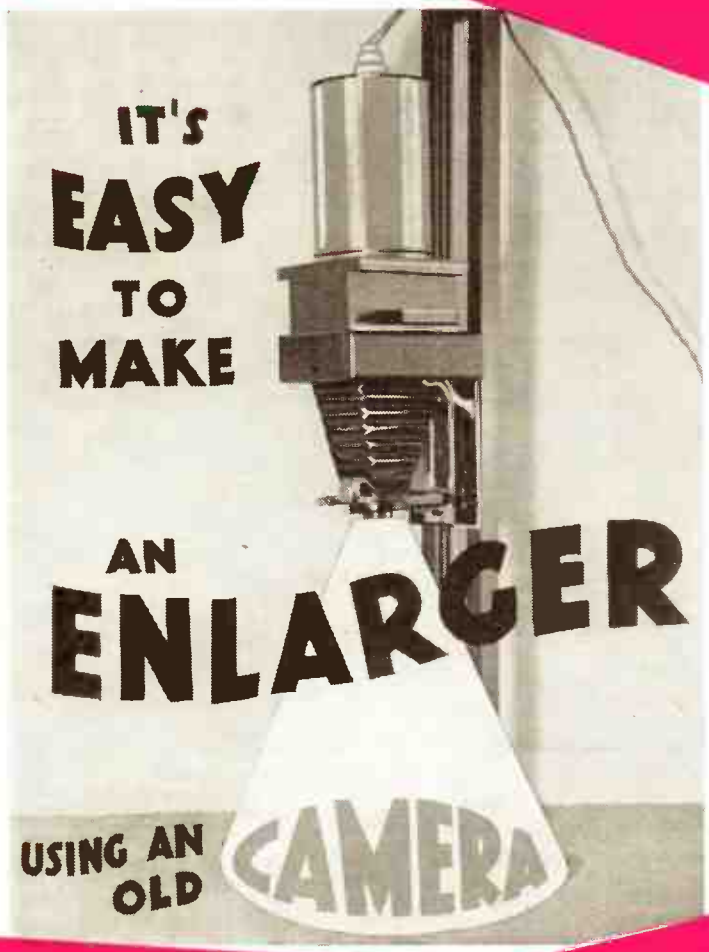
14th FEBRUARY 1962 VOL. 133 NUMBER 3453

THE ORIGINAL 'DO-IT-YOURSELF' MAGAZINE

HOBBIES weekly

FOR ALL HOME CRAFTSMEN



IT'S EASY TO MAKE AN ENLARGER USING AN OLD CAMERA

Also in this issue:

FINISHING THE GARAGE

COLLECTORS' CLUB — LATEST RELEASES

PUTTING MODELS IN BOTTLES

FRETWORK PROJECT — DESK BOOK-RACK

TRANSISTOR DETECTORS

ETC. ETC.

Hobbies

Up-to-the-minute ideas

Practical designs

Pleasing and profitable things to make

5D

SIT down and see how many seats you can find on stamps and labels. You'll find thrones, benches, settles, stools, chairs, etc.

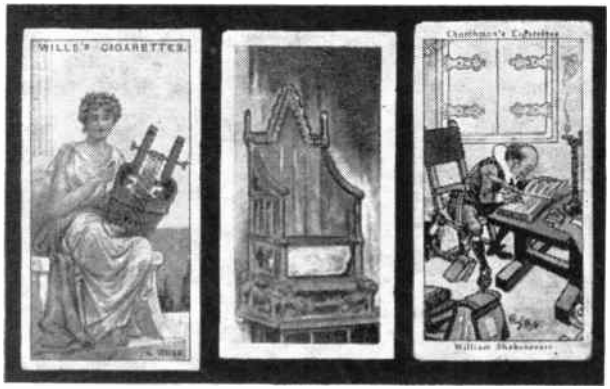
Primarily the seat was intended for rest. Then it came to be symbolical of authority. The first chair or throne was the piece of rock, or log of wood, or mound of earth.

The hunter returning from the chase, the ploughman plodding home to cast himself wearily on the seat near his fire — the seat which thus becomes the symbol of the head of the house.

When you come to consider it there are but two ways in which a chair can be supported, its legs must be crossed or upright. The cross-legged chairs seems to have been the favourites in Anglo-Saxon times. There is much to be said for them. They support any weight placed on them in the most perfect manner. They also allow plenty of movement without risk of upsetting or of breakage. Again, they do not need so much bracing as chairs with upright legs. So the cross-legged chair was long in fashion.

Themetime:

THE SEAT



In the dwellings of the Stone and early Bronze Age a dais of stone occupied one segment of the circular hut. It serves as a seat by day and as a bed by night, and the fire burned in the midst before this dais. That was the forerunner of the settle — a bench with a back to it to cut off draughts from behind, and sometimes with a canopy over it to cut off the down draught.

Some settles that I have seen combine more features than these. The upper portion serving as a canopy consists of small closed compartments in which the tea and sugar are kept, out of reach of the children. Then the back is also occasionally made deep, and guarded with doors and converted into a cupboard in which the bacon is hung. Then the seat is raised and discloses a coffer, in which the baby is put, where it is safe, whilst the mother is engaged at her work.

The chair has gone through many transformations, notably about the legs.

With the bracing of the upright legs came more variety in style. At a time when the floors of homes were of stone and strewn with rushes, then it was necessary for the ladies to keep their feet up, so that they might not be chilled, and as a preventive of rheumatism. Accordingly, the early straight-legged chairs generally had the braces at the bottom, and that in front served also as a footstool. But when oaken floors were introduced, the need for footstools became less. Then the brace was moved upwards, and was made less solid. It was even dispensed with altogether in front, and employed for no other purpose whatever save as a structural element for holding the chair together.

The throne is spoken of as the figure that represents authority and power; and still it is taken as a token of being invested with these attributes, whereby a judge, or magistrate, or any officer can remain seated, while others stand.

★★★★★★★★★★★★★★★★★★★★★
★ NOTE TO CORRESPONDENTS ★
★ All correspondence on any subject covered in this magazine *must* be addressed to: The Editor, Hobbies Weekly, Dereham, Norfolk. If a reply is required, queries should be accompanied by a stamped addressed envelope and reply coupon inside back cover. ★
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LATE NEWS

ON December 1st five Pro Juventute stamps appeared from Switzerland. The 5 cent value shows the first president of the Swiss Confederation Jonas Furrer (1805–1865), from Winterthur, who devoted all his energy to the building and development of the young republic.

The other four values (illustrated) continue the Flowers series begun in 1958.

* * *

CHRISTMAS DAY COMMEMORATIVE

The Ketteler commemorative from West Germany described on next page

REST OF THE ISSUE FROM ST. HELENA

THE thirteen other stamps in the issue from St. Helena released on 12th December are shown in the above illustrations. Details of their designs, etc, are

1d. 'Cunning Fish'. Red, yellow, and blue.

1½d. 'Cape Canary'. Yellow, green and brown.

2d. 'Brittle Starfish'. Grey and red.

3d. 'Royal Effigy'. Blue and red.

4½d. 'Red-Wood Tree'. Brown and green.

6d. 'Red Bird'. Green, brown and red.

7d. 'Trumpet Fish'. Purple, red and black.

10d. 'Feather Starfish'. Red and blue.

1/-. 'Gum-Wood'. Yellow, brown and green.

1/6. 'Fairy Tern'. Blue, white and black.

2/6. 'Orange Starfish'. Green and orange.

5/-. 'Night-Blooming Cereus'. Green and yellow.

10/-. 'Deep-Water Bulls-Eye'. Orange, blue and black.

The £1 value showing Prince Andrew was illustrated last week.

MATCH LABELS IN CIRCULATION Nos. 51–64 of the Australian 'New Wild Life' Series

Advertisers' Announcements

WEST GERMANY

Wilhelm Emanuel Freiherr von Ketteler was born on 25th December 1811 at Harkotten, Westphalia, and died on 13th July 1877 at Burghausen, Upper Bavaria. From 1850 he was Bishop of Mainz, and he may be designated as a pioneer in the field of social development. In commemoration of Ketteler's 150th birthday, the Deutsche Bundespost issued a stamp showing a picture of his head. (See previous page.)

West Germany has also issued a 70 Pf value of the new permanent issue of postage stamps. Together with the 50 Pf and 80 Pf values the 70 Pf value bears the reproduction of the head of Ludwig van Beethoven. (Colour: dark green.)

Part 1

MAKING AN ENLARGER

By N. E. Jenkinson

A PHOTOGRAPHIC enlarger can be made quite easily from an old camera. There are two types of camera suitable for this purpose. Old plate cameras of the quarter-plate or 9 cm. by 12 cm. size are ideal, especially if they are of the double extension type. These cameras can be bought relatively cheaply in second-hand shops.

Another camera suitable for converting to an enlarger is one of the old, large, folding, roll-film type taking film such as the 130 size. These films are now unobtainable and such cameras are picked up very cheaply. If a camera of this type is used, or if a plate camera without a double extension is used, remove the distance scale from the base so as to allow the bellows to extend farther forward, which is essential for enlarging. The camera must possess a 'T' setting on the shutter so that the shutter can be fixed 'open'.

The enlarger illustrated on the front page was made from an old Voigtländer plate camera of the 9 cm. by 12 cm. size. The lens is a 135 mm. one, with an aperture of *f*/8, and is probably a cheap model. The quality of the enlargements will depend on the quality of the lens. If you can pick up an old plate camera with a Tessar lens then you are indeed fortunate.

If an enlarger is constructed to the measurements given, it will give an enlargement at least 6 in. by 4 in., from a VP size negative (2¼ in. by 1⅝ in.), and postcard size from a 35 mm. negative. It will also take any negative smaller than VP size and if the dimensions are adapted, will take the 2¼ in. square type.

Fig. 1 shows the constructional details of the condenser lens housing and the negative carrier holder. You will require a condenser lens of 3½ in. diameter. This will just cover the VP size negative and a smaller one should not be used. A piece of ⅝ in. wood, size 14 in. by 3¾ in., is required and some ¼ in. plywood.

The plateholder is removed from the back of the camera and replaced by a piece of plywood 6 in. by 3¾ in., containing a hole in the centre, size 2¾ in. by 1¾ in., as seen at A in Fig. 1. To it are attached two pieces of ⅝ in. wood, measuring 3¾ in. by 1⅝ in., as at B. These form the channel for the negative carrier. On top of these pieces is fixed piece C, made of plywood and measuring 5¼ in. by 3¾ in., with a hole cut from the centre, 3¼ in. in diameter. The condenser lens rests on this part.

The condenser housing consists of two pieces of ⅝ in. wood, both 5¼ in. by 3¾ in., and containing a hole 3½ in. in diameter in the centre, as at D. Part E is made from two pieces of ¼ in. plywood, both 5¼ in. square. The lower piece has a hole in the centre 3¼ in. in diameter. The upper piece has a hole to accommodate the lamphouse. The diameter of this hole will therefore depend on the size of the tin used for the lamphouse. A National Dried Milk tin, 4½ in. in diameter was used in the prototype. Nothing smaller should be employed, as the heat will become excessive in a smaller tin.

Fig. 3 shows the method of ventilating the lamphouse. A hole is cut in the base of the tin to take an ordinary lampholder. Around this hole drill a number of ¼ in. holes to act as airholes. To prevent direct light escaping, these holes are covered by a tin lid, slightly smaller than the lamphouse tin. A narrow wooden washer, ⅛ in. in diameter and marked A in Fig. 3, is inserted between the two tins to allow a free passage of air. The locking ring of the lampholder is then screwed in place. To minimise light reflection the top of the tin lid and the base of the lamphouse tin are painted matt black. Do not paint the remainder of the tin, otherwise it will smell of burning paint during use.

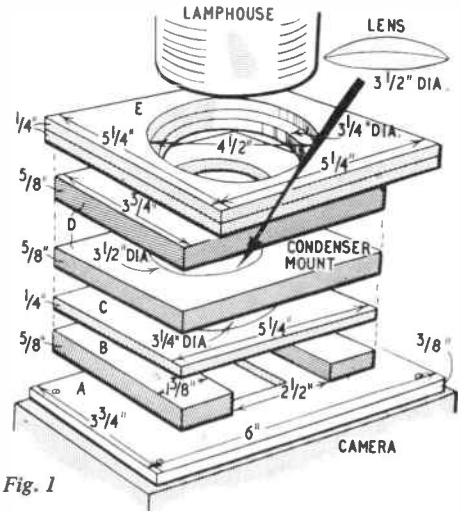


Fig. 1

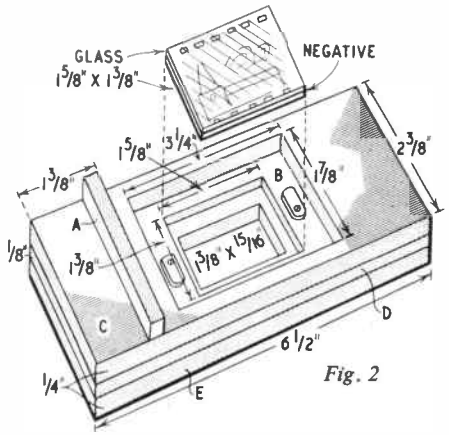


Fig. 2

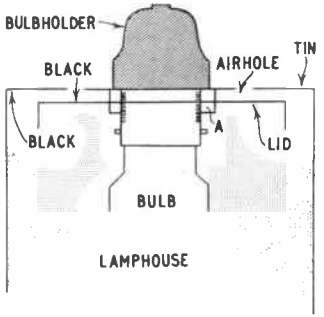


Fig. 3

● Continued on page 317

A SHELL GARDEN IN IRELAND

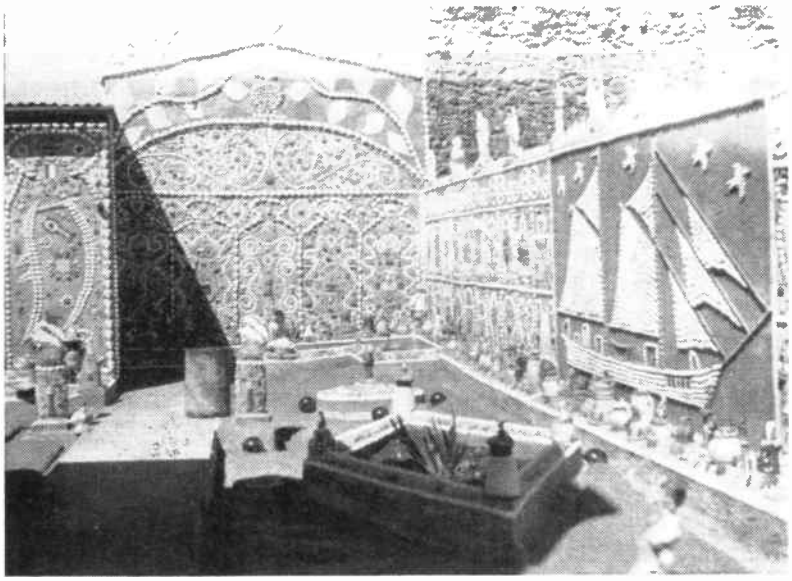
A RETIRED SEAMAN, living in Dungarvan, in the south of Ireland, began with his wife to make a shell garden in 1954, and to mark the start one of the walls was lettered MARIAN. Thousands of shells now cover the walls. There is no magic formula as to how it is done. Mr Foley tells no secrets, for there are none. You need only sand and cement — the rest depends on ingenuity.

By Fred. J. Chapple

Although a microscopical-looking creeper of the 'mind-your-own-business' variety is the only bit of greenery (which so neatly and effectively covers part of the ground and runs round pedestals and ornaments), saxifraga, primrose, forget-me-not, thyme, could be grown if desired.

What strikes the eye at first glance is the way in which the face of the walls has been so well filled and arranged with such skill. Variety is infinite: figures of men, women, children, animals, mosaic tiles, and windmills. The back of the garden (as illustrated), on the right-hand side, is like some eastern fairyland. In this part alone the number of shells is almost beyond computation; a diamond-shaped centre-piece has a creeper plant — a soft green cushion — many ornaments, and glass balls dotted around.

The far back wall, about ten feet high, and several feet wide, is fantastic, and built in stages. From the base five long panels lead up to a dividing line flanking the width of the wall. Of the three remaining parts, the first has encircling and winding scrolls, with a middle crown; the second incorporates leaves, and the upper portion is a zig-zag pattern which adds to the amazing variation of the entire wall.



The Shell Garden, Dungarvan, Ireland

On the right side a ship is in direct contrast to the elaborate work of the next panel, while the figures on the wall top are genuine antiques, representing kings and queens, Boadicea, and Shakespeare.

There are 123 squares or panels, each displaying a different design, over 200 separate pieces of ornaments, including teapots, clocks, jugs, plates, vases, and candlesticks. A beautiful embellished setting is that of the Madonna and Child elevated over the letter M with a little bird perched below looking across to a child sitting among shells.

To the layman it seems incredible that a patch of ground surrounding a house of moderate size should have its interior boundary walls covered with an enormous number of shells. 'We did it solely as a hobby, a pastime in retirement,' Mr. Foley said to me in a pleasant chat.

On the front of the house stand tall and graceful ornamental coloured pedestals adorned in shells; a model boat lies on the top of one and the figure of a woman on top of another. A large ship named 'Catherine Ellen' and flags are on one of the side walls — all shell made. Obviously his sea-faring days have influenced many of Mr. Foley's designs.

● **Continued from page 316**

MAKING AN ENLARGER

The negative carrier illustrated in Fig. 2 is for 35 mm. negatives. The measurements would have to be modified for different sizes of negative. It is made from two pieces of $\frac{1}{4}$ in. plywood and a piece of $\frac{1}{8}$ in. wood, all measuring $6\frac{1}{2}$ in. by $2\frac{3}{8}$ in. From the centre of the bottom piece E, cut a hole the size of a 35 mm. picture, $1\frac{3}{8}$ in. by $\frac{15}{16}$ in., and ensure that the edges of this hole are perfectly smooth, as any roughness will show on the enlargements. Part D is cut from $\frac{1}{8}$ in. wood, and holds the negative between two pieces of glass. Cut out a hole the size of a 35 mm. negative, $1\frac{3}{8}$ in. by $1\frac{5}{8}$ in., and obtain two pieces of thin glass of that size. The negative is positioned between the two glasses and they are then held in place by two small catches marked B in Fig. 2.

The negative carrier is completed by the top piece C, made from $\frac{1}{4}$ in. plywood, containing a hole $3\frac{1}{4}$ in. by $1\frac{7}{8}$ in., and by the addition of piece A. This is a small strip of wood which acts as a stop when the carrier is inserted in the enlarger and ensures that the negative is centred under the condenser lens.

When the whole assembly shown in Fig. 1 is finished it should be attached to the camera. Piece A has four screw-holes for screws to attach it to the camera but their location will depend upon the particular model used. Insert a 150 watt enlarger bulb, obtainable from any photographic shop, in the lamp-house and the enlarger is ready for use.

Instructions for mounting and finishing the enlarger will be given next week.

TRANSISTORS—PART 8

REGENERATIVE DETECTORS

THE diode detectors shown in previous circuits are very much used in all types of transistor receivers. They are trouble-free, give good quality reproduction, and require no extra controls. Their main disadvantage is that they are not very sensitive to weak signals.

If a transistor is used in a regenerative detector circuit, this can be very sensitive indeed to weak signals. It is necessary to have a further control, which acts in the same way as the reaction control in small valve receivers. This control is fairly critical to adjust, and cannot be used in the same way as the simple volume control which is used with a diode detector.

A regenerative detector is thus generally used when the best possible reception is to be obtained with the minimum number of transistors. When the circuit is working properly, increasing regeneration improves volume, until a point is reached when the set starts to oscillate. The regeneration control thus has to be adjusted in conjunction with the tuning control, to keep the set in a sensitive condition, just below the oscillating point.

Results to expect

In a regenerative circuit, a radio-frequency type transistor, such as the OC44, must be used. Transistors which are intended for audio frequency amplification will usually not work in such circuits.

By 'Radio Mech'

A single transistor set (regenerative detector) with a ferrite rod aerial will usually give sufficient headphone volume from a local station. If an amplifier stage is added, making two transistors in all, enough phone volume should be possible from a number of stations, in most parts of the country.

If some form of extended aerial can be added, even if only a few feet long, volume will be much increased. If a reasonably good aerial is possible, moderate speaker volume can be expected from two transistors (detector and amplifier).

For really good speaker volume, with an extended aerial (which may be indoors) three or four transistors will suffice. The same circuit will give reasonable speaker volume from local stations, with no external aerial.

Detector circuit

Fig. 33 shows a typical regenerative detector circuit, which will be found to give good results. The 300pF condenser is for tuning. A 500pF (·0005μF) condenser is often used here, though 300pF is sufficient to cover the usual medium wave band.

If size is of no importance, an ordinary air-spaced condenser can be used.

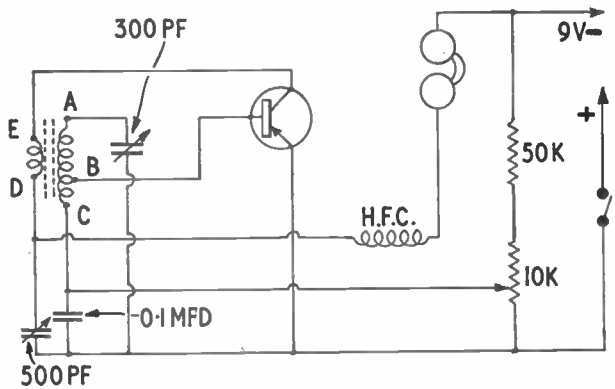


Fig. 33—Transistor detector with regeneration

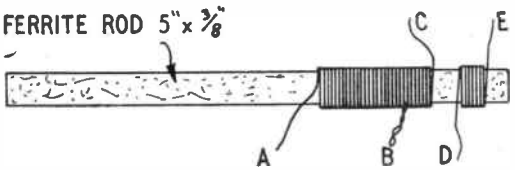


Fig. 34—Ferrite rod aerial

But if a pocket-sized set is in view, a miniature condenser will be wanted.

The 500pF condenser is for regeneration — an ordinary variable reaction condenser will do well. For a midget set, a 500pF compression condenser (see Fig. 3) may be used instead.

The 10K potentiometer allows the base voltage to be adjusted for best results, but in some cases it can be omitted, as explained later. It may be pre-set, or on the panel, with a knob.

Any ordinary High Frequency Choke is suitable. For small sets, or economy in size, a 1K resistor may be used here instead, with a slight loss in volume.

Rod aerial

A suitable ferrite rod aerial is shown in Fig. 34. It is wound with 26 S.W.G. cotton-covered wire. Winding A to C is 52 turns in all, and the loop B is 8 turns from C. The feedback coil D to E has 8 turns, and is about $\frac{1}{16}$ in. from the larger winding.

The ferrite rod need not be the size

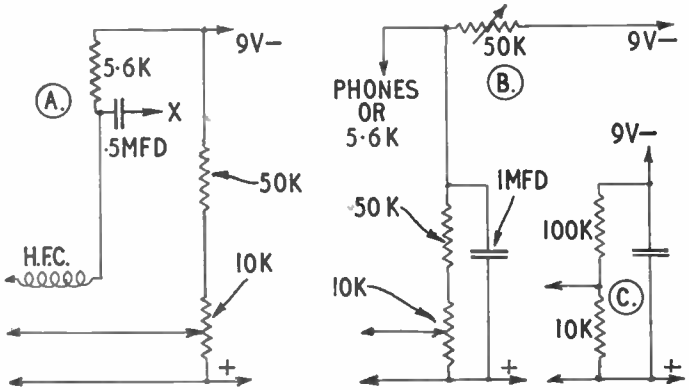


Fig. 35—Three circuit changes

shown. But much smaller rods or slabs may need a few extra turns, or the winding may be slid along nearer to the centre of the rod, which has the same result as using more turns.

If insufficient turns are used, the set will not tune to high wavelength stations, such as those around 450 to 550 metres. If too many turns are used, the set will not tune to low wavelengths, however, such as 200 metres. The usual medium wave coverage is about 200 to 550 metres. If the winding is wrong for the rod, and tunes 250 to 600 metres, for example, it is clear that any stations between 200 and 250 metres cannot be heard.

No trouble should be experienced if it is remembered that the set can be made to tune to lower wavelengths by removing a few turns, or by sliding the larger winding nearer to the end of the rod.

The ferrite rod aerial should be mounted on brackets or supports of wood or other insulating material, and should be clear of any metal items, or volume will be reduced.

Adjustments

When the set is first tried, the 10K potentiometer should be adjusted so that the slider is at or near the positive end of its track. It should be possible to tune in a local station, with the 500pF condenser fairly well closed.

Careful adjustment of the 10K potentiometer should then give an improvement in volume, until a spot is found where reaction can be easily controlled with the 500pF regeneration condenser.

If the 10K potentiometer is turned too far, regeneration will be difficult to control, and volume will fall. The potentiometer should not be turned beyond the point giving best volume, or reception may be accompanied by a high background noise.

It will be found that tuning is very much sharper, than with a diode type detector. If the controls are adjusted so that the transistor is *almost* oscillating, very weak signals can be picked up, and good volume may be possible from distant stations.

If no regeneration can be obtained, then the smaller winding may have been wound or connected the wrong way round. If reaction is always rather weak, slide the smaller winding slightly nearer the large winding. On the other hand, if reaction is violent and difficult to control, separate the windings slightly. Fix the coils with dabs of adhesive, when correctly positioned.

Audio amplifiers

It is very easy to add an amplifier stage, to give better phone volume with all signals. To do this, omit the phones, and wire a 5·6K resistor in their place. A 0·5μF or similar condenser is then taken from the junction of the H.F. Choke and 5·6K resistor, as at A in Fig. 35. The lead from this condenser, marked X, goes to the base of the transistor amplifier.

A good amplifier stage would be that in Fig. 29. For a simple loudspeaker set, the 2-stage amplifier in Fig. 19 may be added, so that there are three transistors in all. For really good speaker volume, the push-pull amplifier in Fig. 26 could be used.

Audio amplifiers can only increase the volume of signals already being obtained. It is thus a good plan to see that the regenerative detector, used alone, gives good phone reception.

Resistance control

It is often convenient to dispense with the 500pF variable condenser and to use a pre-set condenser in its place. If this condenser is wired inside the set, some other means of controlling regeneration must be provided.

One means of doing this is to wire a 50K variable resistor in the battery negative line, as at B in Fig. 35. Miniature variable resistors or potentiometers, with switch, may be obtained, and this is very convenient for a pocket-sized receiver.

It is necessary to fit a by-pass condenser from the phones or 5·6K resistor. In Fig. 35, this is 1μF, but other values will do equally well, provided the capacity is fairly high (say, 0·25μF to 8μF).

For this type of circuit, the 500pF condenser is adjusted with a screwdriver, until smooth control of reaction is achieved with the 50K resistor. For a small or ordinary-sized receiver, this resistor will have a control knob. With a miniature set, it will be a midget part, with milled-edge thumb-wheel control.

Fixed potentiometer

In order to eliminate the 10K variable potentiometer, it is possible to use a pair of fixed resistors, as at C in Fig. 35. This does not permit the exact adjustment of the transistor base voltage, which was possible with the 10K potentiometer. Nor can it be sure that the values of 100K and 10K will always give the best voltage, especially if the transistor is much different from an OC44 type. It is, however, a practical arrangement.

If it should be found that no possible adjustment of the feedback winding spacing, or other controls, will give smooth reaction, then the base voltage is probably incorrect. To change the base voltage, it is only necessary to modify the value of *one* of the resistors (100K or 10K). The simplest means is temporarily to insert a variable resistor. This is adjusted for best results, its value is measured with a meter, and a fixed resistor of the same value is wired in.

If no meter or variable resistor is to hand, a few spare resistors, of rather similar value, can be tried. It should not be necessary to go outside the limits of about 5K to 20K, in the 10K position.

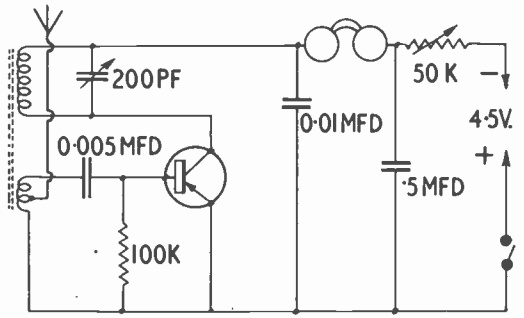


Fig. 36—Another regenerative circuit

Another circuit

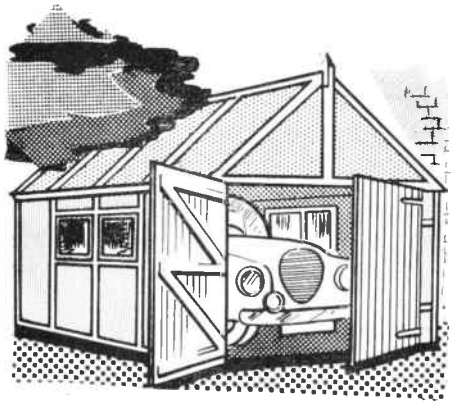
A regenerative circuit especially suitable for those interested in short wave reception is shown in Fig. 36. A high-frequency transistor able to work at the high frequencies used must be employed.

Values can be changed somewhat, and on these high frequencies the behaviour of any particular transistor will vary from that of others, even of the same type. The tuning coil will have about 9 to 12 turns, according to the waveband wanted. It can be on a short ferrite rod, or on a cored former. For the base winding, only 2 to 4 turns will be needed. The best number of turns, and the spacing between this winding and the tuned winding, will have to be found by trial.

Regenerative circuits can be very sensitive indeed, as already explained. But they usually need some adjustment, possibly to resistor values, or to spacing between the tuned and feedback winding, or to the 500pF pre-set or variable condenser. Even when these adjustments are correct, adjustment of the regeneration control (500pF variable condenser, or 50K resistor) will be fairly critical.

Sets with regenerative detectors thus need a little extra care in operation, to get anything like maximum efficiency.

Constructors who have built 1 or 2-valvers, described in these pages, will probably be accustomed to the careful adjustment of the valve set reaction control. The transistor regeneration control should be used in the same way.



Part 3

FINISHING THE GARAGE

HAVING finished making all the main sections for this practical garage we can now get down to the job of assembling and finishing the construction.

Place two ⅜ in. bolts at each corner of the site, and have a hammer ready to hand. Ascertain that there is a 2 in. groove in the flooring to take the bottom rail of the front section. With assistance, carry the most convenient side section to its appropriate position, and prop it up with battens fixed under the rails.

Next, place the front section in position, locating it in the groove in the floor. Make sure that the groove is deep enough to allow the frame to be flush with the floor. Draw the two sections together, and from the front tap in the top bolt, passing it through the two sections. Loosely fit the washer and nut (see Fig. 14). Now fit the bottom bolt in the same way.

Carry the second side into position, and fit the two bolts with the heads outside, and loosely assemble the washers and nuts. Treat the rear section in the same way, fitting the four bolts with the heads to the outside, and the washers and nuts loosely assembled.

Now check the four sections for squareness. This can be done with three weather strips tacked together. Push on the corners to correct if necessary, and fully tighten the eight bolts. The garage should now stand as shown in Fig. 15.

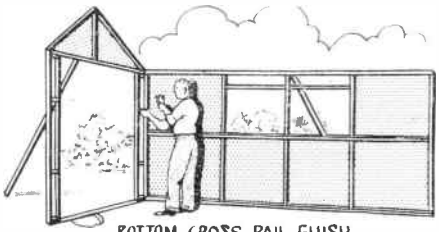


FIG 14 BOTTOM CROSS RAIL FLUSH WITH CONCRETE FLOOR

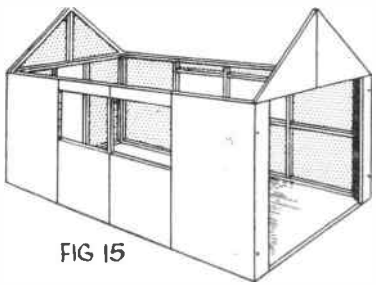


FIG 15

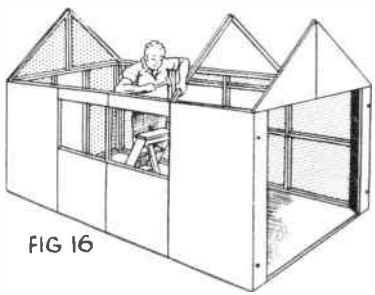


FIG 16

FIG 17

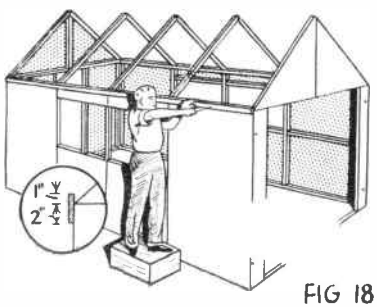


FIG 18

Fitting the roof

Take up two of the 2 in. by 2 in. intermediate roof supports. Nail them together at the apex, using two 3 in. oval nails (it will pay to drill for these nails to avoid splitting). Place the two pieces in position on the top rails of the two sides and in line with the first intermediate uprights. Nail them in position with two 3 in. oval nails in each end, taking care that the ends do not protrude over the outside edges of the side sections (Fig. 16). Do this with the other four roof supports, nailing the pair of 3 in. by 2 in. pieces over the centre side uprights.

To provide extra support for the roof, to prevent the roof sagging, and the sides bulging, three cross pieces of 2 in. by 2 in. are fitted. These are given as 7 ft. lengths in the cutting list. They should be held in position approximately 3 in. up the roof supports, and marked for sawing to length. After sawing, drill each end to take two screws, then screw the pieces in position (see Fig. 17).

Next, take up the two 14 ft. lengths of 3 in. by 1 in., and drill holes for 2½ in. screws about 15 in. apart and 1 in. from the side. Screw these in position along the top rails of the two side sections, leaving them standing 1 in. above the top rail (see Fig. 18). It will be necessary to drill through the asbestos before inserting the screws.

With these two side boards securely screwed in position, the four roof sections can be lifted on, taking care not to break the overhang of the asbestos. The roof sections are secured by fitting the metal clips shown in Fig. 19. Four of these are fitted to each section with one screw in the roof frame, and one in the roof support. The centre clips will have to be bent to accommodate the overlap of the two 2 in. by 2 in. frames on the 3 in. by 2 in. supports.

Weatherboards

Next, fit the weatherboards. These consist of eight pieces of 5 in. by ⅜ in. planed, two pieces 5 ft., two 5 ft. 1 in., and four 5 ft. 3 in. After cutting the pieces to length, pair up the two 5 ft. 1 in. pieces with the two at 5 ft. Nail these to

each end of the roof, the 1 in. extra allowing for overlap at the top. They should be fixed to overhang the front and rear of the garage by ¾ in. Use 2½ in. oval nails, driving two into each overlap at the top.

Now fit the two ridge boards. These are given as 13 ft. 4 in. in the cutting list, and they will require shortening to fit snugly between the end boards. Mark for length, saw, and nail them in position, using 2½ in. oval nails, and allowing one board to overlap the other at the top, as shown in Fig. 20.

The barge boards are fitted next. These are nailed to the front and rear sections under the end boards. They are given as 5 ft. 3 in. in the cutting list, and will require cutting to length and shape. Hold each piece in turn in position, and mark the angle at the top, and saw to the mark. Before nailing the boards in position, saw the four lower ends to match, as shown in Fig. 21. Nail in position, keeping the pieces well up to the top weatherboards.

Next fit the six weather strips to the roof, three to each side. These are given as 5 ft. in the cutting list, and should be shortened to suit. They are then nailed over the joints in the asbestos with 2 in. oval nails. It is advisable to give the strips one coat of paint before nailing in position.

All that remains to finish the roof is the making and fitting of the end ornaments. These are cut from the two 1 ft. 6 in. lengths of 4 in. by 1 in. given in the cutting list. (See Fig. 22 for the dimensions). Nail in position, using 2½ in. oval nails.

The simplest form of 'T' hinge is used for hanging the doors. Six are required. First lay the front doors on the floor with the outside face up, and screw two hinges to each door in line with the top and bottom ledges, and to the edge of the doors where the ledges come flush with the matching. Keep the joint of the hinge level with the edge of the door.

If the garage is to be made thief-proof, use nuts and bolts instead of screws for securing the hinges. Should bolts be used, they must be fitted with the heads outside, and after the nuts are tightened, the threads should be burred over.

Fitting the doors

Before hanging the doors, screw to one of them a length of matching. This piece is screwed to the opening edge, after the tongue and groove have been removed, and should overlap by half its width. Its purpose is to hide the gap between the doors when they are shut.

Lift the doors in turn, up to their respective uprights in the front section, and mark the position of the hinges. This will be on the front face of the upright. If a piece of § in. matching is placed under the doors while the marking takes place, the doors will swing free of the ground when in use. Drill holes in the uprights for the hinge screws, pierce the asbestos, first drilling one hole for each hinge. Screw the doors in position, and check for opening. If correct, drill the other eight holes, and fit the screws.

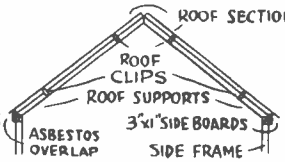


FIG 19

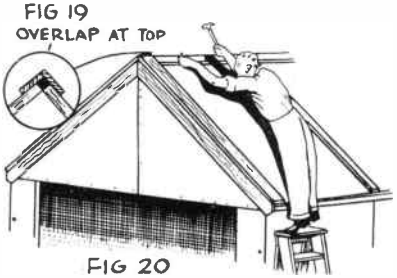


FIG 20

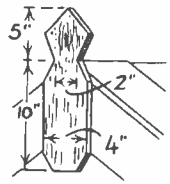


FIG 22

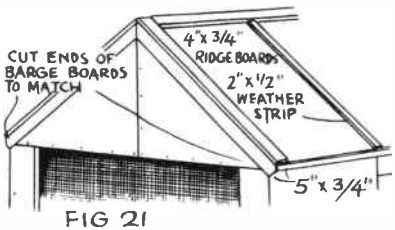


FIG 21

Carry out the same procedure with the rear door, ensuring that the hinges are screwed to the edge where the ledge comes flush with the matching, and that the door swings clear of the bottom rail.

Window frames

The decision as to how many windows will be made to open, is left to the owner. Those which are not to open are simply nailed in position, with a piece of weather strip (2 in. by § in.) between the window frame and the lower scantling. The other windows will have to be fitted with hinges. The thickness of the hinges is cut out of the top scantling, leaving no gap when the windows are shut. A piece of weather strip should be nailed to the lower scantling to form the window sill.

Screw the hinges to the window frames, then hold them in position in the side sections, and mark for the centre hole in each hinge. Drill for one hole in each hinge, and screw the frames in position. If correct, fit the remaining screws. Next, screw on the window fittings, and finally fit the glass, making the panes secure with putty and glaziers' brads.

Weather strips

The weather strips are all 2 in. by § in. planed. Their lengths can be ascertained by referring to the grouped list of materials. From this list, and noting the details in the finished illustration, no difficulty should be experienced in fixing them.

Two strips are fitted at each of the four corners, three strips down each side section, to cover the asbestos joints. Eight strips are placed above and below the four windows, and a strip each side of the three doors. A strip right across and above the front and rear doors, and two strips, one front and rear to cover the joints in the triangular pieces of asbestos, and two short pieces to cover the joints half way up the front section. The two strips, one each side of the front doors, will require chiselling out to accommodate the hinges.

It is advisable to paint the strips one coat before fitting, this will save time and the risk of messing up the asbestos with paint.

Finishing

All that is necessary now to finish the job, is to fit the door fastenings, the gutters, and carry out the painting. The door fastenings can be arranged to suit. On the prototype small bolts were fitted to the top and bottom of one front door, drilling into the top and bottom scantlings. A large bolt was screwed half-way up for bolting the two doors together. The rear door was fitted with a padlock, so that with one key the three doors can be opened, proving a time saver.

All the outside woodwork should be painted at least two coats.

The gutter brackets are screwed to the 3 in. by 1 in. roof boards, and arranged so that the gutters fall towards the drain. The gutters are placed in position, and the job is finished.

Next week there will be a Bonus Plan for making a Desk and Stool for a very young child — an easy project for every father. Make sure of your copy.

A GAS/LIQUID PUMP

THE gadget described here is a bicycle pump simply modified so that it can be used for transferring gas or liquid, or for raising the pressure of a gas. It was originally made for filling party balloons with gas from the mains so that they floated. The mains pressure is too low to allow this to be done directly. But other uses, such as a plant spray, can be envisaged. When amended it can still be used as a bicycle pump.

Only three modifications are made to an ordinary bicycle pump, the main one being the introduction of a valve A into the side of the pump, and as near as possible to the lower end. The valve holder is cut from an old cycle inner tube leaving a circle of rubber attached to the base of the holder to act as an airtight washer. The metal washer at the base of the holder should be removed.

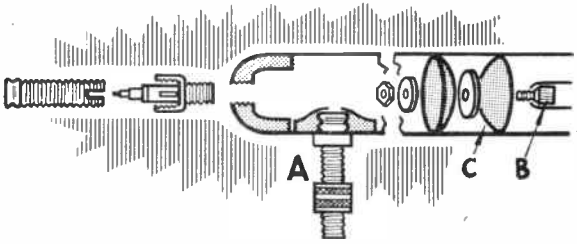
A hole slightly larger in diameter than the valve holder is drilled in the side of the pump, and the holder is allowed to slide down the inside of the pump so that it comes to rest near the hole. It is worked into the hole with a piece of stiff wire.

If the holder is too long to be worked into the hole, due to its wedging against the sides of the pump cyclinder, the base

By D. Houghton

of the holder must be cut off and a nut must then be fitted to that end to prevent it from slipping through. In this case a rubber washer is slipped on above the nut before the holder is fitted. When the valve holder is in place the nut which is normally used to fasten it to the rim of the wheel is used to fasten it to the pump. An 'easypump' valve, and not a rubber tube valve, is then fitted.

It will be realised that if the piston is pushed right down the pump it will be fouled by the new valve. Therefore, after removing the washer the shaft is shortened by cutting the required amount from the washer end. The nut B is removed and fitted in the end of the shaft which is bent over it as before. The washer is replaced together, and back to back, with a second washer C which prevents air entering at the handle end of the pump. The piston can then be refitted in the pump.



Pump modifications

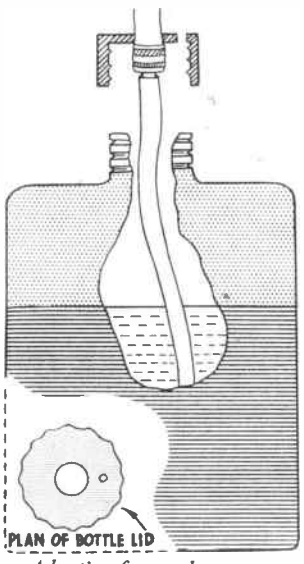
The pump is now ready for use. A flexible gas pipe is pushed on to valve A and a balloon is pushed on to the other valve, being secured with an elastic band. The gas is turned on and the pump is checked to ensure that it has no leaks, *but not with a naked flame.* The pump is worked slowly until the balloon reaches the required size, then the neck is tied with string.

It is, of course, necessary to take precautions when using the pump for this purpose. It should not be used in the presence of a naked flame, and an outside door or window should be kept open.

The pump can easily be adapted for use as a garden spray by fixing a polythene bottle to valve A and a piece of polythene tubing from the end of the valve to the bottom of the bottle. Two holes are drilled in the bottle lid; the larger should be of clearance diameter for the valve holder, but not so large that the valve retaining nut will slip through. The diameter of the smaller hole, which is to allow air to enter to replace the liquid pumped away, is not important. If the tubing tends to fit the end of the valve too loosely, it can be secured by wrapping a piece of copper wire round it and twisting the ends together with a pair of pliers.

The polythene bottle can be obtained from most of the popular stores, and a suitable piece of tubing can be bought from cycle shops where it is sold for use as straws for the cyclists' water bottles.

If the pump is an aluminium one care should be taken not to use a corrosive weedkiller spray fluid with it.



Adaption for garden spray

A NEW METAL PLATING OUTFIT

WE have had the opportunity of personally testing a new handyman's electro-plating outfit which did all that was claimed for it and gave a professional finish to the projects worked on. It is the 'Silv-r-Cote' silver plating kit of American origin, which costs 40s. and is available from Gamages, Holborn, London, E.C.1.

The principle used is the deposition of the plating metal by breaking down the appropriate salt applied as a fluid. This is accomplished by a brushing-on action through a special applicator the size of a pencil torch and the tiny current for which is provided by a self-contained battery.

Obviously, therefore, any metal which conducts electricity can be plated if certain conditions, such as clean surfaces, are provided. We had particularly good results on copper alloys and brass. The heads of drawing pins, for instance took on a very expensive look with the addition of silver plating. Watch cases and costume jewellery would also lend themselves admirably to this treatment, the application of which is simplicity itself.

Other kits are available for chromium plating (36s.), and gold plating (57s. 6d.)

ROCKIN' IN THE HILLS

ROCK climbs afford the strenuous hiker plenty of scope for adventure. It is for those who desire grand fun, with risks to be taken. But those who are strong and athletic, and sound of wind and limb, need not fear a moderate crag climb.

There is always a risk in doing even an easy climb. Dozens of accidents occur every year, summer and winter, for climbing is popular all the year round. Rock climbing is somewhat hazardous, being a sort of modified Alpine mountaineering, and as such is fascinating to those who aspire to master the steeper slopes of the hills, negotiate narrow ridges, or scale pinnacles hundreds of feet up. There may be formidable peaks to conquer, or a 'chimney' that calls for a degree of skilful climbing, but, on the whole, the mountains of England, especially, have little about them to deter the tougher hikers, unless specially difficult climbs are selected.

In some popular mountain areas the tracks are now so improved that they are easy to follow and to conquer. The constant usage of many paths has made them clear enough for the merest tyro to tramp over, and even in a mist one cannot go far wrong, provided one sticks to the trails.

It is not necessary to be a skilled mountaineer in order to explore the hills of the English Lake district, the range of Snowdonia, the ridges of Kinderscout, and the Peak Country, or the more attractive mountains of Scotland, yet it is very advisable to know something about the sport before the novice attempts anything big.

Training essential

Training is one of the first needs. Going straight from an office or factory on a climbing or strenuous walking holiday is asking for trouble. Off goes the holiday-maker with a rush on the first day — on the second day he is definitely whacked. He should prepare by fairly rigorous tramps at weekends over rough lands, hard-going farm tracks, and hilly districts.

Nailed boots are a 'must'. See that they are fitted with hobs and side-nails. It is necessary to 'break in' such footwear. It is a good idea to wear a pair of rock-climbing boots on several cross-country walks before attempting to climb in them, so that your feet may become accustomed to their 'feel'.

A compass does not tell you where you are when you get lost, but it is a very useful aid to your direction in conjunction with your map, and to check your position with the landmarks around you. The Ordnance Survey 1 in. map is very convenient. This shows the countryside in detail, and with the aid of a compass will save you from getting hopelessly lost when in remote areas.

An experienced 'rocker'

An alpenstock is of help when rock climbing, and you may carry a length of good sound rope in the rucksack, to connect you with your companions when negotiating difficult and dangerous ridges and pinnacles. Usually the leader of the party (it is wiser to go 'rockin' ' with an experienced party) who should be fully experienced, carries the rope, and he should know when and where its use will be needed. It is foolish for a novice to start crag scaling or rock climbing with other tyros — there should be at least one expert in the party.

Carry in your haversack or jacket pockets emergency rations such as a few sandwiches, chocolate, dates, an apple, etc, and, if in a small party, take a picnic stove and small kettle in order to brew something hot on the spot. Don't forget the water. Useful, too, will be a pullover, and a mac or cape in case of rain.

When on your route, set a steady pace, and keep to it as much as possible. If a rest seems to be essential, have a good spell, but don't get into the habit of indulging in too many rests. Take matters easy, and never start running down a steepish slope unless you can see all the way to the bottom, and are certain there are no loose rocks or pot holes on the way. It is advisable to carry a whistle in case of accidents.

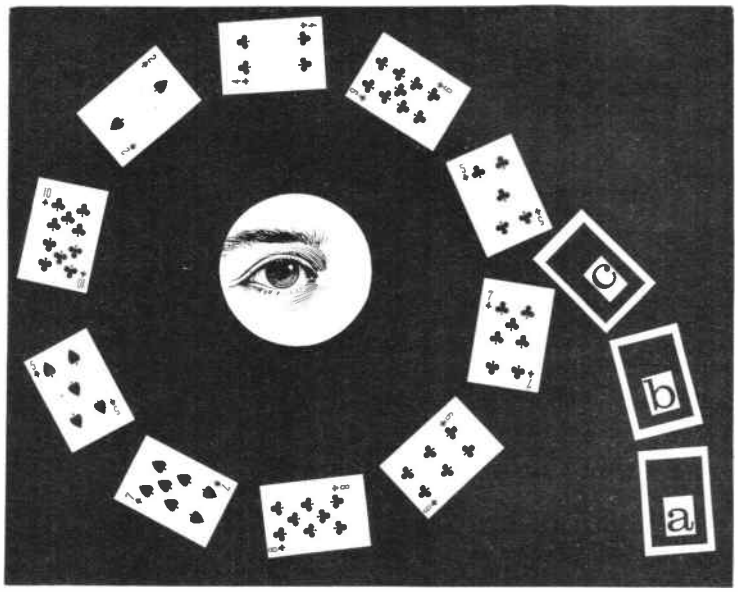
Where to go

For rock work wear your oldest clothes, for they are bound to meet with rough usage. Some climbers wear gloves for tackling sharp-edged rocks.

Some attractive climbs are to be found in Britain, particularly in Scotland — on the Cairngorms, on Ben Nevis, in the Isle of Skye, and other areas. The Mountaineering Club issue booklets on various climbing districts. Likewise there are guides and books on climbs in England, including those on Scafell, Great Gable, Pillar, and Buttermere Crags. Then, in Wales we have the Snowdon range of splendid hill climbing. In a lesser degree we find scope for this sport or pastime in the Peak Country of Derbyshire, especially on Kinderscout and around Castleton. (E.)

THE MAGIC CIRCLE

LOOK at the thirteen playing cards shown in the diagram. Think of a number between ten and twenty. Begin counting along the cards silently to yourself, starting at the face down 'tail' cards A, B and C, and continuing round the circle in an anti-clockwise direction until you reach your secretly chosen number. After you have commenced counting, the tail cards must be completely ignored. Now, remembering the card that you arrived at and regarding it as number one, begin counting your chosen number around the circle in a clockwise direction. Note the card that you finally stop at. All you readers who try this experiment will be thinking of the eight of clubs!

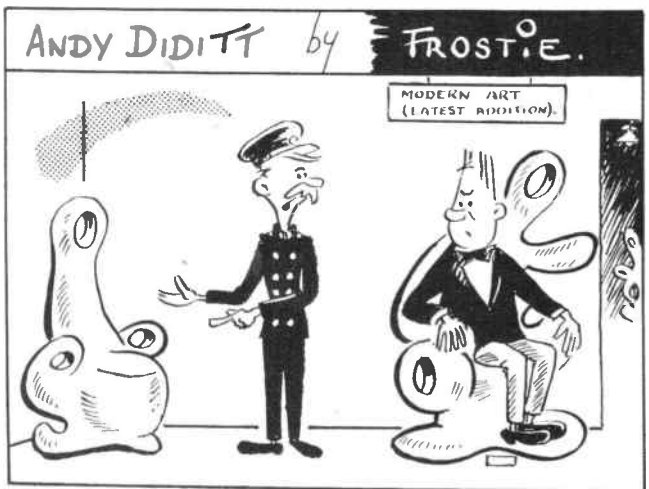


By A. E. Ward

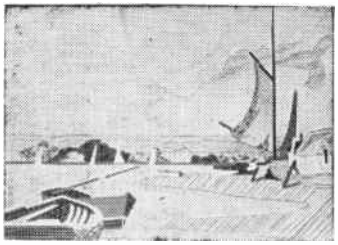
Mathematics, not 'thought reading', was responsible for the success of the demonstration, and it should not take you long to discover the elementary arithmetical principle which has been at work here. But try a second experiment. Form a much larger circle of playing cards upon the table and, this time, append a longer tail of six face down cards. Again think of a number. Actually it can, in this instance, be any number above six (the total number of tail cards), although we had better say a number between ten and forty. Count anti-clockwise and clockwise, as instructed before. Your 'freely' chosen card will now lie number six in a clockwise direction around the circle to the left of the sixth tail card.

As described, the 'Magic Circle' may be used as an example of 'mental magic' to amuse your friends. However, you can improve the presentation of the effect and convert the simple trick into a first class parlour mystery. Consider the following routine. Arrange about twenty cards in a tidy circle upon the floor and add a tail of three cards. Request every person in your audience to think of a number between ten and thirty and then to proceed in the same manner as you were instructed at the beginning of this article. Whilst your directions are being followed, remove the tail cards and write the name of the card which you know everybody will 'choose' upon a slip of paper, put the note into an envelope and rest the envelope in the middle of the circle. Allow your audience sufficient time to commence shouting before you remove the face-down cards.

At the conclusion of the experiment, allow a spectator to open the envelope and read aloud the enclosed prediction. Most of your audience will be thinking of the correct card, but one or two persons may have made mistakes. Actually a few such accidental errors will make your prediction of the 'card nearly everybody thought of' seem like a clever psychological feat. Complete success will be likely to suggest mere trickery to many minds. Immediately offer to repeat the experiment. Append a tail of six cards at a new point upon the circle and ask everybody to think of any number (say, between fifteen and thirty-five), and to continue as before. On this occasion let the card generally thought of be found to correspond with a duplicate card, which you placed in the pocket of one of your spectators before the performance began.



"THIS IS THE CHAIR SIR! — THAT'S OUR LATEST PIECE OF SCULPTURE YOUR SITTING ON!"



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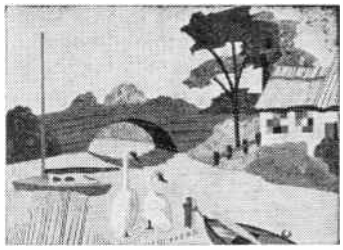

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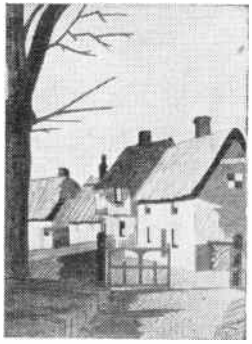

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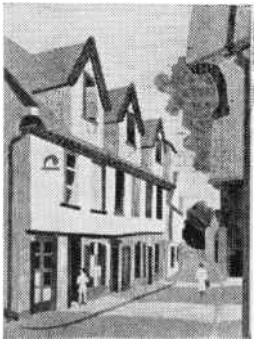

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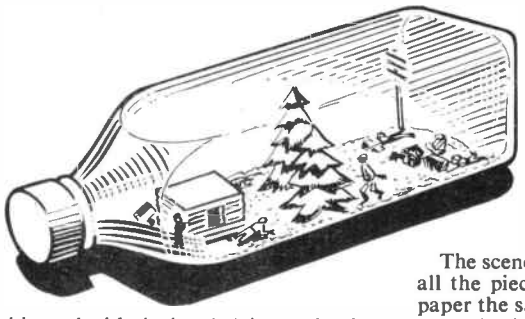
Models in BOTTLES

By A. Liston

SHIPS in bottles have been popular for many years, but landscapes, complete with tiny figures, are much more unusual, and easier to construct. Red Indian camps, battle scenes, country farms and snow scenes are only a few of the possibilities in this wide field.

The first requirement is a clear glass bottle with flat sides, which must be perfectly dry and clean on the inside.

Coat one of the sides inside the bottle with paint of a suitable colour — green for grass, white for snow, fawn for desert, and so on. Oil paint is used for

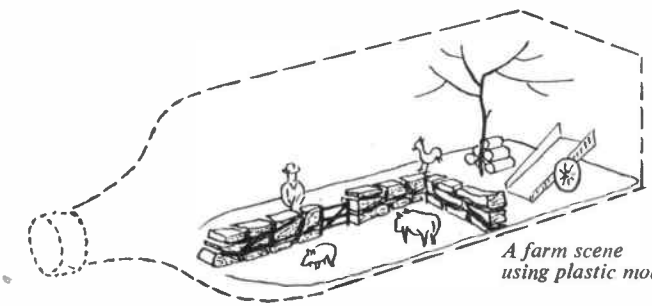


this, and with the bottle lying on its side, just enough paint is poured in via a V-shaped cardboard channel to cover the side which is to be the base of the scene. The bottle is then gently tilted and any excess paint poured out. Be careful to see that it does not run on to the other sides of the bottle. The interior of the neck is wiped clean with a rag tied to the end of a stick, and the bottle left for several days until the paint is completely dry.

Much of the scene can be made up with tiny plastic figures and accessories sold by model shops as model railway equipment, but it should also include several items made at home, to give it a more personal touch. The top illustration of a finished model shows the possible arrangement of a battle scene as an example.

The scene is assembled by first placing all the pieces in position on a sheet of paper the same size as the bottle. In the example shown, the tiny plastic soldiers are bought ones, painted in two different colours to represent two armies, and the plastic trees are sectional. The boulders are chips of gravel, and the shack is made from matchsticks glued to card sides. Each side is made separately from a square of card slightly smaller than the neck opening of the bottle.

The pieces are put in place in the bottle, starting with those at the end farthest from the neck. The base of each piece is coated with contact adhesive, and it is then wedged in a slit cut in the end of a drinking straw and placed in position. The sides of the shack are glued in place, one at a time, then the roof added. The base of each tree is glued in place, the flexible plastic allowing the widest section to be squeezed through the neck opening. The upper sections are pressed in place with the end of a flat stick.



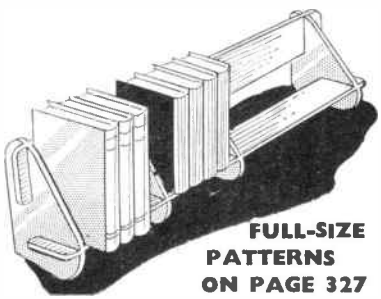
A farm scene using plastic models

Fallen or misplaced fittings are best retrieved by a length of wire with a small loop at one end coated with adhesive.

The same method is used for other scenes, and for those with the necessary patience, small objects such as stone chips can be used to build whole walls, one piece at a time. Twigs can represent winter trees; these, however, must be glued against a fitting already in place. An example of this is shown in our other illustration, where a farm scene uses plastic animals and figure, but other details are made from odds and ends assembled inside the bottle.

As a general rule, the best effect is obtained by a mixture of small ready-made accessories and larger self-made pieces, built up piece by piece inside the bottle, so that the finished scene leaves other people wondering how it was done.

MAKE A DESK BOOK-RACK



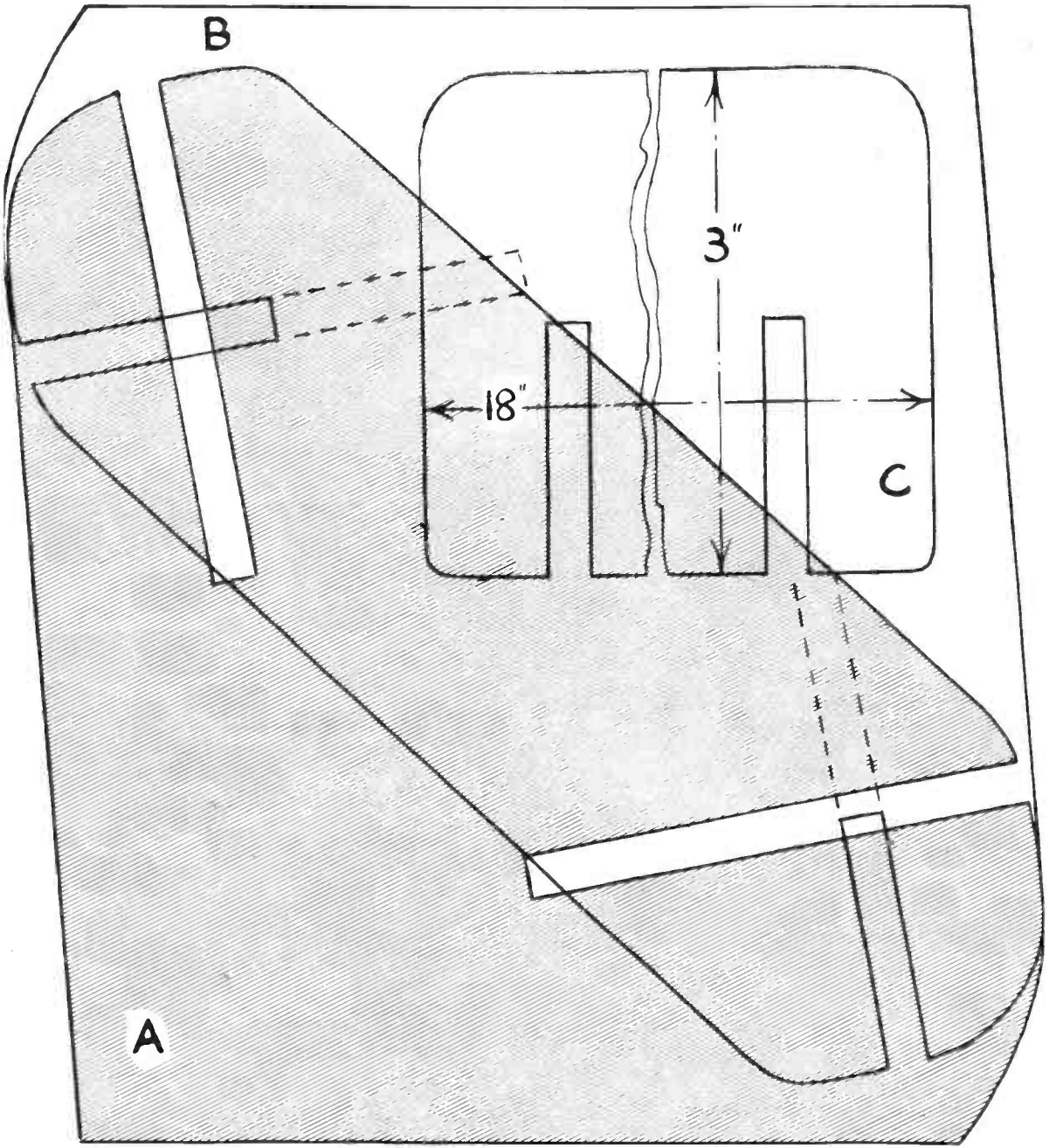
FULL-SIZE PATTERNS ON PAGE 327

THE six parts of this attractive rack slot together to make an adaptable holder for small books. The two centre partitions will slide along so that a set of books may be contained together for easy reference. The ends A and partitions B are identical except for the slots. Cut two of each from ¼ in. plywood. Note that in the full-size diagrams on page 327 the partitions A are shaded, and the ends B are in outline.

Two of the pieces C are required, both cut from ¼ in. plywood. The diagram shows that the length should be 18 in., but this, of course, can be extended considerably if desired. Clean up the various pieces, and paint carefully. The rack is simply slotted together, and requires no nails or glue. (M.p.)

Full-size patterns

DESK BOOK-RACK



Printed by BALDING + MANSELL, LTD., London and Wisbech, and Published for the Proprietors, HOBBIES LTD., by HORACE MARSHALL & SON, LTD., Temple House, Tallis Street, E.C.4. Sole Agents for Australia and New Zealand: Gordon & Gotch (A'sia.) Ltd. For South Africa: Central News Agency Ltd. Registered for transmission by Canadian Magazine Post.

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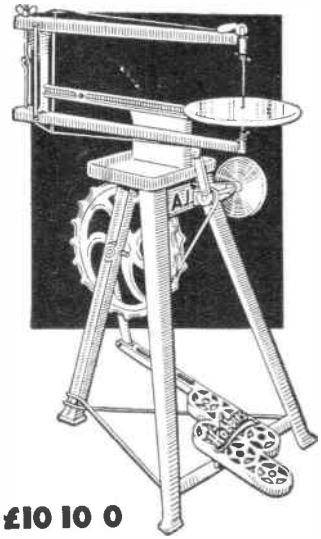

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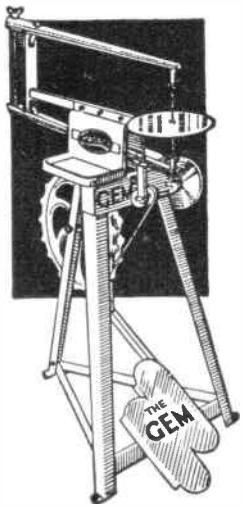

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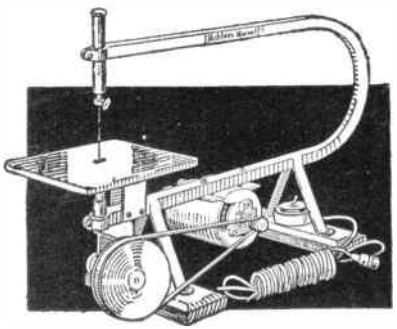

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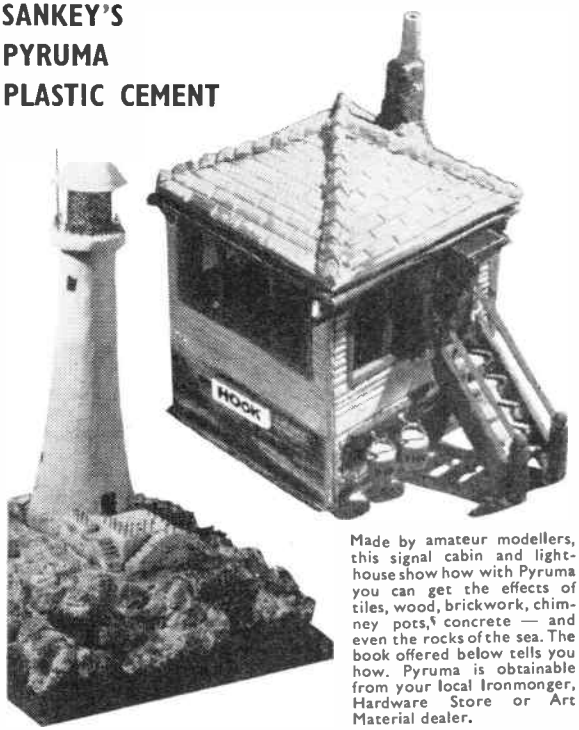

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