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Get good results from this

VARIOMETER CRYSTAL SET

IT would be difficult to find a crystal set design which could be made at less cost than that described here. Assuming that a few oddments of wood are to hand, it is only necessary to purchase three terminals, a 20zs reel of wire, and a crystal. Despite this, the receiver can give just as good results as a ready-made set costing many times more. A condenser is not used for tuning; instead, the inductance (and consequently wavelength) is varied by altering the degree of coupling between two flat coils, one being swung upon an axle for tuning purposes.

Making the Coils

Stout cardboard is perfectly satisfactory for these, though thin paxolin sheet can be used if available. Thin card is not satisfactory because it is not strong enough to support the wire.

Two discs of card are cut $3\frac{1}{2}$ ins. in diameter, and a circle 2 ins. in diameter is marked in the middle of each. Seven slots are then cut, about $\frac{1}{4}$ in. wide, from

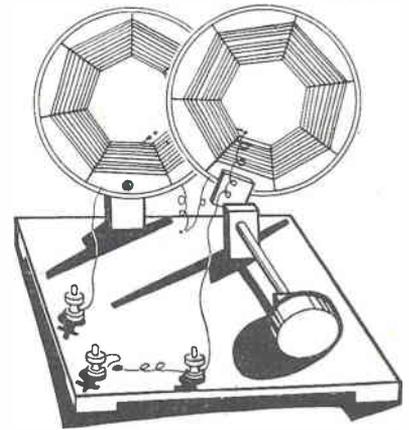
the perimeter to the 2 ins. circle, forming the shape shown in Fig. 1. Seven equal spaces can be obtained by setting compasses at $1\frac{1}{2}$ ins. and using them to divide the perimeter of the disc.

The gauge of winding wire, or type of covering, is not very important, except that thick wires cannot be accommodated, and thin wires reduce efficiency. If it is to be purchased, then 28 or 30 S.W.G. D.C.C. wire will be satisfactory,

By *F. G. Rayer*

and a small spool will make several coils.

Cardboard will be much stronger if varnished, and allowed to dry, before winding. To wind, the wire is anchored by passing it through two small holes, leaving a few inches for connecting purposes. As the turns are wound on, the wire is passed backwards and for-



QUITE CHEAP
EASILY MADE
AND INSTRUCTIVE

wards through each slot as it is reached, as in Fig. 1, which shows five turns in position. Since there is an odd number of slots, half the wire will come at one side of the disc, and half the other.

The moving coil has forty turns in all, the wire being terminated by passing it through another pair of small holes. The number of turns on the fixed coil depends to some extent on the wave-

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

For Modellers, Fretworkers
and Home Craftsmen

4½^D

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length of the local station, which can be looked up. If in the bottom half of the medium wave band (200' to 350 metres) then thirty turns will suffice. If in the top half (350 to 550 metres) then about fifty turns will be satisfactory.

Both coils *must* be so wound and mounted that the turns on them are in the same direction, commencing from the inside.

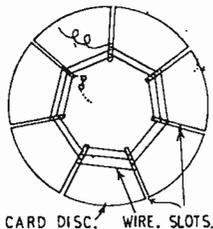


Fig. 1—How the coils are made

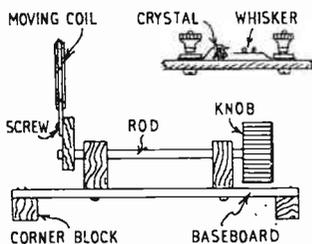


Fig. 2—Details of Detector and Tuning Control

Detector

The simplest form for this will become clear from Figs. 2 and 3. A small piece of brass is cut and shaped so that when it is secured under the terminal, it clamps the crystal to the baseboard. The catswhisker is made by taking about 2ins. of the coil wire, clearing away insulation, and winding into a 'spring' on a small nail. One end is then pulled out straight, and the other clamped under the Aerial terminal.

It is also possible to use a ready-made crystal detector, or to wire a crystal diode to the two terminals. Such a modification will not increase actual volume, but will avoid the need for setting the point of the catswhisker by hand.

Tuning Control

A small piece of wood about $\frac{1}{2}$ in. by $\frac{1}{4}$ in. is made a tight push fit upon a rod or axle, which turns with a little friction in two uprights screwed to the baseboard, as in Fig. 2. The rod can be of wood or metal, and the knob is cut from $\frac{1}{2}$ in. thick wood. Alternatively, if $\frac{1}{4}$ in. dowel is used for the rod, a standard radio control knob can be fitted to it.

A small screw attaches the moving coil, as shown, and there needs to be a

little friction on the axle, so that the coil will remain in the position to which it is set. If the fitting proves too loose, a compression spring can be placed between upright and knob.

Base and Connections

The baseboard is of thin wood 5ins. by 5ins. and fitted with four small corner blocks. The three terminals are placed as in Fig. 3, which shows all connections.

To secure the maximum possible wavelength coverage, the coils should be

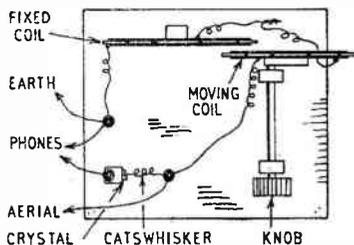


Fig. 3—Receiver connections

as close as possible, when opposite. The fixed coil, supported on a small wooden block, is positioned so that this will be so. So that the one coil can move, connections from it should be at least 6ins. long, and wound into a spiral. It will be remembered that both coils are wound in the same direction. This being so, the outside end of the fixed coil goes to Earth. The inside of this coil is joined to the outside of the moving coil, and the

inside of the latter goes to Aerial.

A moving coil of this type cannot tune over quite so large a waveband as when a tuning condenser is used, and the actual wavelength will also depend upon the aerial. Because of this, it may prove desirable to modify the total number of turns a little. However, good results will almost certainly be obtained at once with the numbers given.

More or Less Turns

Should it be found that a station grows louder as the coils are brought together, until they are opposite, then some more turns will further increase volume, and fifteen to thirty can be added. If, on the other hand, volume keeps on increasing as the coils are separated, then some turns need removing from the fixed coil. The number is correct when volume is at maximum with the moving coil in some intermediate position, not right opposite the other coil, nor as far as possible from it.

The catswhisker is stretched out so that its point will rest on the crystal. When a station has been heard, the point of the whisker can be moved about until it is resting on a sensitive spot, as shown by volume being greatest.

Any normal aerial and earth will be satisfactory, with phones of the usual type intended for crystal sets, that is, of medium or high impedance. If an aerial is to be put up, then volume will be increased if the wire is fairly long, away from walls, roof, trees, etc., and as high as possible. A sound earth is very helpful in obtaining loud reception.

Books to Read

Tent Lore

by Lone Wolf

ALL the information needed by those who pitch their tents under the stars, will be found in this book which features numerous illustrations to help the camper. It will prove a valuable aid to the beginner and contains much of interest to the experienced. The informative chapter on the care and repair of tents will greatly assist those to whom economy is essential.

Published by Brown, Son & Ferguson Ltd., 52-58 Darnley Street, Glasgow, S.1—Price 5/-.

The British Journal Photographic Almanac 1956

THE pictorial gravure supplement in this new edition is a striking feature, and authoritative articles will make interesting reading for the enthusiast, who is also well catered for in a section devoted to up-to-the-minute lists of sensitive materials for colour, and

black and white still photography. The glossary of technical terms will prove valuable to amateur and professional alike, and not a little knowledge can be gained from the delightfully illustrated announcements of advertisers, particularly those in colour.

Published by Henry Greenwood & Co. Ltd., 24 Wellington Street, Strand, London, W.C.2—Price 6/- (Linson board covers), or 8/6 (cloth bound).

Complete Signalling Instructor

THIS is a book for those interested in communication by means of signs and signals. It is also a book of suggestions designed to help the reader to get more fun out of his signalling — particularly useful reading for Scouts and Wolf Cubs. There is also a section on road signs, which it behoves every user of the roads to read, mark, learn and inwardly digest.

Published by Brown, Son & Ferguson Ltd., 52-58 Darnley Street, Glasgow, S.1—Price 4/-.

Out with the camera

A FOCUS ON PETS

NEXT in popularity to snaps of their families many amateur photographers' pets figure large in family albums. And photographs of pets have a much wider appeal to outsiders than rows of family snaps. They can often find a market in popular magazines or in newspaper-sponsored photographic competitions.

The photographs of the playful kitten, the wistful puppy — these are hardy perennials in many illustrated periodicals and magazines. Many of these 'paying' snaps are the result of careful planning and first-class photographic technique, but with a subject of such general appeal there is always room for the amateur snapper to make his hobby pay a little back towards the cost of film and printing paper.

With the exception of photographs of show animals (which may well find a market in magazines devoted to their breeding), snaps of pets which sell depend upon popular appeal. It is not suggested that all snaps of pets should be approached with the ultimate aim of making a magazine sale — but, if the following hints are studied, your snaps have a better chance of achieving that 'popular appeal'.

Lighting

The texture of fur and hair is brought out most realistically by side-lighting. Slightly diffused lighting is an advantage in avoiding harsh shadows that destroy texture. As with outdoor snaps



You are always welcomed with a camera to snap other people's pets



A bone helps to keep them still. Here, lower side lighting and focus concentrated on facial features, makes the dog stand out against out-of-focus background.

of the family, avoid the harsh noon-day sun — try for partial shade or lightly-clouded sunlight.

Back lighting is not generally acceptable with pets, as here the facial formation is in shadow, and in most animals the eyes form a focal point of interest needing to be sharply defined and 'alive'.

Focusing

Young animals are like children, they move like quick-silver. With a frolicsome pet it is best to use zone focusing. Decide in what area the pet is to be snapped, set your camera focusing to ensure sharp focus over the whole of that area, and then wait or entice the pet into it.

With larger or older animals who can be ordered to take up a position — if your dog is that well trained! — more careful focusing is possible: and here it is a sound hint to focus on the eyes, relying on the lens stop used to secure adequate depth of field over the rest of the body. The face, with emphasis on the eyes, is the crucial point of focus; slight softness of definition can be tolerated or even useful over the rest of the body — but muzzy facial formation and, above all, eyes, never!

Even with young playful animals, as puppies and kittens, 'props' can be used to settle a firm position to focus upon — and, incidentally, give the snap popular appeal by depicting the pet 'doing something'. A ball of string, a

paper ball hanging from a chair leg — all these things give a good focusing position and add interest by showing 'life' in action.

A high shutter speed is useful for stopping the swift movements of playful pets. Here the owner of the simpler type box or folding camera is not necessarily at a great disadvantage. In most moments of play there is a brief moment of poise — at the top of a kitten's stretch for a string ball, for example. Careful watching and swift clicking of the shutter can catch that one moment of stillness which is, in itself, so expressive of action.

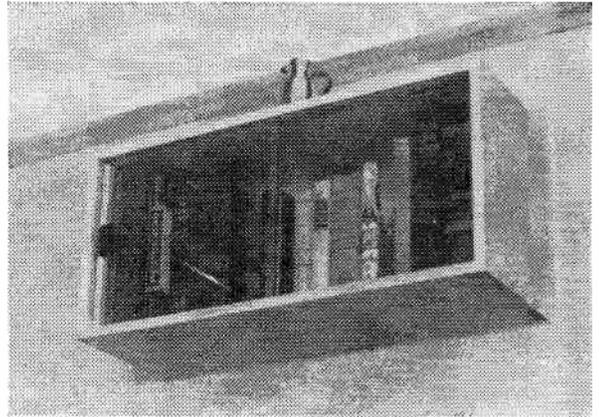
Taking Position

We are used to looking downwards at our pets, but snaps of popular appeal often rely upon an almost eye-to-eye level. Snapping from one's normal height, with the camera pointed downwards, may, at fairly close quarters, have the effect of fore-shortening the features or body proportions — as will too close a taking position from whatever angle. Kneeling, however, brings the photographer down to the pet's eye level or nearly so — and achieves that candid, eye-level appeal. Beware here of stray pieces of grass standing up close to the lens front, and recording as out-of-focus blurs in the foreground. Backgrounds need care, as with outdoor

● Continued on page 263

BOOKCASE IN MODERN STYLE

DESIGNED for volumes of the larger type, this wall book-case was made in sycamore at a total cost of 14/-. It is 26ins. long overall, and is capable of holding books up to a size of 10½ins. by 8ins. Modifications can be made in the sizes, of course, to suit individual requirements. It is not easy to procure sycamore in thicknesses under 1in., and the choice of wood must necessarily be limited by what is locally available. Make sure that the wood you buy is mild-grained and well seasoned.



By *K. Blackburn*

mark across the four lines shown (Fig. 1). Square these lines round each piece after removing the wood from the vice. Mark out the top and bottom in the same way (Fig. 2).

The dovetails are marked on the two shorter pieces. Square the lines across the ends first, then draw the sloping lines down to the shoulder lines with a sliding bevel set to a slope of 1 in 7. Shade in the waste as shown in Fig. 3.

the front edge of each piece while they are in their correct positions.

To mark the pins, draw round the tails on to the end of the corresponding long piece while the latter is held in the vice. Rest the short piece on a strip of wastewood so that it does not move while drawing round the tails (Fig. 4). Square the lines down to the shoulder line.

A very important point to notice at

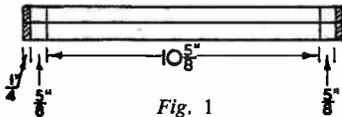


Fig. 1

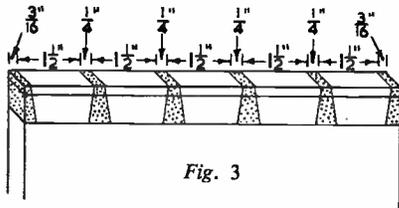


Fig. 3

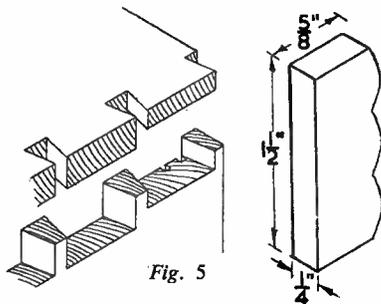


Fig. 5

Fig. 6

Prepare the four pieces to 8½ins. wide and ¾in. thick, remembering that the appearance of the finished article depends very largely upon the accuracy with which the wood is prepared. Put the two ends in the vice together and

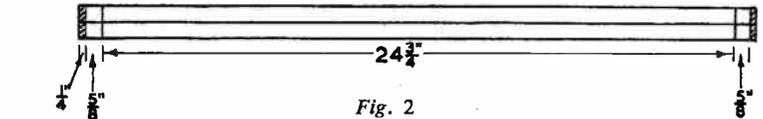


Fig. 2

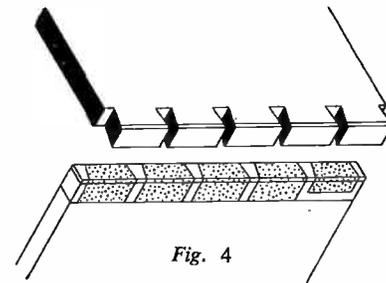


Fig. 4

Saw carefully down the sloping lines with a tenon saw, and remove the waste. The two side pieces can be cut away with a tenon saw, and the other four pieces with a chisel after sawing out the bulk of the waste with a coping saw. Now the four pieces should be put together in the positions which they will later occupy with relation to one another, and each corner numbered so that the pieces may be put together in the same way at any time. To avoid error, all numbers should be put on the outside of the book-case. Put an identifying mark on

this stage is that the socket at the front edge of the wood is not cut right down to the shoulder line. This modification of the dovetail is necessary so that the grooves which are to accommodate the glass are not exposed at the ends of the wood. An enlarged drawing of the completed joint is shown in Fig. 5. Square across the line indicated ¼in. from the shoulder line, and shade in the wastewood. Saw down the lines on the shaded side, remove some of the waste with a coping saw, and finish off with a chisel while the wood rests flat on the bench. Now gauge a line on the front tail of the short piece with the gauge set to ¼in. Make sure that the gauge is pressed against the inside of the wood. Cut out this piece with a mallet and chisel. Fit the joint, and mark and cut the others in the same way.

Assemble the book-case with sash-cramps, and check that the joints are bedding down firmly on to the shoulders. If the front edges of the case are not perfectly level, run a smoothing plane round the edge. If this is not done, the grooves for the glass doors will not be in alignment. Before dismantling, pencil in

the positions of the grooves roughly, so that no mistake is possible.

Cutting the Grooves

The grooves are cut with a plough plane, using a $\frac{1}{4}$ in. blade. Set the fence of the plane so that the first groove is cut $\frac{1}{4}$ in. from the edge of the wood, and plough a groove in the top and bottom pieces, and on *one* of the end pieces. Re-adjust the fence so the second groove is at a distance of $\frac{5}{8}$ in. from the edge. This leaves $\frac{1}{4}$ in. space between the grooves. Plough this groove in the top and bottom pieces, and on the other end piece. Each end piece should contain only one groove: a groove in one, $\frac{1}{4}$ in. from the edge, and the groove in the other, $\frac{5}{8}$ in. from the edge.

The depths of the grooves is an important consideration. Those in the bottom piece are cut to only $\frac{1}{4}$ in. deep, while those in the top are cut to $\frac{5}{8}$ in. deep. This is necessary in order to allow the glass to be put in after the case has been assembled, and also so that it can be taken out for cleaning. The grooves in the ends can be cut to a depth of $\frac{5}{8}$ in.

Clean up with a smoothing plane and glasspaper all interior surfaces, and apply a coat of wax polish. Before

LIST OF MATERIALS

Hardwood. Two pieces 26 $\frac{1}{2}$ ins. by 9 ins. by $\frac{1}{2}$ in.
Two pieces 12 $\frac{1}{2}$ ins. by 9 ins. by $\frac{1}{2}$ in.
18oz. glass. Two pieces 13 ins. by 10 $\frac{1}{4}$ ins.
Three 1 $\frac{1}{2}$ in. mirror plates, with 1 in. screws

gluing up, it is advisable to have the glass cut to size. If the measurements given have been adhered to, the size in the cutting list will be required. If the sizes have been modified, the length of each piece of glass must be cut to about $\frac{1}{8}$ in. longer than half the interior length of the book-case. The height of each piece is $\frac{1}{4}$ in. more than the interior height of the case. The glass is put in by inserting it into the top groove, and then lowering it into the bottom groove. The width of the grooves allow adequate clearance for this to be done without difficulty.

Planing Hint

Glue up the case, using sash-cramps if available, and check for square. If the joints are a good fit, they can be tapped up with a hammer, but if this is done, use a thin glue, or it may not be possible to drive the joints home fully.

When the glue is dry, clean up the

outer surfaces with a smoothing plane and finish with glasspaper. All planing should be done towards the centre of the wood, otherwise there is a danger of splitting the exposed end grain of the joints. Clean up, too, the front and back edges of the case. Cut recesses in the back edge for the three mirror plates, and screw these in position. Wax polish the outer surfaces.

The edges of the glass doors can be ground by placing them on a flat table with the edge projecting no more than $\frac{1}{4}$ in., and rubbing with an ordinary oilstone. (If this grinding is done by the supplier, the glass becomes subject to purchase tax.)

Attractive handles

The handles look attractive if made in a contrasting wood. The ones on the book-case shown in the photograph were made in purple-heart, providing a marked contrast with the sycamore. Fig. 6 shows details of one of the handles made in the original. They are best made together from a piece of wood $\frac{1}{4}$ in. thick. After shaping, saw down the centre and smooth off with a plane. There are several adhesives on the market which are suitable for securing the handles to the glass.

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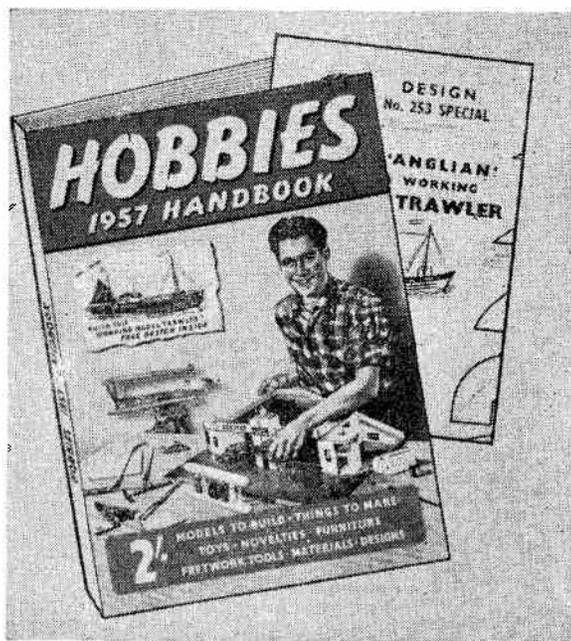
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THE ELECTRIC MOTOR

IF you have made the model electric current detector you will have learned how an electric current flowing in a circular conductor causes a magnetic compass needle placed at the centre of the conductor to move. You can study the effect of an electric current flowing in a linear conductor by

wooden stand as in Fig. 18. Two long bar magnets, with unlike poles together, are placed as near to the coil as possible, allowing it just sufficient space to turn. A permanent horseshoe magnet from a magneto is more effective than the two bar magnets. You may be able to obtain such a magnet from a garage.

Connect the ends of the coil to your current reverser and a battery, and try

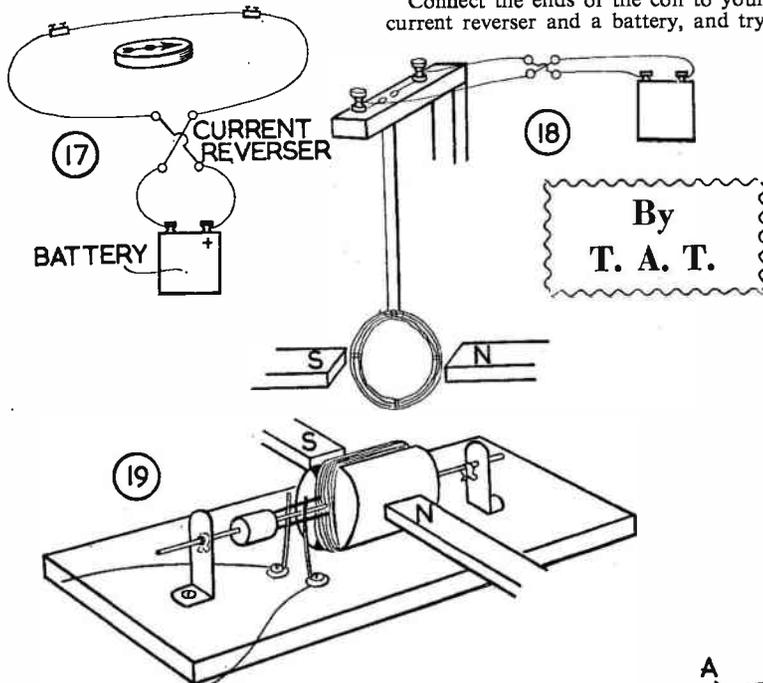
the effect of sending the current first one way, then the other.

A Simple Electric Motor

Wrap as many turns of insulated wire as you can on a large cork (Fig. 19), first cutting grooves in opposite sides of the cork to hold the wire. The ends of the wire are bared and held in another small cork. Both corks are supported on a steel knitting needle, Meccano axle rod, or piece of brass rod which passes through holes in two supporting brackets made from pieces of tin plate. In this way the coil of wire can revolve freely. Both the corks must fit tightly on the knitting needle or rod. Bar magnets with unlike poles together are placed on either side of the large cork, and two lengths of copper wire act as brushes, to lead the electric current in and out of the coil. Meccano spring clips keep the axle rod from sliding backwards and forwards horizontally in the tin plate supports as the cork revolves. You have now made a simple electric motor and should try the effect of reversing the electric current and the magnets.

How to Improve Simple Electric Motor

In the simple electric motor the insulated wire wrapped on the large cork is the armature and the bared ends of the wire pushed into the small cork serve as the commutator. You should now investigate the effect of wrapping the armature coil on a laminated soft iron core instead of on the cork, using the



By
T. A. T.

using the current reverser and a compass needle as in Fig. 17.

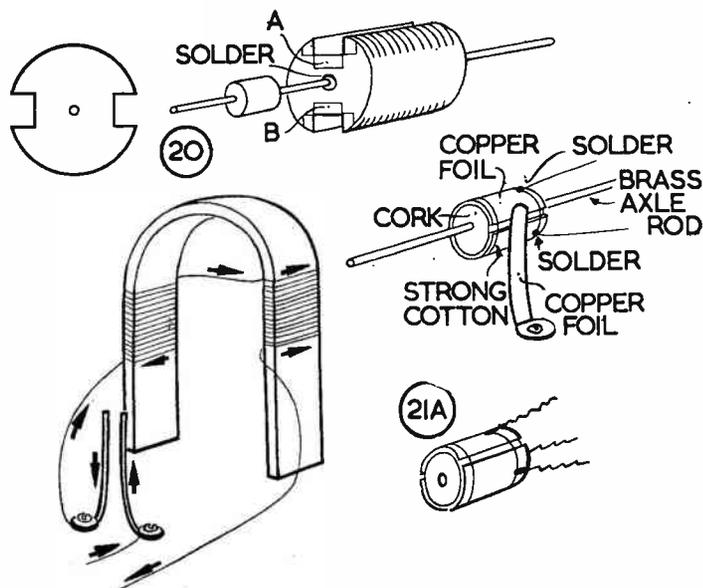
With the compass needle below the wire, the north-seeking pole is deflected towards the left when the current flows from left to right, looking in the direction of the current, and to the left again, still looking in the direction of the current when it flows from right to left.

Repeat these observations with the compass needle above the wire.

Effect of Fixed Magnets on a Circular Conductor

You should now study the effect of fixed magnets on a coil of wire, carrying an electric current, which is free to move. This is the principle which is applied in the electric motor and in moving-coil instruments for detecting and measuring electricity.

Make a coil of about ten turns of No. 26 D.C.C. copper wire and about 1 in. in diameter. Suspend it from a



same magnets, the same mounting and the same number of turns of wire.

To make the soft iron armature, circular pieces of thin tin plate, the same diameter as the cork, should be cut out and small pieces removed to take the wire as in Fig. 20. Each piece should have a hole drilled in the centre to take the axle and a sufficient number of pieces should be made, so that when placed on the rod the total length is the same as the cork. The completed core mounted and ready for winding is illus-

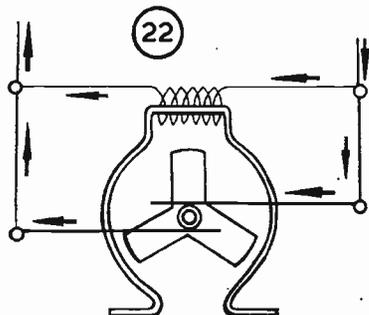
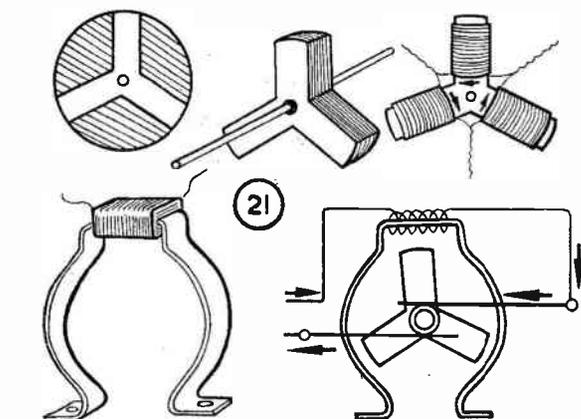
are two-pole motors and require a twist to start them. This three-pole motor is a self starter. When the magnetic field is supplied by an electromagnet, as with this motor, there are two methods of supplying the electromagnets and the armature with electric current. This motor illustrates the series-winding method, the next the shunt-winding method.

Cut out about a dozen circular pieces of thin tin plate (Fig. 21). Drill each through the centre to take a brass axle-

reverse your motors and read about the characteristics of the various types.

Simple Electric Fan

The fan blades are made from thin card or aluminium, and these are held in oblique slits made in a cork which is fixed to the end of a brass axle-rod. The armature (B) is made from three or four strips of tin plate drilled and soldered to the axle-rod and wrapped with paper and 5 or 6yds. of insulated wire. The ends of this wire are sup-



trated (Fig. 20). (A) and (B) are pieces of paper placed along the grooves to prevent the sharp edges of the tin plate from cutting through the insulation on the wire. The axle rod, preferably of brass, is soldered to the outer surfaces of the first and last discs. During this soldering the discs should be clamped tightly together.

The permanent magnet may next be replaced by an electromagnet built up from a few strips of tin plate bent into a U-shape and wound with about fifty turns of No. 26 D.C.C. wire on each arm, one arm in a clockwise direction, the other in an anti-clockwise direction (Fig. 20). You can also try a better type of commutator and a better pair of brushes, using copper foil or thin tin plate as shown.

Three-pole Series-wound Motor

The electric motors already described

rod, and then cut them to the shape illustrated by removing the shaded parts. Place them on the brass axle-rod and fix the two outside pieces to the axle rod with solder. Wrap a little paper round the arms to prevent the sharp edges of the tin from cutting through the insulation on the wire which is to be wrapped on these arms.

Take three lengths of No. 26 D.C.C. copper wire and wind one length round each arm, taking care to wind each arm in the same direction. Twist the ends together and solder them to three pieces of copper foil fixed round a cork as shown (Fig. 21A). Mount this armature as already described.

To make the electromagnet cut two or three strips of tin plate each about 1in. wide and bend them into the shape illustrated. After wrapping the upper part of the field magnet with paper, wind round about fifty turns of No. 26 D.C.C. wire. Connect up the brushes and electromagnet. The windings of the armature are connected in series with the coil of the electromagnet. The battery connections are to one of the brushes and to one of the ends of the wire round the field magnet.

Three-pole Shunt-wound Motor

The motor used in the last exercise can be converted into a shunt-wound motor by connecting the armature windings in parallel with the magnetising coil (Fig. 22). You should find how to

ported by a small cork fixed to the axle-rod. The field magnet (C) also consists of three or four pieces of tin plate, wrapped with paper and 5 or 6yds. of insulated wire and fixed to the wooden base. The axle-rod is filed to a fine point which fits into a well-oiled duct made in (C). The rod is supported in a hole made in a tin plate strip supported by two upright pieces of wood fixed to the base. The method of supporting the brushes is shown in Fig. 23. You should try the effects of series- and shunt-winding the armature and the field magnet.

● Continued from page 259

Focus on Pets

family snaps — they should be unobtrusive, generally not high-lighted, and can often be thrown out of focus with advantage to assist in the 'standing-out' of the pet.

Novelty Poses

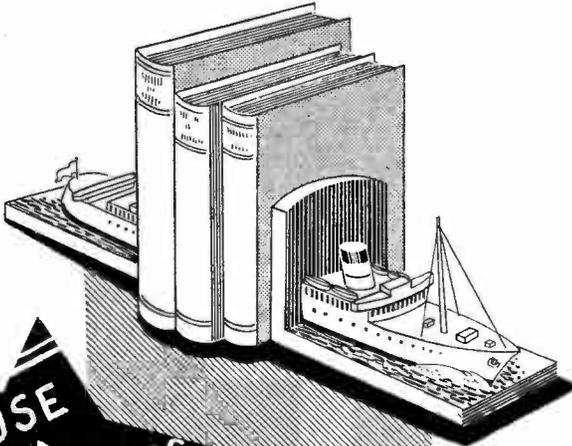
These are always of wide general appeal for magazine reproduction. The dog with his master's pipe in his mouth, or a pair of lensless spectacle frames on his nose — we see them often in popular magazine photos. Here your own ingenuity and discipline over your pet is the only limiting factor.

Finally, if you have no pet of your own, your camera will be welcomed at the home of a friend who has one.

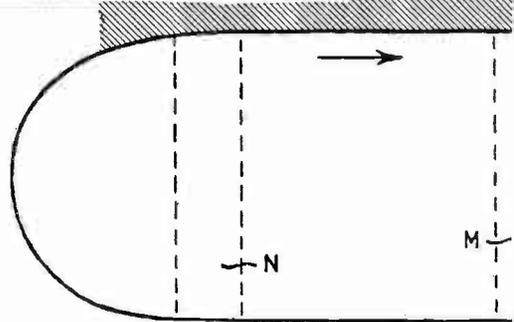


FRETWORK PATTERN

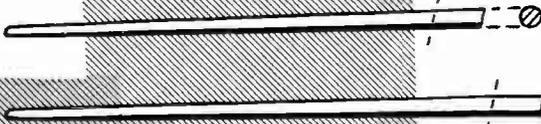
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USE
A
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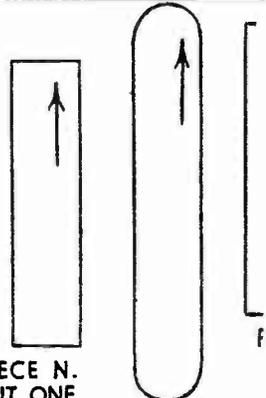


PANELS OF WOOD
REQUIRED FOR THIS
DESIGN
TWO GD6, ONE G4,
ONE G2.



MAST P. SHAPE
ONE FROM 1/8IN.
DIA. ROUND ROD

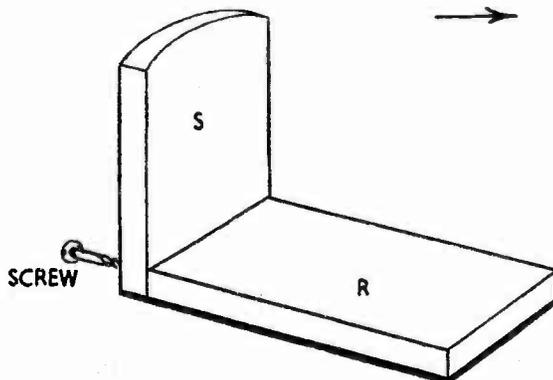
MAST Q. SHAPE ONE
FROM 1/8IN. DIA. ROUND ROD



PIECE N.
CUT ONE
1/4IN.

PIECE O
CUT ONE
1/8IN.

PIECES R.
CUT TWO 3/8IN.

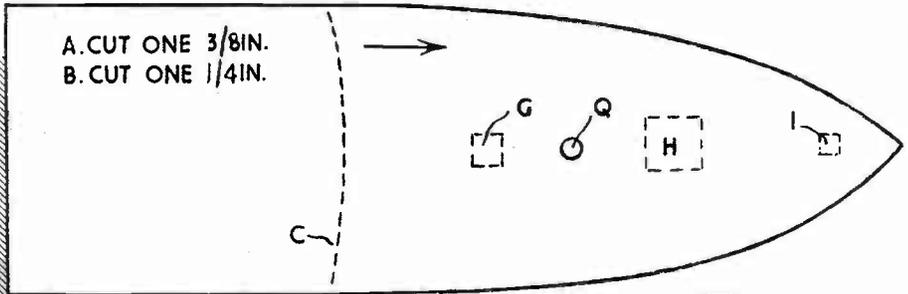


THE ARROWS INDICATE
DIRECTION OF GRAIN
OF WOOD

PIECES S
CUT TWO 3/8IN.

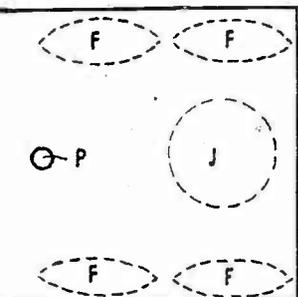
BOOK ENDS

A. CUT ONE $\frac{3}{8}$ IN.
B. CUT ONE $\frac{1}{4}$ IN.

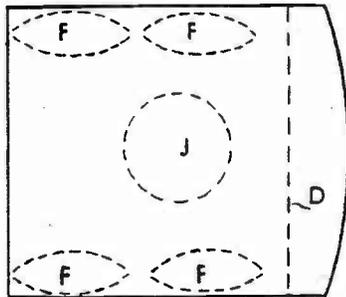


K. CUT ONE $\frac{3}{8}$ IN.
L. CUT ONE $\frac{1}{4}$ IN.

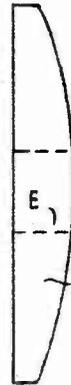
M



PIECE M. CUT ONE $\frac{1}{4}$ IN.



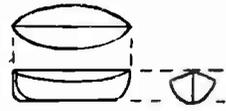
PIECE C. CUT ONE $\frac{1}{4}$ IN.



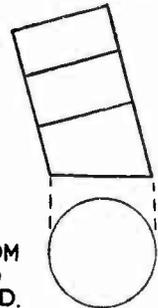
PIECE D.
CUT ONE
 $\frac{1}{4}$ IN.



PIECE E.
CUT ONE
 $\frac{1}{8}$ IN.



BOATS F. MAKE 8
FROM WASTE $\frac{1}{4}$ IN.
WOOD

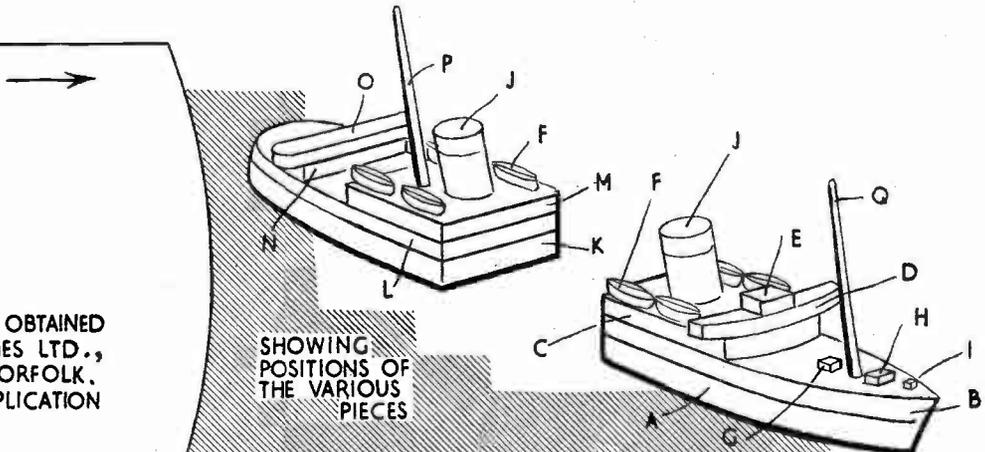


FUNNELS J.
CUT TWO FROM
 $\frac{1}{2}$ IN. ROUND
ROD.



PIECES G, H, I, CUT
ONE OF EACH $\frac{1}{8}$ IN.

CUT ONE $\frac{1}{8}$ IN.



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COLLECTING BEACH PEBBLES

IF you're spending your summer holiday by the sea this year and start pebble collecting, it can be the start of a hobby that will bring you interest for a long time to come.

It is quite inexpensive. All you need as tools to begin with are, a primer on geology, a geologist's hammer and a small magnifying-glass. Then, it's only a question of time and the collector can acquire an array of choice specimens at no cost whatsoever.

If you live on or near the coast adjacent to a pebble beach, your problem is solved; otherwise your pebble collecting will have to be done during your annual summer holiday.

Educational

Another advantage of this hobby is, that it can also occupy your spare time all through the long winter evenings, because as we shall see later on there will be plenty to do with your pebbles during that period.

Once you've taken up this hobby you will feel an urge to add to your knowledge of geology, and will not be content with the mere rudiments of your primer.

All your walks abroad will take on an ever-increasing interest, because gradually, you'll be able to read 'the sermons in stones, books in the running brooks', as the enthralling record of the creation of the rocks gradually unfolds itself before your eyes.

Pebbles, as you find them on the beach, will not inform you from what kind of rock they came, because they have acquired to some extent a disguise in the form of a 'skin' as the experts name it, as the result of the rolling and weathering they have endured. What you must strive to do is to find two pebbles of each kind, keeping one in its beach disguise, and breaking the other with your hammer in order to display a fresh unweathered surface, which will tell you the kind of rock from which it came.

Exciting possibility

From the broken pebble you can learn much about the composition, texture and colouring of the parent rock, and from the unbroken pebble you'll be able to memorise the appearance of a beach pebble of that rock.

Remember in your pebble quests that there is always the anticipation and excitement of coming upon a semi-precious stone. They all belong to the quartz family, and a very handsome family it is. If you spend your holiday in Cornwall, for instance, you may find an amethyst on a pebble beach. These

stones are to be found also on the East coast of Scotland. We are all familiar with the beautiful stones used to decorate a Highlander's dress. They are all pebbles from the Scotch mountains, which find their way to the pebble beaches on the coasts of Scotland; and later on some of them drift to our East coast by longshore drifting. Other semi-precious stones to be come upon on our pebble beaches are onyx, agate, cornelian and sard. If you are ever lucky enough to come upon one of these you can have it cut and polished for a very modest sum.

Under each pebble in your cabinet you should place a card on which you have entered the name of the rock, the beach from which it came and the date of the find. Failing a proper geological glass-topped shallow showcase, glass-fronted cupboards, fitted with a good number of shelves, all of little depth, are excellent.

It was said earlier that this was a hobby that you could continue during the winter months, even if you reside far from the coast. What can you do till your next holiday when you go pebble hunting once more? There is plenty of work to keep you occupied. You can now start to give your pebbles a polished appearance by the following methods. Just as a clean wet pebble displays a

cleaner surface than a dry one, so a clean varnished pebble reveals a surface at least as clear, and retains it for a much longer period. While the sheen of the varnish lasts, the pebble almost appears to have been polished. You can also apply the varnish to a flattened side of a pebble. All limestones, for example, and many other rocks that are not too high on the scale of hardness, rub down easily on a flat piece of tough sandstone or grit. A smoother polish may be obtained on a piece of carborundum, and a still better one by using different grades of carborundum powder on plate-glass. Then, perhaps, your town has a museum. If so, you can study the pieces of rock there that will add much to your knowledge.

Smoothing the path

Look around and up at the public buildings as you walk the streets. Examine the Town Hall, the churches, the bridges, etc. They will tell you more now than they did before. Ask yourself of what stone they're built and from what part of the country it probably came.

Finally, there may be a local geological society you can join. There you will meet people who will be able and willing to help you by answering your questions and so smoothing your path to further study. (A.E.)

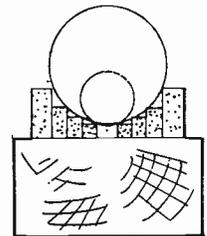
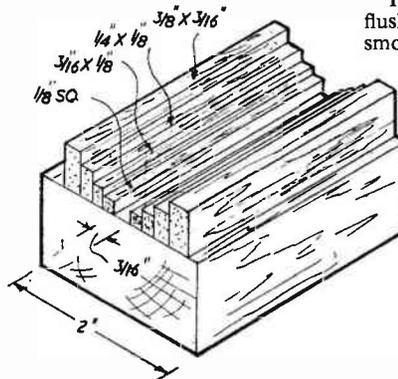
A Soft Jaw Vee Block

THIS 'soft' V-block is an ideal jig for holding polished metal tubing or other cylindrical objects for drilling. The jaws have sufficient 'give' to hold the work securely and, being much softer than the work surface, cannot scratch it.

A block of hardwood forms the base, about 2ins. wide and as long as you want the support to be. The jaws are

then built up from standard sizes of medium balsa strip, cemented in place as shown in the sketch. Start by drawing two parallel lines $\frac{1}{8}$ in. apart down the centre of the block and cement on the two $\frac{1}{2}$ in. square pieces. Either pin these in place temporarily to prevent them being displaced, or wait until the cement has set, and then cement in the remaining strips.

The ends of the strips can be trimmed flush with a razor blade and finished smooth by glasspapering. (R.H.W.)



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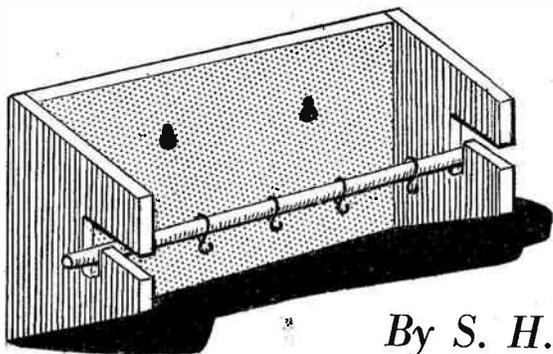
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Serviceable Rack for Film Drying

By S. H. Longbottom

WITH the ever increasing cost of processing films, many amateurs are now developing their own films, either by the old fashioned see-saw method in a dish, or in one of the modern tanks.

Whichever way you do it, the film has to be dried, and the greatest enemy during this part of the process is dust. The wet emulsion is particularly sensitive to dust and abrasion, so that drying is one of the most important parts of the whole operation. A speck of dust on the film, means a white spot on the print and which becomes even greater on enlargement.

The rack shown can be very quickly made to hang in a quiet corner of a room away from constant streams of dust.

A piece of $\frac{1}{2}$ in. wood, 5 ins. deep and 1 ft. 1 in. long is required for the back portion, with two end pieces of similar material 5 ins. square. Hardboard may be used instead of wood for these two end pieces. Note that two slotted holes have been provided in the back for hanging the rack on to permanent screws in the wall, or, alternatively, two

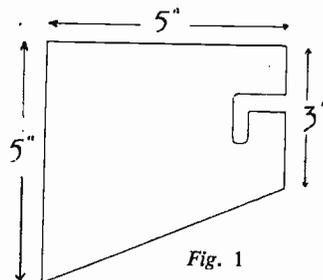
cup hooks may be screwed in on the top edge. The end pieces are clamped together and cut out as shown in Fig. 1. Here a slot has been prepared to drop in a dowel rod, which should be 4 ins. longer than the fitting when finished. The dowel rod should be $\frac{3}{8}$ in. in diameter and the slot made accordingly.

The end pieces are attached by nails or screws, but it is advisable to glue a strip of quarter round beading at each inside corner for strengthening purposes. Note that the slots for the dowel rod are made by drilling two $\frac{3}{8}$ in. holes 1 in. in from the front, and 1 in. lower down, and then the slot cut out. Smooth off any roughness with a file.

The illustration shows four 'S' hooks on the rod and these have been made from paper gliders, straightened out and shaped round the dowel rod, but with the lower end open to form a hook. The films are retained in film clips, or bulldog holders, and hooked on to these hooks for drying. The measurements given are for a small rack to hold four films, probably as many as will be developed at any one time, but if it is desired to allow for a greater capacity, it

is only necessary to lengthen the back piece of the rack and the length of the dowel rod.

When a film is removed from the washing water, it is a good plan to rinse it in what is termed a 'wetter'. This has the effect of spreading the water evenly, so it will drain away rapidly without staying in little drops in many places on a film. The process can



be assisted by wetting two fingers, placing one at each side of the film and drawing them down to the bottom of the wet film, thus squeezing some of the water out, but remember not to apply too much pressure or the film may be scratched. Wetters are sold by all photographic stores in liquid form under many proprietary names and full instructions for dilution are given.

Underwater Spear

UNDERWATER fishing is becoming an increasingly popular pastime and there are many places around the coasts of Britain where people may try this sport.

The fishing spear described here will make a useful addition to the enthusiast's kit, and it can be quickly made.

Purchase a suitable spike for the end. These are readily obtainable in a variety of shapes and sizes from any shop that sells fishing equipment. Possibly, such a spike could be made. A piece of tubing 3 1/2 ins. long is also required and a 1 in. length of rod (brass, copper or steel).

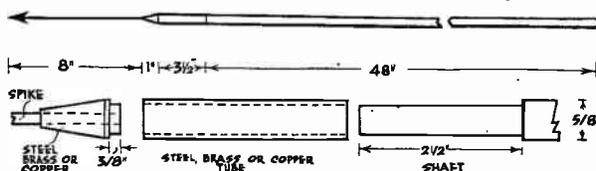
Firstly shape the smaller length of metal as shown. The ideal would be to turn this on a metalwork lathe, but alternatively it can be filed. Hold securely in the vice and drill a hole down

the middle to the size of the diameter of the spike and then solder the spike into the hole.

Cut the piece of tubing to the required length, making sure that the ends are

of a hardwood and must be straight grained to prevent bending after immersion in sea water. Round one end and then carefully shape the other end so that it is a good tight fit into the metal tube. Knock into the tube with a mallet.

Glasspaper the shaft smooth and give it several coats of yacht varnish, glass-



perfectly square. Fit the solid piece of metal into the tubing. Drill a small hole through both and secure with a brass pin, riveting over the ends.

A piece of $\frac{1}{2}$ in. dowel rod is required for the shaft. This should preferably be

papering down between each coat. Paint the metal parts to prevent rusting or tarnishing.

Always remember for safety reasons to keep an old cork over the spike when not in use. (A.E.H.)



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Replies to Readers

Is this YOUR Problem?

A Blistered Veneer

HOW can I remove blisters from the top of a sideboard due to water from a leaky vase? (W.C.—Stoke-on-Trent).

THE blister should be cut across in such shape that it will not be noticeable when repolished, so as far as possible let the cut follow the line of grain. Hot thin glue should be worked under the cut veneer with a thin knife, kept hot by dipping in hot water. Rub out surplus glue. Have ready a piece of wood, well heated, place paper over cut and lay wood on top, weighting the lot down with a heavy box, or cramp up if feasible. Next day clean off the paper with a scraper, make good any defects with coloured stopping and repolish.

Grinding a Glass Stopper

IHAVE an old decanter, but the stopper does not fit as it is slightly on the large side; can you tell me how to reduce it slightly in diameter? (B.M.—Oxshott).

PRESUMABLY the decanter and stopper are of glass, in which case the only feasible way of reducing the diameter of the stopper is by grinding. If a lathe is available, the stopper can be held in a chuck and the grinding accomplished by applying a coarse carborundum stone to the conical surface, whilst keeping the whole well lubricated with water. In the absence of a lathe, the best plan is to make a conical hole in a piece of wood and to use coarse carborundum grinding powder and water and rotate the stopper in the conical hole until sufficient has been ground away to suit your purpose.

Decorating over damp

IHAVE a number of damp patches on the inside of a plastered wall, and have a quantity of double thickness brown paper which is impregnated with bitumen. As yet I have been unsuccessful in finding a suitable adhesive to bond this to the wall before decorating, and would be glad if you could help me. (V.M.—Bishopston.)

AMIXTURE of strong flour or dextrine paste, with an equal amount of made glue may stick the paper to your wall. In our opinion, a better preventive against damp would be to apply a coat of Kuro, a decorative waterproof paint. If you cannot obtain

this locally, it can be bought direct from Devon Paints Co., Church Lane, Barnstaple, Devon. You can safely paper over this if you wish.

Preparing for paint

IWISH to paint my car, but before I do so I need a filler for some bad patches on the bodywork, where the weather has got under the cellulose. Can you advise me on this matter? (J.L.—Plumstead.)

WE advise that with wet and dry rubbing-down paper, you should remove all paint, etc., down to the metal, and clean off. Over this apply the filling, pressing it across the metal with an old knife. Let dry and apply a second lot if the first has shrunk in drying. After filling, rub down again and coat with priming. Again rub lightly down then paint or cellulose. A vital point to remember if the final coat be paint — use paint filler and priming. If cellulose, you must employ cellulose priming and filler, as cellulose will not lay on paint. The special primers and fillers for the work, also the wet and dry paper (which is dipped in water during the work) can be bought at oilshops and ironmongers.

Waterproof Glass Cement

WHAT is the best method of sealing two pieces of glass (butt to butt) in a conservatory, where driving rain seeps through? (D.K.—Trowbridge).

AWATERPROOF glass cement suitable for your purpose can be made from five parts by weight of hide glue, and one part by weight of calcium dichromate. The glue is allowed to swell in contact with water in the usual way, and then melted in a glue kettle. Dissolve the calcium dichromate in the smallest possible quantity of warm water, and mix it with the glue. Apply this to the glass in fine weather — a few hours of daylight are needed before it becomes waterproof, and it is essential that no rain fall on it during that time, otherwise it may wash out.

Levelling for Tiles

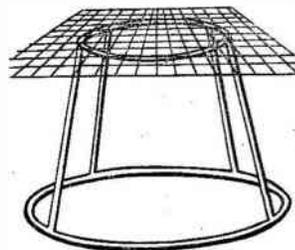
IWISH to lay some tiles of lino or rubber on my kitchen floor. The floor is of very uneven tiles at present. What is the best way of levelling the floor. (A.B.—Harefield).

FOR successful laying of tiles it is essential to make a flat firm bed for them. Clear off the old tiles, see the foundation is firm to start with, then lay

* * * * TIMELY TIP * * * *

Chemistry Stand

AN old lampshade frame makes an excellent support for vessels which have to be heated over a Bunsen burner. When small containers are being used, a piece of wire mesh (small mesh wire netting will do) should be placed over the stand, the height of which should be about ¼ in. above the flame. Bending outwards the 'legs' of the stand will decrease to the height required.



a strip of wood the same thickness as the proposed cement bed, along one side of room, and a second strip down centre. Trowel in a mixture of 1 part cement to 3 parts sand, and level off with a straightedged wood lath. Lay a third strip the opposite side of room and follow same procedure. Let set, knock wood strips away and fill up gaps with cement. Leave awhile for cement to set and dry, then lay the tiles and you should have a satisfactory job of work.

Free Offer to Woodworkers

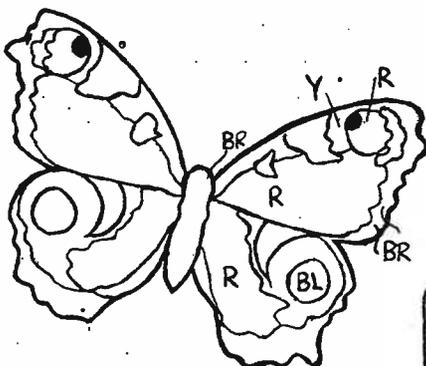
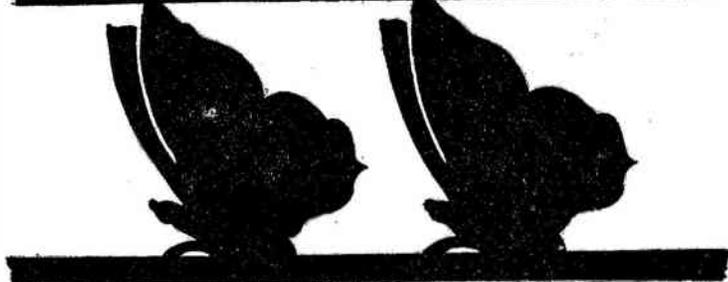
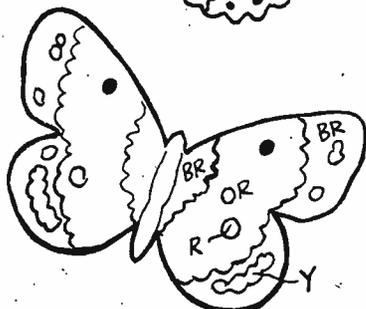
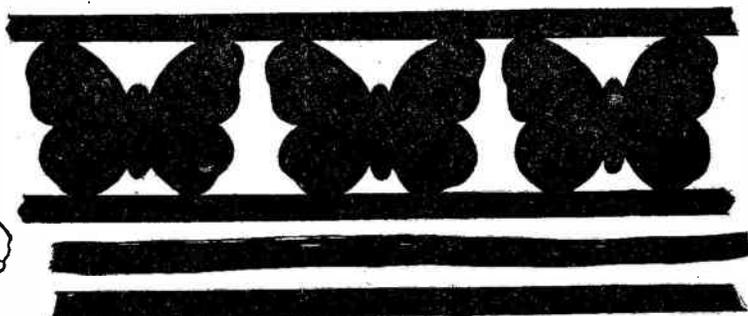
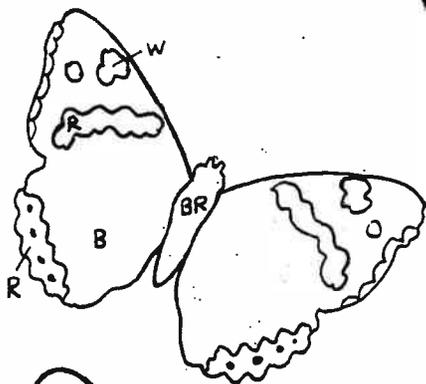
ASET of 16 cards issued by Croid Ltd. (the glue manufacturers) makes a valuable reference for the handyman, covering the making of all types of woodwork joints. These cards contain all the necessary details for making halved, dowel or mitred joints, mortise and tenon, edge to edge, angle bridle, tongued and grooved, dovetail, housed, bridle and lapped joints. Other useful but more difficult joints explained are the dovetail halving, mitre with false tenon, and crossed halving. A list of tools needed for these joints is also included.

These details are a great help when making small articles of furniture, and a good working knowledge of each joint helps considerably when the worker is constructing from his own designs.

Readers of *Hobbies Weekly* are invited to obtain a free set of these cards. Send your name and address on a post-card to: Croid Ltd., H.W. Joint Cards, Imperial House, Kingsway, W.C.2.

For screens, lampshades, etc.

BUTTERFLY PATTERNS

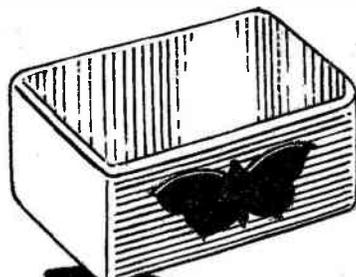


COLOUR KEY

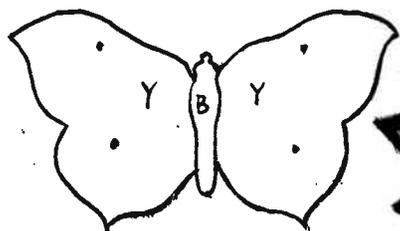
- W = White
- B = Blue
- BR = Brown
- R = Red
- OR = Orange
- Y = Yellow
- BL = Black

NATURAL objects, if adapted for the purpose, make excellent decorations for small boxes, firescreens, lamp shades, etc. We have shown animals and birds as overlays in many of our designs, and this week we give patterns of butterflies which can be used full size or enlarged as required.

Individually they can be used as overlays cut in thin wood or plastic. They can be painted in natural colours as indicated or may be in silhouette form only.



Keep this article handy for future reference. The butterfly motif can be applied to many projects



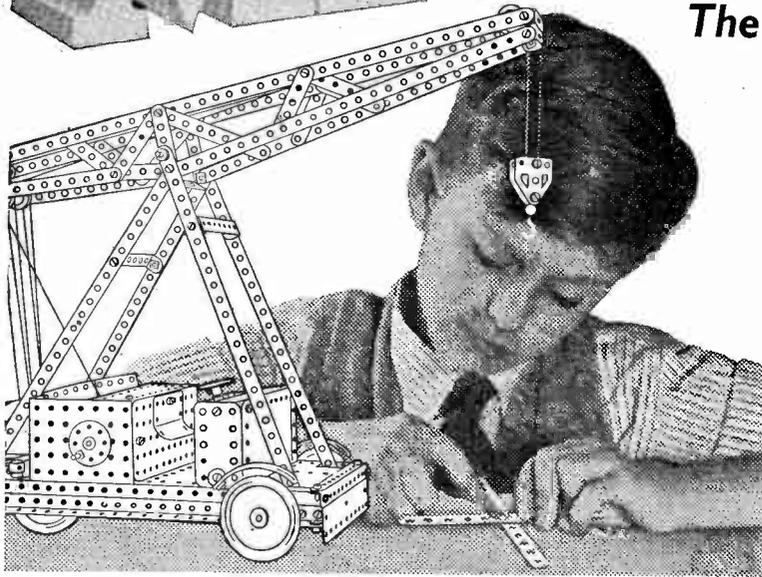
FOR
FRETWORK
DECORATION

Inlay woods of suitable colours may be used to build up a butterfly marquetry picture in miniature. In this way they can be used for decoration in a similar manner to the overlays.

Using a conventional outline the butterflies can be grouped together to form borders as shown in the illustrations at the top of the page.

If you need further illustrations to work from you will find them in any good encyclopedia. (M.p.)

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