a fundamental part of the craft, and so is scoring. When paper or card is scored, great care should be taken not to use too much pressure and thus sever or cut too deeply into the material. The beginner should try out several types of card or thick paper in order to arrive at the correct pressure, which can only come from practice. Too deep a cut may break up the paper into two parts when ultimately folded. Much scoring work is obtained by the use of blunt instruments, such as a paper knife or bone folding knife, but the substance, weight, and thickness of the material used will determine the measure of pressure and the scoring instrument to be used.

A simple four-pointed star will make up into a festive decoration by joining all points together. A star is a happy motif and, among the many early exercises which may be carried out, it is, perhaps, one of the most useful shapes to produce. The star is drawn out in the number of points desired. Here a scoring knife is lightly employed, and some lines from each point to their common centre are made. The star is then cut round the outline with a knife. Then the reverse side is treated, and lines are scored from the centre to the crotches.

In the folding operation, which again is quite simple, ridge the long scores up, and then fold the short scores down. The knife is used to get folds at the centre. The four-pointed star is obtained in this way, and the ultimate result is useful as an adjunct to a complete design with other motifs.

There is depth in this kind of work, and not just the flat result which is obtained from a plain cut star, and this lends distinction to the work as compared with flat work. To underline this effect, paper scored on one side can be

Here is a list of materials which are obtainable at handicraft stores:

Board is a generic term for stiff or thick 'paper'. Varieties listed below are mostly made in sizes 20 in. by 25 in. and 22½ in. by 28½ in.

BRISTOL BOARDS. High-quality cardboard with very fine surface, consisting of two or more sheets pasted together. Ideal for Paper Sculpture.

CORRUGATED PAPER OR BOARD. Corrugated sheet of strawboard lined with flat, strong, brown paper.

STRAWBOARD. A cheap, coarse board made from straw, in many thicknesses.

IVORY BOARDS. High-grade board with good finish, familiar use of which is for visiting-cards.

PASTEBOARDS. Several sheets pasted together giving medium thickness with low finish.

PULP BOARDS. Distinguishes solid board from pasteboard. Well-finished in white and pale tints, from 2-sheet thickness upwards.

WHATMAN BOARDS. High-grade board obtained by pasting Whatman drawing-paper together to give thickness.

BLACK PAPER OR PHOTO PAPER. Thick, black paper with matt finish, suitable for backgrounds.

CARTRIDGE PAPERS. Hard, tough drawing-paper in various surfaces and qualities.

COVER PAPERS. Thick, coloured paper generally heavier and stronger than ordinary paper. Excellent for folding purposes.

FLINT PAPERS. Paper which has been flint glazed, giving it a hard, brilliant polish.

FOIL PAPERS. White backing paper, coated with metal and burnished, giving a smooth surface.

LAMP SHADE PARCHMENT. Cover paper coated with linseed oil and, in some cases, glycerine.

NON-CURLING GUMMED PAPERS. Specially prepared to be free from stretch after coating with gum.

POSTER SURFACE PAPERS. Strong, vividly coloured, matt-finished surface paper.

WOOD VENEER PAPERS. Imitation wood grain papers.

folded downwards, while the reverse side can be folded upwards. Leaves and other motifs, which will be dealt with later on, may be treated on similar lines.

Paper and card curling is obtained by pulling a cut sheet or strip of material under a ruler and upwards. The paper so treated is much more easy to handle, and furthermore becomes flexible to work and fashion. By carrying out this simple exercise of paper under a ruler with some pressure on the opposite side, a wavy effect is obtained. This resembles a rather wide corrugated effect, and such a piece may be fashioned into a lampshade.

In this case, holes made at one end and string or thread passed through brings the paper into a decorative wavy circular shape rather resembling a lampshade. Such effects may be used, and are similar to a pie frill. Accurate folding and corrugating give the best and only

possible effect to any piece of work, and also scoring, folding, and bending should be carefully measured off before any operation takes place.

There are many variations of this exercise, and another style, which is perhaps a little more difficult for beginners, is that in which a piece of paper is drawn with vertical lines on one side, and horizontals and diagonals on the reverse. The vertical lines are drawn across the centre. The paper is bent away from the cut surface, and the finished sheet is then rolled and sealed at the end, thus giving an elongated barrel-shaped object. Exercises of this kind are best tried out in a practical way.

Many handicraft classes and studios have paper-cutting machines with which to prepare specially sized board or paper, and also to trim finished work. Such machines are useful where a considerable volume of work is going on. By the way, don't forget a pad of some thick card to work upon as this will prevent cuts or

scratches being made on table surfaces. It will also keep work from slipping. All outcuts and left-overs may be used for smaller parts of a motif. Beginners should be encouraged to use pencil lines to follow for both the cutting and scoring operations, as in this way more accurate work will be obtained. Where a wavy or similar line is being worked out, the card is moved by the left hand, thus following the shape either round or backward and forward, and the knife is held firmly in position by the other hand. An even, irregular cut is thus obtained. Knife cutting is cleaner, and gives a better edge than scissor cutting.

Pinking shears and leather punches are useful adjuncts to the craft, as they can give holes and delicate lace effects in card. The punched-out circles have many uses, and all clippings should be kept neatly in boxes. Tassels are useful for certain kinds of decorative work, such as scrolls and banners, to supplement paper sculpture decoration. A stapling machine

may be useful in holding the joints in certain kinds of work. In this way, work may be stapled to a background of cardboard to give it some substance or for the purpose of display.

The handicraft worker will soon realize how pliable paper really is, and how paper flexibility helps in the work; so that there are really two mediums at work, the hands and the paper. Paper sculpture is composed of various forms and lines, and this is in direct opposition to ordinary flat paper work.

Before concluding this article on simple, bending, folding, cutting, and scoring, which are the true basis of the handicraft, it would be well to emphasize that these operations must be well and truly mastered. Paper must not be considered as a substitute for other such materials as wood or plastic; it is paper, and this has many purposes and applications in various paper handicrafts. It is pliable, and the more skillful the worker and adept the fingers, the better the work.

Making equipment for Sea Fishing

MAKING a line for sea fishing is a project which the handyman — or the handyman's son — can finish in next to no time, very cheaply, and using odd scraps from the home workshop. Such a line might also make a very acceptable gift for some budding young fisherman. The sizes given need not be strictly adhered to, and may be modified to suit the size of frame required or material available.

For the winding frame use, if possible, a piece of hardwood, preferably mahogany. Make four pieces, as shown in Fig. 1, fit together, and glue with waterproof glue and/or fix with brass screws. If the latter are used, fix two at each joint, taking care to countersink the heads, otherwise the projections will foul the line. Glasspaper the frame thoroughly and, for a really excellent finish, apply two or three coats of

marine or exterior varnish.

The paternoster is a device for holding the hooks out from the line, and can be made from brass or copper wire. Cut three pieces of wire each about 8 in.

By G. R. Wyllie

long, for the vertical parts, and three pieces about 9 in. long for extending arms.

With a pair of round-nosed pliers, fashion the three 9 in. pieces into arms, shaped as in Fig. 2, and double the wire at each loop. Take the first 8 in. piece and double loop one end, then twist the other end on to loop A of the first arm-piece. Then loop the upper end of the second vertical piece on to loop B, and its lower end on to loop A of the

second arm-piece. Repeat this for the third vertical and arm pieces, and the paternoster should hang as shown.

Buy about 30 yds. of quality fishing line, either No. 2 or 3 grade, depending on the size of fish you expect to catch. Secure one end to the frame and wind it round. Attach the other end to the upper end of the paternoster. To the lower end of the paternoster attach a lead weight by a piece of line about 9 in. long. A galvanized nut is quite a useful sinker.

Make up some hooks on about 8 in. or gut or lighter fishing line and attach one to the end of each arm of the paternoster. Keep the others handy for spares — in case that big fish comes along and takes the hook with it.

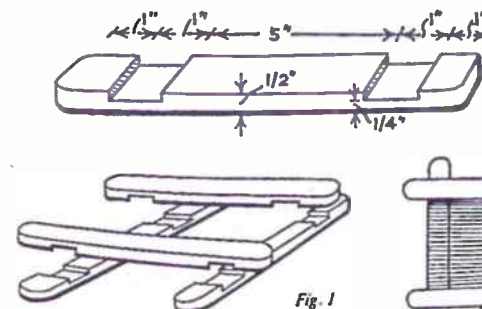


Fig. 1

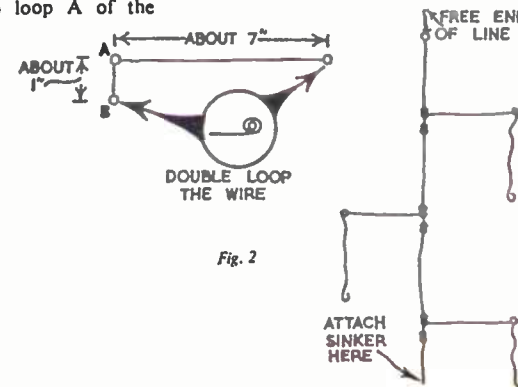


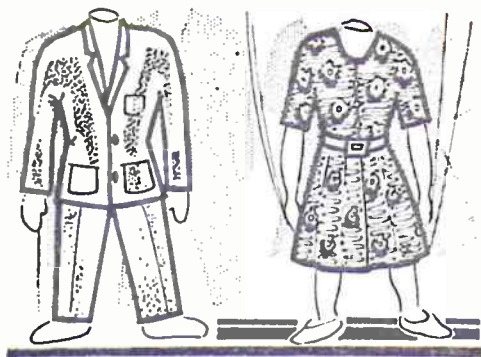
Fig. 2

DRESSING A MARIONETTE

THE dressing of the puppet can be the most difficult of the operations involved in the making of a paper maché marionette. If the aim is to dress it with human clothes in miniature, very considerable technique with the needle is needed. However, as the making of the body was very simply carried out, there is no reason why the dressing should not also be so.

Children have successfully dressed these marionettes in crêpe paper, and have painted the paper afterwards to represent clothes. Of course, crêpe paper is not durable; then neither are most of the desires of children who soon want to dress the puppet differently. This is no obstacle with crêpe paper. It is simply torn off and another dress fitted. However, if a lasting result is needed, then a thin white cotton material may be used.

By G. A. Edmonds



proceeds. The backstitch is the stitch to use. The sewing finished, the excess crêpe is cut off, leaving a small margin for later over-sewing.

For female puppets the same foundation is used, except that the crepe around the lower legs is sewn tightly to represent stockings. A skirt can be made to the length desired, and fastened

and round to the back until the armpit is reached from the rear. For male puppets the sleeve is loose, and for female puppets the sleeve and elbow is loose, but the lower arm is sewn skin tight.

Painting

For male puppets the template originally used for the dress may be used to try out designs. The easiest method is to paint a shirt and trousers on the puppet, but, with a little thought, a suit can be painted. The best paints to use are powder tempera colours or tempera blocks, both of which are commonly used in schools. Poster colours are also suitable if used thickly, but water colours or oils should not be used.

For female puppets the lower arms, legs, and neck are painted in flesh colour. This is obtained by mixing a little red and a little yellow into white. After the neck line and the short sleeves have been indicated, the dress may be painted in the desired colour, and a pattern painted on it when the first colour is dry.

If a skirt and blouse is wanted, then the skirt could be made of coloured crêpe and the top left white to represent a blouse. The lapels, overlap, and buttons can be painted later in black or blue.

Unusual costumes, i.e. historical, can be built up and/or painted very easily on this simple foundation.

Controls for the marionette will be described in another article.

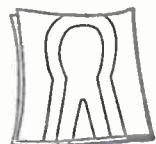


Fig. 1

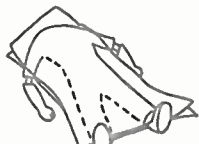


Fig. 2



Fig. 3



Fig. 4

The dress is made in one piece, and the foundations for male and female puppets are similar. To begin, the head is removed from the strings, and a paper template is made of the body, including the legs, but not the arms or the feet. The template, when cut out, is placed upon a double sheet of crêpe paper. A margin, which approximately equals the thickness of the puppet, is drawn around this template (Fig. 1).

The puppet is now placed between the two sheets of crêpe in as near the same position as before. The two sheets are fixed together with pins as in Fig. 2. A gap is left around the point where the upper arm joins the shoulder. The shoulders are pinned, but a gap is left where the neck joins the body and a strip of very thin card is pinned to the crêpe around the neck, leaving a hole big enough for the neck to pivot in (Fig. 3).

The crêpe between the legs should also be pinned, but the legs should be slightly astride before this is done.

The crêpe paper may now be sewn and the pins removed as the sewing

around the waist as a frill. For male puppets the foundation is the only dress, and the crêpe around the legs must be left free to be recognized as trousers. The edge that is left can be folded back on to the first sewing, and the whole resewn for extra strength. The resulting seam will not be obvious on a stage after the dress has been painted.

The Arms

Measure around the thickest part of the arms, and to this measurement add a further 1½ in. This will be the width of crêpe required. The length will equal the measurement from the wrist to the place where the neck joins the shoulder.

When the crêpe is cut to these measurements it is folded once and a point cut as in Fig. 4. The lowest point from which this cut is made is a length just less than that from the wrist to the armpit.

The point of the sleeve is placed under the shoulder seam of the dress and on the shoulder of the puppet. From the armpit the sewing is continued over the shoulder, joining the sleeve to the dress,

ANSWERS TO QUIZ

(see page 235)

1. Nogging. 2. 405. 3. Single Abutment.
4. Flying Shelf. 5. (a) Quarry, (b) Scaffolding, (c) Mason's.

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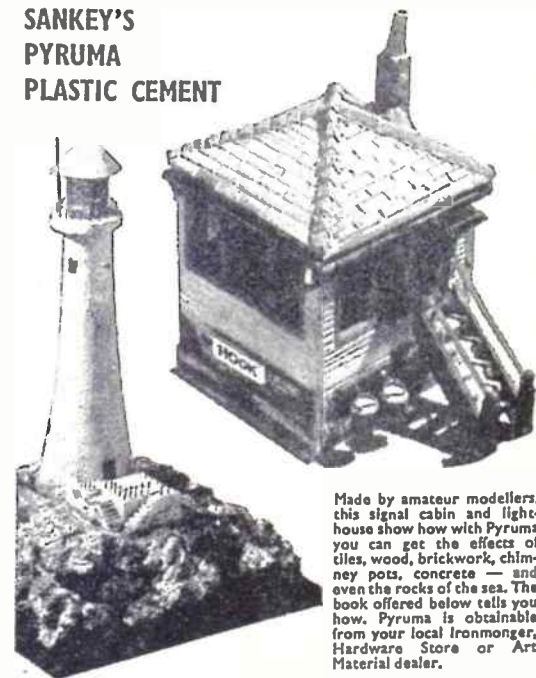
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SOME ENLARGING AIDS

By employing various methods of control during the printing of enlargements, a mediocre photograph can often be transformed into a real picture of merit. And let it be realized now that there are very few photographs indeed which cannot be improved considerably by a little control. Moreover, it is true to say most, if not all, exhibition prints are subjected to some kind of con-

details. A face in the straight print may contain portions which are burnt out due to heavy densities in the highlights, and consequently the modelling is destroyed.

Experienced workers use their hands for shading, but correction may prove easier if a piece of cardboard or opaque paper is cut out with an aperture matching the shape, but slightly smaller in size. After giving the normal exposure time

the finished print. The additional time can be determined by test.

This is such a common fault with the majority of prints, that it is an advantage to prepare an adjustable mask as shown in Fig. 2. Obtain a piece of stout cardboard not less than 10 in. square and a smaller piece of cardboard to make a revolving disc. First describe a circle in the centre of the large card with a radius of 2 in. Mark out several different shapes around the circle in the forms of squares, circles, oblongs, crescents, as shown in the diagram. The disc is now cut to cover

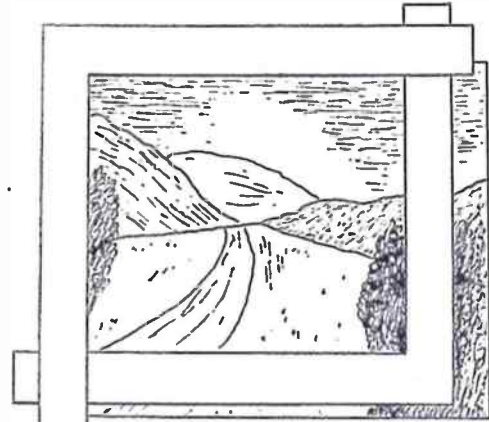


FIG 1

control during the printing process. This is done by shading parts of the image during the exposure, or by 'burning in' the strong highlights.

With a straight print before us it is possible to judge whether an improvement could be effected by making it a little lighter or darker in certain areas, and it may be that a portion of the photograph will make an even better picture than the whole. There are often sound reasons for this, but it is sufficient to say that we arrange the picture so that the principal subject is placed in the strongest centre of interest.

A simple and most useful device for this examination is shown in Fig. 1, composed of two pieces of cardboard of reasonable size shaped like a letter L. These two pieces can be moved up and down or sideways over the print, the opening being diminished or enlarged until the most satisfying picture is found. When this portion has been decided upon the original print can either be marked or trimmed accordingly for use as a guide.

When the negative is projected on to the enlarging baseboard, the highlights appear darker than the other areas, and the problem arises as to whether these should receive more exposure. Alternatively, some of the shadow areas may be too thin, and require some restraint to balance the other tones and retain the

for the whole print, the prepared card is held between the paper and the lens and an additional exposure given to the dense areas of the image. This card should be held nearer to the lens than the paper and kept moving up and down so that there will be no trace of the control in

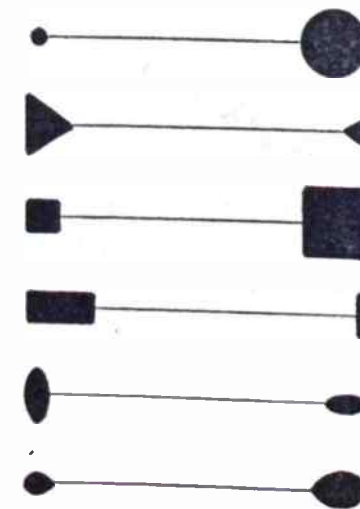


FIG 3

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all but one of these apertures which are cut out. The disc should be 6 in. in diameter with a sector cut out as shown, the two pieces being joined together with a brass paper fastener. It will be apparent that any particular shape can be used as desired merely by revolving the disc. Once again, you are warned not to hold the accessory too near the sensitized paper or the result may appear too obvious. The top surface should be covered with white paper so that the image may be clearly seen, but the underside should be covered with black paper to prevent any reflection and the possibility of slight fogging.

When confronted with the thinner areas of the negative, we are obliged to restrain the normal exposure for that part, and this is achieved by either preparing a scrap of opaque paper for shading or by making a set of 'dodgers' as shown in Fig. 3.

The opaque paper is roughly cut out to the shape it is desired to shade and fastened to a piece of thin wire for ease of holding. A piece of paper gumstrip will be sufficient to hold the shape in position, but you will find it more convenient to have a set of dodgers ready for any emergency. You will need a few wires about 12 in. long and you will see that we have a large shape at one end with a smaller one at the other, making a double gadget with one wire. These dodgers must be kept moving while the exposure proceeds for if held too near

Continued on page 238

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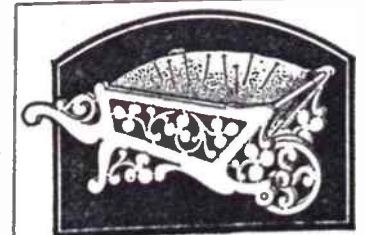
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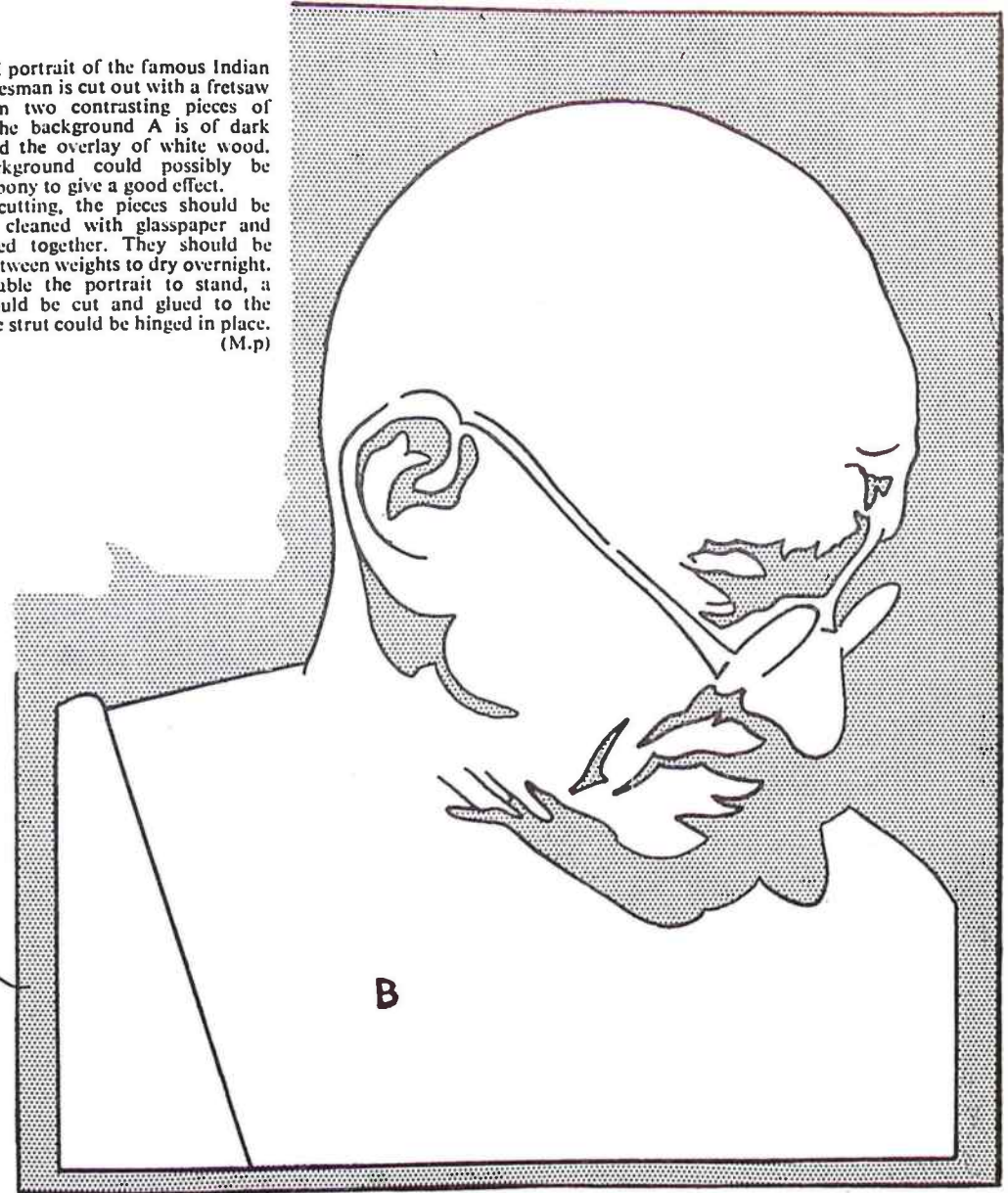
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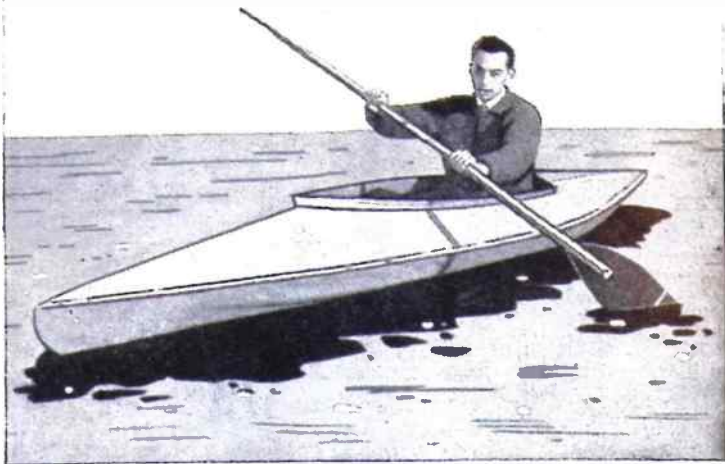
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