

HOBBIES WEEKLY

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MAY 9th 1956

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★ *FREE Design inside for*

A MODEL BARGE

They
make
a
perfect
pair!



*Designed for use
with Tug 'Climax'*

HUNDREDS of modellers who made up Hobbies Electric Tug No. 251 Special, will be interested in making this floating model barge, which is intended to be used in conjunction with 'Climax'. The idea is for the barge to be hitched behind the tug on its excursions on the water.

The building scheme consists of a framework which is covered with thin plywood. Transfer the various pieces from the design sheet to their appropriate thicknesses of wood, and cut them out with a fretsaw.

The first step in assembly is to make up the two end sections of the barge

which it will be seen are of the same pattern. Diagram (B) on the design sheet shows how pieces 3, 4, 5 and 6 are glued together to form these identical ends. To connect these ends, glue the bottom (1) and the long pieces (7) in place as shown at (C) and glue pieces 12 into the slot in piece 2. This completes the framework.

The sides and deck can now be skinned with thin plywood, using waterproof cement and pinning with household pins until dry. Note that the opening in the deck can be trimmed to the pieces 7 afterwards.

The hatch cover is made up from

pieces 8, 9, 10 and 11 as shown in diagram (A). The top of this is also skinned with thin plywood. The hatch can be glued on as a fixture, but for those who wish it to be removable, lengths of $\frac{1}{8}$ in. square stripwood should be fixed along the top edges of pieces 7, as shown at (C).

The deck fittings, pieces 13, 14, 15, 16, 17, etc., can now be glued in place. Their positions are indicated on the appropriate pieces by dotted lines.

Wire and screweyes form the rails (18) which are fixed along the sides of the hatch cover.

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

*For Modellers, Fretworkers
and Home Craftsmen*

4½^D

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MAKE YOUR OWN WINE

THE production of home-made wine is a most fascinating occupation and can be carried on throughout the whole year as there is always something available for use. Excellent wines which are very pleasant and wholesome may be made quite cheaply from almost any edible fruit, from many vegetables and also a number of flowers.

There are hundreds of different recipes and it seems that no two people make wine exactly the same. The general principle, however, does not differ much and in this article it is hoped to set this out, so that you can easily turn out a satisfactory product.

First a word or two about the utensils used for wine making; and here it must be emphasized that absolute cleanliness is necessary in order to ensure success. Fruit juices and wines should never be allowed to come in contact with certain metals, but it is quite safe to use aluminium, tin-plate, stainless steel and silver plate.

The spoon used for stirring should be of beech, oak, ash or other non-resinous wood, and should be thoroughly washed and dried after use. Do not put wines into wet bottles — they should be well washed out and then completely dried before use.

It is generally necessary to use a small quantity of yeast to make the wine start 'working', although some fruits and vegetables contain sufficient yeast in themselves and no further addition is needed, unless, however, they have been destroyed by boiling. Buy only a small quantity of yeast at a time from a baker's, as this will go bad if kept for more than a day or two.

The best temperature for working wine correctly is between 60° to 65° F., and if you can stand it near a hot water system or an all-night fire you should have no trouble.

Elderberry

Elderberry is probably the best of all home-made wines and is an extremely good tonic. The following is a simple yet very good recipe.

3½ lbs. elderberries
3½ lbs. white sugar
1 gallon water
½ oz. yeast

Remove the berries from the stalks, place in an earthenware bowl or jar and bruise with a wooden spoon. Pour on boiling water, cover with a cloth and let it stand for two or three days. Then strain through butter muslin, add the sugar and yeast and stir till dissolved.

Put this mixture into dry wine bottles

and fill to within in. of the top. If you possess the fermentation lock as described in *Hobbies Weekly*, December 21st, 1955, fit these to each bottle, but if not, place a very loose fitting cork into the bottle. It should allow the gas to escape freely, but on no account should it be tight, as this may stop the process of fermentation or the imprisoned gas could burst the bottle.

After about two to three weeks the rate of fermentation will decrease and the wine will be ready for bottling.

Many readers have sought recipes for making their own wines, and these suggested here are recommended by

A. F. Taylor

Decant it into clean bottles, filling them nearly to the top and cork down, but not too tightly for a few days. Further decanting may be necessary when the wine has settled down and there is a deposit on the bottom after a few weeks.

Some people augment the above recipe with ½ lb. raisins, ½ oz. root ginger, 1 lemon or a few cloves either separately or you can use any combination of these or all of them together.

Almost all fruit wines can be made by using the same proportions as for elderberry wine — such as sloe, cherry, damson, blackberry, currant and gooseberry. You can use the simple recipe or spices may be added as mentioned to suit your taste.

The 3½ lbs. of sugar to each gallon of water for fruit wines produces a sweet wine, but if you prefer a dry wine then you need only 3 lbs. to the gallon.

Dandelion

Flower wines made from the blossom of cowslip, dandelion, clover, broom, elderflower and rose are easy to make and are very popular. The recipes for each are very similar and we quote dandelion as an excellent example.

2 quarts dandelion heads
3½ lbs. white sugar
1 gallon water
1 lemon
1 orange
½ oz. yeast

Use only the petals, placing them in an earthenware container with the lemon and orange juice and grated rind, pouring over them boiling water and allowing to stand for two or three

days. Then strain, add the sugar and yeast and continue exactly as stated for the elderberry wine.

Parsnip

Parsnip is probably the most popular of the vegetable wines, but the same recipe may be used for carrot, beetroot, mangold, or marrow. Here is a good recipe in which spice has been added to improve the flavour. This may be omitted or others substituted such as a few cloves to suit your taste.

4 lbs. well frosted parsnips
3 lbs. white or demerara sugar
1 lemon
1 orange
1 oz. root ginger
1 gallon water
½ oz. yeast

Well scrub the parsnips, cut up into small pieces and boil with the grated peel of the orange and lemon and the root ginger which has been well bruised until the parsnip is quite tender. Strain through butter muslin and add the sugar, fruit juice and yeast and well stir until dissolved. Put into bottles and continue as directed for elderberry wine.

Ginger

Ginger wine is very good and can be made at any time.

1 to 2 oz. root ginger
3 lbs. white or demerara sugar
2 lemons
2 oranges
1 gallon water
½ oz. yeast

Boil the ginger, grated orange and lemon peel for about half an hour, then strain and add sugar, fruit juice and yeast and then proceed as mentioned before. Half a pound of raisins may be added with advantage if desired.

Keep the bottles well filled while the wine is working, otherwise it is likely to turn to vinegar. If the foregoing instructions are carefully followed and the process watched from day to day you should have no trouble in turning out a satisfactory wine which will be enjoyed by visitors.

It is important to remember that home-made wines may be manufactured for home consumption but they must not be sold without a special licence from the Customs and Excise Department.

Details of how to make a handy stand for wine decanting were published in our issue of April 4th. Copies price 6d. post free from the Editor.

FRAME YOUR FAVOURITES

WITH a minimum of time and expense any small illustration or photograph can be made up into a most attractive miniature picture.

As shown in Fig. 1 only a few simple parts are required. Strips of coloured Perspex $\frac{1}{4}$ in. wide, $\frac{1}{8}$ in. thick, are used for the outer frame. These are cut from sheet and trimmed true with file and glasspaper. The outside dimensions of the frame should be in pleasing proportion to the size of your illustration. Make a flat frame first to your chosen dimensions, mitring the corners of the Perspex. Use Perspex cement sparingly

*Says
Gordon Allen*

trimmed to size. Dimensions 'C' and 'D', being the lengths of the sloping sides of the tray, correspond to those shown in the 'plan' and 'side' views of the tray within the Perspex frame. Similar sketches will be required of your own frame to ascertain these dimensions.

Cut the development from the card, score the full lines deeply, and then



Fix the tray to the glass with small pieces of masking tape, or with colourless gum. Place the combined glass and

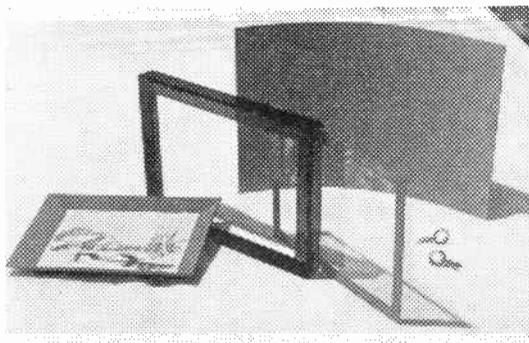


Fig. 1 — The various parts

at the joints.

Then give the frame an 'L' shape (see drawing) by butt-jointing further strips, on edge, round the rim of your flat frame. Make sure these are square. A piece of window glass fits neatly inside the completed frame.

Next a stiff cardboard tray is made to accommodate your illustration. A typical development of such a tray is shown in Fig. 2. Dimensions 'A' and 'B' are the length and depth of the illustration

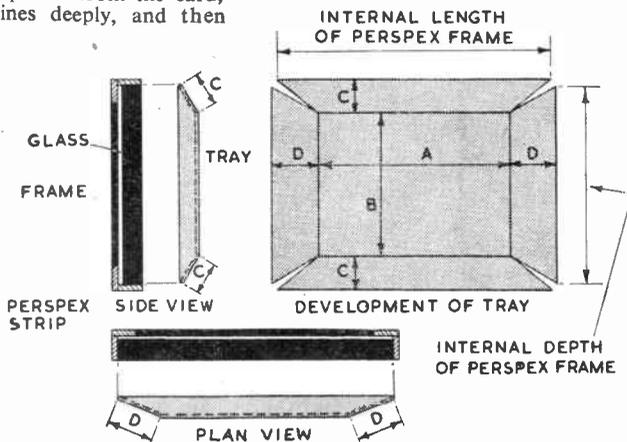


Fig. 2

bend and glue the sloping sides together. Mount your picture either with gum or photo-mounting paste. The inside edges of the tray can be painted, pebble dashed with tiny coloured stones, or covered with an attractive marquetry veneer. In either of the latter cases use balsa cement.

tray inside the Perspex frame and hold again with masking tape. Then, as shown in Fig. 3, glue a stiff card backing in place, which has been equipped with a picture hanger ring. Use Perspex cement for this and make sure both the edges of the frame and the back of the tray are well coated.

● Continued from page 81

A Model Barge

For finish, give the whole model two applications of flat grey undercoat paint. Then load up the barge with ballast and find a reasonable waterline by trial and error by floating it in water. This ballast has, of course, to remain in the barge when it is afloat. Paint the hull red below the waterline and black above. The decks can be brown or grey, and the hatch red. Fittings will be black or red, and the divisions on the hatch cover can be marked in with pencil or painted on.

KIT FOR 12/-

All the planed panels of wood, plywood, stripwood, etc., needed for making this Model Barge are contained in Kit No. 3158, price 12/-, obtainable from branches and stockists or Hobbies Ltd., Dereham, Norfolk

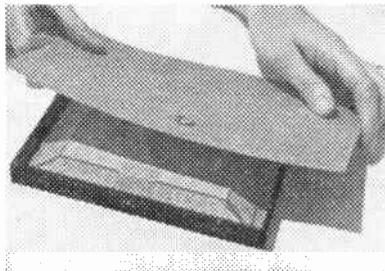


Fig. 3 — Fixing the backing

A SMALL TOOL CABINET

DESIGNED to accommodate a range of small tools, such as a hand drill, drill set, metal protractor, coping saw, modelling knives and cutters, plane, sanding blocks, etc., etc., this handy cabinet is constructed largely from 'stock' width obeche, $\frac{1}{4}$ in.

By R. H. Warring

which are glued to the base and the insides of the cabinet frame pieces. These are then covered with two $13\frac{1}{2}$ in. lengths of 3 in. wide $\frac{1}{4}$ " obeche sheet,

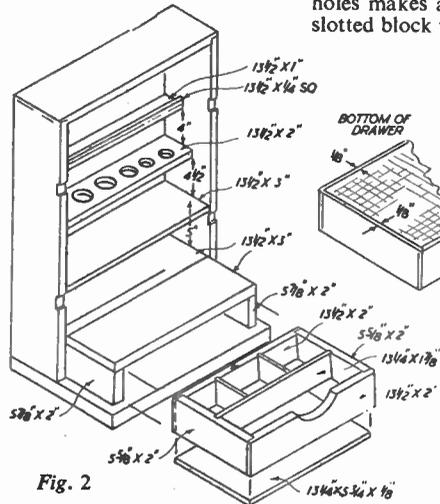
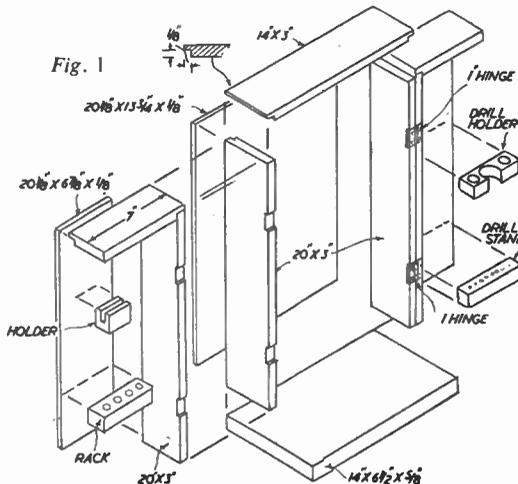
fitted to the insides of the door panels — see Fig. 1. These are best arranged to suit individual requirements, according to the type and number of tools you wish to accommodate. A block of wood drilled with a number of closely spaced holes makes a convenient drill stand; a slotted block will hold a coping saw or a square, and so on.

Check that any blocks fitted to the door panels are so positioned that they do not foul the shelves and so prevent the doors from being closed.

A satisfactory finish can be obtained by giving the whole construction a coat of size and then spraying or brushing with clear cellulose lacquer. Alternatively painting or varnishing may be preferred.

A latch or catch to hold the doors closed is optional, as are handles to open them. Also the arrangement of

shelves shown can readily be altered to take different types and sizes of tools; spring clips can be fitted to the inside of the door panels instead of wooden blocks and racks, and so on. One thing is certain, however, this cabinet will be a most useful addition to any home workshop.



thick. Only the base ($\frac{3}{8}$ in. thick) and the panels ($\frac{1}{8}$ in. ply or hardboard) are therefore fully dimensioned in the diagrams.

An exploded view of the cabinet and doors is shown in Fig. 1 together with the relevant dimensions. The inverted 'U' shaped main framework is cut from three lengths of 3 in. wide $\frac{1}{4}$ in. thick obeche sheet, with the top rebated as indicated to fit. A $\frac{1}{2}$ in. rebate is cut on the inner edges of the three pieces at the back in order to accommodate the back panel flush. This panel should be marked out carefully and cut absolutely square, after which it can be used to align the frame pieces accurately. Assemble the frame pieces to the back first, with glue and pins, and then glue to the base, reinforcing with screws from the underside.

The two doors are simple structures, the main frame pieces again being 3 in. wide $\frac{1}{4}$ in. obeche sheet. These are assembled in the form of an 'L' on the accurately cut $\frac{1}{4}$ in. thick panel. The doors are mounted on 1 in. hinges, as shown. Check before completing this fitting that the doors swing closed without binding and also meet flush at the centre.

The bottom drawer and shelf assembly is detailed in Fig. 2, the doors being omitted from this view for clarity. The bottom shelf is erected on two 5 $\frac{7}{8}$ in. x 2 in. pieces of $\frac{1}{4}$ " obeche sheet

glued in place. This shelf will actually project $\frac{1}{8}$ in. beyond the true front and must be trimmed down to exact size. A $\frac{1}{8}$ in. strip can be trimmed off the second piece before finally fitting, or this can be done after assembly, as preferred.

The individual shelves can then be mounted to the back panel. The bottom shelf is 3 in. wide, the second 2 in. wide and the top shelf only 1 in. wide, all from $\frac{1}{4}$ in. thick obeche again. These are glued in place, the joint strengthened by screwing through from the back. Before fitting, drill holes in the 2 in. wide shelf to accommodate modelling knives and similar tools. Further tools can be hung on panel pins driven into the edges of the top and middle shelves.

The drawer is a straightforward unit, made from 2 in. wide $\frac{1}{4}$ in. obeche sheet, cut to the individual lengths specified. End joints are as indicated and the bottom edges are rebated before assembly to take the $\frac{1}{4}$ in. thick base panel flush. Assemble the drawer frame on the base, using glue and pins, but before assembling, decide on the arrangement of any partitions required and cut locating grooves $\frac{1}{8}$ in. deep. The partitions themselves are best cut from thinner stock — $\frac{1}{8}$ in. thick ply or hardboard, and are simply glued in position. The centre of the drawer front is carved away to produce a finger grip to facilitate opening.

Hangers and racks for other tools are

Book to Read

Improve Your Home with Built-Ins

by Robert Scharff

HERE is an extremely practical guide to enable house owners to make their own improvements to any room in the house. For instance, Mr. Scharff gives detailed instructions for building shelves and cabinets, cupboards and efficient 'built-ins' for those who seek more storage space. There are a variety of ideas, for improving bedrooms, for transforming an attic into a bedroom or recreation room—in fact, projects which are intended to give more space in every room in the house. If only one or two of the ideas suggested are taken up, they will more than repay for the price of this excellently produced book.

Published by McGraw-Hill Publishing Co. Ltd., McGraw-Hill House, 95 Farringdon Street, London, E.C.4—Price 37/-.

EXTENDING THE RANGE

by A. Fraser

ALTHOUGH there are quite a number of stations available on the medium wave band, and a wide selection of entertainment is thus open to us, the time inevitably comes when we want to extend the range of our set.

The long waves provide few stations, comparatively speaking, so if one desires to extend the set's range to a noticeable extent, the short waves are the answer. This is obvious when we consider that there are roughly three times as many stations on the short waves as there are on the medium and long waves combined. Consequently, this article is mainly concerned with methods of extending a set's range from medium to short waves.

The simplest way of making a set tune down to the short waves is to introduce alternative inductors (or coils) and to switch over the variable tuning condenser to these as desired. This is the

medium wave position. Turning the switches, short-circuits the larger part of the coil, connecting in the variable condenser to the short wave winding at (A), while the aerial is tapped in at (B).

Although the foregoing methods are simple, they are not good, because they are inefficient. In the first place, there is a large capacitor valve (the variable condenser) in conjunction with a small inductance valve (short wave winding). This constitutes a bad L.C. ratio, and a poor 'Q' or efficiency value, in the tuning circuit is the result.

In the second place, owing to the large capacity, the range of the tuning is far too great. The usual range in commercial sets is 15 to 50 metres, and this covers a tremendous number of stations. These are mostly congregated in groups round the 16, 19, 25, 31, 41 and 49

The above methods, while being helpful in enabling us to separate the stations more easily, are only partial solutions to the short-wave tuning problem, especially if efficiency is to be considered. What is really needed is a method which gives easy station separation, together with a high L.C. ratio. Moreover, as the short wave stations come mostly in bands (designated previously), it is advantageous if these bands can each be switched in independently of one another, instead of all being lumped together as in the commercial system.

All these things can be achieved to a satisfying extent by electrical arrangements involving the switching of capacitors or inductors or both.

An easy arrangement is one by which the main tuning condenser is cut out and a much smaller capacity condenser switched in, thereby attaining the low C value which is necessary for high 'Q'. This simple switching, even without

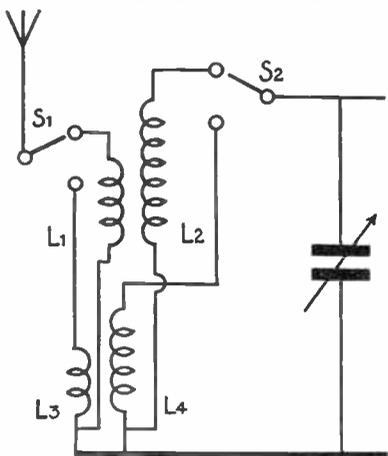


Fig. 1

method of the ordinary domestic receiver produced by commercial firms. Fig. 1 illustrates this, showing the medium wave with one short wave coil. The medium wave coil is in operation with the switches S2 and S1 closed, connecting up the secondary with the condenser, and the primary with the aerial. Turning the switches puts the medium coils out of circuit and the short wave coils into circuit (L3 and L4).

For this, a two-pole two-way switch would be needed. With an R.F. stage in the set, a four-pole two-way switch is necessary.

With home-made coils it is possible to economise by using a single large tapped coil. This is shown in Fig. 2, where L1 and L2 combined make up the medium wave winding, with the switches in

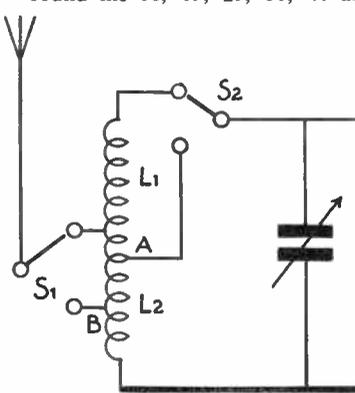


Fig. 2

metres points, or bands as they are called. As a result, short wave stations are crammed so closely together, that the ordinary tuning system (manual control) is quite inadequate.

So, to achieve fineness of tuning, mechanical devices such as epicyclic gears or large drive drums are often used.

However, a more successful method is to employ what is called a band-spread condenser. This is a small tuning condenser of 15 to 25 picofarad mounted in parallel with the main tuner. When the desired band is tuned in by the main tuner, the band-spread condenser is then used to separate the particular station wanted. Another control knob is needed for this method, of course.

It need hardly be pointed out that if the set uses a twin-gang tuner, then a twin band-spread condenser will also be needed.

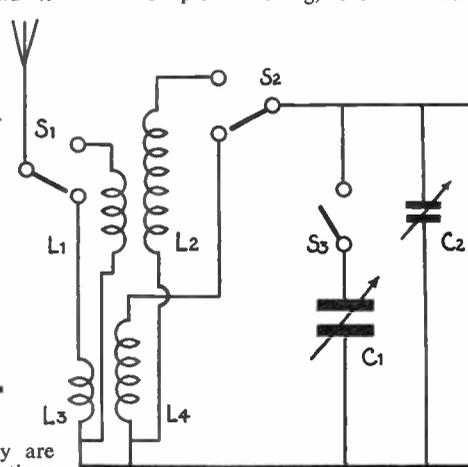


Fig. 3

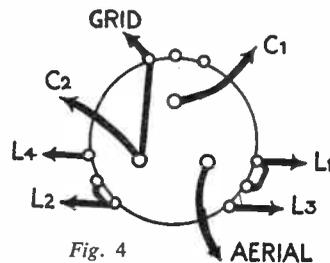


Fig. 4

altering the coil system, can alter the tuning range remarkably. For by merely using the medium wave coil already installed, the new condenser (assuming that its capacity range is 3-10 pfd.) will

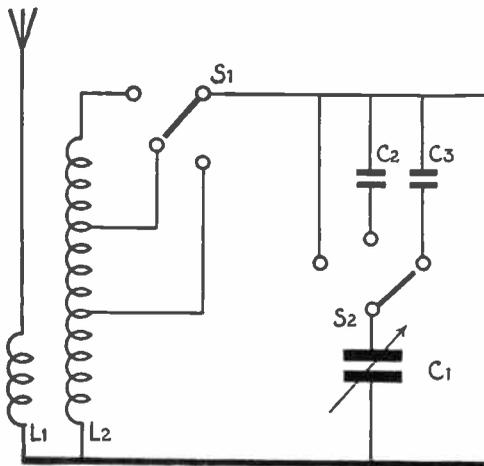


Fig. 5

tune from roughly 45 to 80 metres.

If we use the same switch to cut out the medium wave coil as well, and replace it by a smaller coil of 57 microhenries, then we could tune the short waves from 25 to 45 metres — a very useful short wave section. Instead of a separate coil, we could use a tapping on the medium wave coil, as shown in Fig. 2.

By using coils or tapings of smaller inductance value, we could cover further sections lower down on the short wave range. Fig. 3 shows the theoretical arrangement. For simplicity only one extra coil, beside the medium wave coil, is given. One three-pole three-way switch only is needed here and must be wired up so that in the first position L1, L2 and C1 are all in circuit for medium wave operation. In the second position, L1 and L2 are still in circuit but C1 is switched out in favour of C2, thus giving the first short range. In the third position of the switch C1 is still cut out, and also L1 and L2, while L3 and L4 are switched in, so giving the second short wave range. (See Figs. 3 and 4.)

Wind your own Coils

One can wind one's own coils to cover wave sections specifically wanted. Instructions on winding coils and calculating inductances and wave ranges have been given before in *Hobbies Weekly*. However, the formulae will be stated briefly at the end of this article.

Another system more ingenious than the one just described is to use separate coils or taps for particular bands in a similar way, but also to employ special combinations of capacitors to reduce the capacity of the existing main tuning condenser. The arrangement is based on the facts that when condensers are in series the combined capacity is the product of the two capacities divided by

the sum of the two capacities, and when in parallel the combined capacity is the sum of the two.

A simple form of this system is illustrated theoretically in Fig. 5. A tapped coil is shown for ease of illustration. A couple of examples will suffice to illustrate this system. Assuming that L2 is medium wave inductance (170 microhenry) and C1 is a 10 to 500 pfd. condenser, and C2 is a fixed capacitor of just over 5 pfd., it can be calculated that when the tuning condenser C1 is closed to its maximum capacity (500 pfd.), the combined capacity of the two condensers is approximately 5 pfd. When open, at minimum capacity, the combined capacity becomes roughly 3.3 pfd. This capacity range (3.3 to 5 pfd.) in conjunction with 170 microhenry coil will give a wave range of 55 to 43 metres.

If the condensers are now tapped down the coil to an inductance of, say, 50 microhenries, the wave range becomes 30 to 25 metres. This 5 metres range is spread over the whole tuning dial — this is band-spreading, indeed!

This system thus provides good band-spreading, and in addition a high L.C. ratio, owing to the small tuning capacity, so giving high gain.

The bandspreading, it must be noted, takes place increasingly towards the low frequency end of the band, which is obvious. However, a more linear spreading, i.e., a more even spreading over the whole band can be achieved by introducing another capacitor in parallel this time with the tuning condenser. This also narrows still further the band covered.

Thus, a 50 pfd. condenser placed in parallel with the variable condenser and in series with the 5 pfd. condenser previously used would give us a more even bandspread covering a range from roughly 52 to 55 metres if a medium wave coil were used untapped.

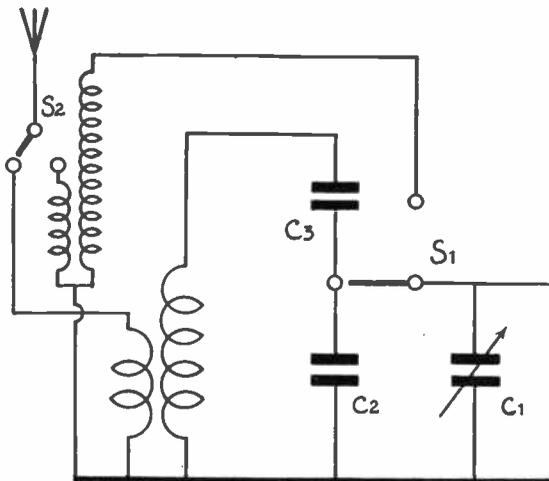


Fig. 6

In actual practice a wider band than this is advisable and series condensers more towards 50 pfd. rather than 5 pfd. will be found more useful, if only for the fact that a smaller number of coils or tapings is necessary.

Fig. 6 shows how the condensers and coils are arranged in this last system. For simplicity, only one short wave coil is shown, beside the medium wave coil. In this circuit the medium wave coil is switched right out by S1 and the short coil switched in at the same time. The tuning condenser in this last instance is thus put in parallel with C2 and the two together in series with C3. This provides the capacity reduction and bandspread.

Further coils can be switched in and/or further series condensers in order to extend the ranges.

Try different condenser values

It is instructive and worth-while to try different values of condensers and coils (or tapings) and observe the effects, before deciding on a final circuit. This can be done by a few simple calculations on paper, or practically by using a tapped coil and a collection of condensers.

A useful formula for making up coil inductances is as follows:—

$$L = \frac{r^2 \times N^2}{9r + 10b}$$

where L is the inductance in microhenries, r is the radius of the coil in inches and b is the length of the winding. N is the number of turns.

For calculating the wavelengths which inductance/capacitance combinations will cover, the following formula is necessary:—

Wavelength = $1885 \sqrt{L.C.}$
where wavelength is in metres and L in microhenries and C in microfarads.

EXPERIMENTS WITH BORAX

AT the beginning of the 17th century the yak caravans toiling over the bleak passes of Tibet began to bring to the outside world loads of a substance obtained from the country's dried-up lakes. This was crude borax. It was destined to find many uses in Western homes and in industry. Though Tibet still exports small quantities, the great world demand can only be satisfied from other sources. The largest amount comes from the Mohave Desert in California.

Apart from its familiar household uses for mouth and hair washes and for water softening, it comes to us in many unsuspected articles. It is used to produce such widely different things as our enamelled kitchen vessels, cream laid paper, heat resistant glass kitchen ware, the glaze on our crockery and even some of our cosmetics. It is also used in metallurgy, for fireproofing and as an insecticide.

The chemist uses it for several purposes and these and some of its properties we can see for ourselves in simple interesting experiments.

For the first experiment you will need a little anhydrous copper sulphate. This you can make by crushing a pea-sized crystal and heating it on a crucible lid until it turns white. Take a little of this and place a drop of water on it. It will become blue. This gives us a test for water.

Drop some borax into the bottom of a dry test tube, clamp the tube horizontally and insert some anhydrous copper sulphate about 2 ins. away from it (Fig. 1). Borax seems to be a perfectly dry substance. Now heat the borax in

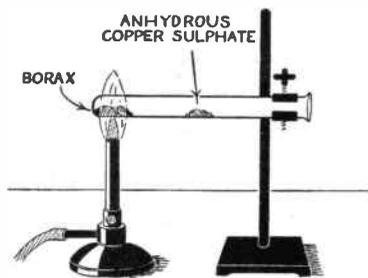


Fig. 1—Finding out what happens on heating borax

the tube. It swells up and gives off vapours which condense farther up the tube in colourless drops. These vapours and drops will colour the anhydrous copper sulphate blue. You have proved the presence of water in borax. This is present in combination as water of

crystallisation. Nearly half of a given weight of borax consists of water. An astonishing thought!

The chemical name of borax is sodium pyroborate. As both its names seem to imply, it is related to boric acid ("boracic powder"). You can actually prepare a specimen of boric acid from it. Dissolve 12.5 grams of borax in 50 c.c. of boiling water. Slowly stir in 10 c.c. of strong hydrochloric acid and let the solution grow cold. Shining scaly crystals of boric acid will separate. After standing overnight to complete the crystallisation, filter off the boric acid, wash it on the filter with a little cold water, turn it out on to a clean porous tile or brick and let it dry.

Why does borax soften water? This is answered by a simple experiment. Take three test tubes. Half fill them with rain water or distilled water and add a few drops of warm soap solution to one. Close the tube with your thumb and shake. A lather forms.

Harden the water

To the second test tube add some magnesium sulphate (Epsom salt) solution and also some calcium chloride solution. Again add soap solution and shake. No lather forms. The water has been made hard by the magnesium and calcium salts — which is exactly the case with natural hard water.

Now take the third test tube, add magnesium and calcium salt solutions as in the last instance and then some borax solution. A white precipitate appears. Add borax solution until no more precipitate is produced, and then drop in soap solution and shake. A lather forms. The borax has softened the water because it threw the dissolved magnesium and calcium salts out of solution so that they could not react with the soap. This is what happens when one adds it to natural hard water.

The white precipitate is a mixture of magnesium and calcium borate and you can prepare specimens of each for your chemical stock by adding borax solution to separate solutions of magnesium sulphate and calcium chloride until no more precipitate forms in each. Filter off the precipitates and wash well on the filter with plain water and then dry them in the oven.

The metallurgical use of borax lies in its ease of combining with metallic oxides. In brazing and welding molten borax dissolves the oxide films off metals and leaves a clean surface. This principle can be shown by means of borax beads. Make a loop at the end of a platinum wire by turning it round a pencil point,

so that the loop is about $\frac{1}{4}$ in. in diameter. Platinum wire, by the way, is not as expensive as it sounds. Laboratory furnishers sell it at about 1/6 per inch. Heat the loop until it glows, dip it in powdered borax and then heat it in the mouth blowpipe flame (Fig. 2). The borax will swell up and then forms a colourless bead. Touch this bead to a minute grain of copper sulphate (no bigger than a pin head). Reheat it in the blowpipe flame. The borax will remove the oxide from the copper sulphate, combine with it and form a green bead. On cooling this turns blue.

Salts of other metals give coloured beads and on this depends the use of borax beads for detecting some metals in analysis. You can make a set of these beads for reference by repeating the above experiment with cobalt chloride, chrome alum, nickel sulphate and iron alum. Their colours are: cobalt, sapphire blue; chrome, green; nickel, yellowish-brown; iron, bottle-green. The beads should be sealed in a short length of narrow glass tubing in a known order. This sealing up is necessary, for the beads effloresce on the surface if long exposed to the air and so spoil their appearance and effectiveness.

Another laboratory use for borax is as a test for glycerine, and a pretty effect it has, too. Dissolve 1 gram of borax in 100 c.c. of water. Pour a little of the

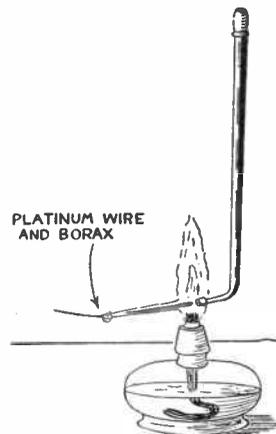


Fig. 2—Making a coloured borax bead

liquid into a test tube and add a few drops of phenolphthalein solution. A beautiful pink colour appears. Add a drop or two of glycerine. The pink colour disappears. Now heat the solution. The pink colour reappears, but vanishes again on cooling.

●Continued on page 89

Try Selection in Enlarging

Says E. G. Gaze

THE amateur photographer soon learns that his camera's eye, its lens, is not selective. It reproduces on the negative the scene comprised within its angle of view, and just that. It is the photographer who has to select and balance the composition.

A scene appeals to the photographer because his brain is selective and critical and capable of concentrating on the main theme whilst ignoring the distractions of unbalanced foregrounds and unwanted, intruding masses or areas of light and shade. Once he learns this his photographs begin to please him more, they present not a general, cluttered up scene but the main theme — the point of interest that caught his eye and imagination and made him click the shutter.



Fig. 1—Foreground and surroundings all tend to distract eye from church tower

It all leads up to the often given advice of filling the negative with what you want to record — no more, no less. Haphazard, careless 'shooting', with little or no thought of composing the main subject, leads to a cluttered negative — and the main subject has to be rescued and presented in the final print by ruthless disregarding of much of the negative space during enlargement. And as enlargement in general results in a loss of viewing sharpness in the print in proportion to the degree of enlargement, it follows that it is always good practice to have a negative of which you can use as much as possible — in other words, fill the negative only with what you will need to present the scene.

But it is not always possible to use the camera as selectively as the human eye.

Viewpoint may be limited, your main subject may be cluttered around with material or natural structures that cannot be avoided by change of viewpoint. Here you have to accept a wastage of negative space and rely upon selection and composition during enlargement to present the main subject to the best advantage. Not to 'shoot' is to lose an attractive picture. So, with later selection in mind, 'shoot' and rescue the result on your enlarger easel.

Illustration No. 1 examples this way of continuing your selective composition by enlargement. It was the old half-timbered church tower rising between shadowed and sun-lit trees that caught the eye. To fill the negative space, and to cut out side trees and wide foreground unbalancing the selected view, meant going closer to the church. That meant cutting off the tower top or tilting the camera and so causing converging verticals in the tower. A compromise was made: the tower was given breathing space with sky above it, and more foreground than was needed also included. No. 1 shows a print from almost all the



Fig. 2—Same negative, but the tower 'rescued' by enlargement

negative. During enlargement the sun-lit foreground was toned down, but this and the side trees still detract from the scene which originally appealed. It is not a picture of an old tower rising between trees now — it is a picture of sunlight and shade with a church somewhere in it.

Now look at No. 2. A greater degree of enlargement on the same sized printing paper has cut out the unwanted foreground and subdued the distraction of the side trees by cutting them out. The foreground being smaller can be left sun-lit without detracting from the sun-lit tower. It is now a picture of what the photographer saw and liked and raised to snap. An old tower, sun-lit, rising between shadowed trees.

Material difficulties prevented the negative from being filled with what was wanted — but selective control during enlargement has produced that very result and secured the wanted picture.

New approach

But there is a second use of selection during enlargement that is of even greater scope, giving what amounts to a new 'approach' to the subject. You have a chance here for second thoughts, not necessarily to produce a better picture of your subject but to show it in a different approach. And all from the one negative.

Examining a print made from all, or nearly all of a negative, it is often possible to find that more than one picture is comprised within the one scene — a different way of placing emphasis on the component parts of the scene.

Illustration No. 3 is from almost the whole of a negative. The narrow sun-lit and deeply shadowed lane, closed by a shadowed building with the abbey tower rising above, attracted the photographer.

Examination of this print showed another approach to the same subject, but shifting the emphasis. No. 4 is an enlargement on the same size paper from a part only of the negative used to make No. 3. Here the emphasis is less on the narrow sun-shadowed lane leading the eye to the tower, and more on the tower dominating the end of the lane. There is still the suggestion of a narrow sun-lit way to the tower—but the emphasis has been shifted by selective control in enlargement.

It is the same scene from the same negative, with proportions of parts to parts the same within each — but on the same size of printing paper the self-same scene is given a 'new look'. Each is attractive, but by giving a difference in emphasis virtually two pictures have been found from one negative.

This selective sense comes with practice. Many photographers find the following method useful in finding two or more pictures from one. Make two L-shaped cards in black, so that when placed with open ends together they form a rectangle approximately equal to



Fig. 3—Print made from almost whole of negative. Emphasis on sunlit lane-way

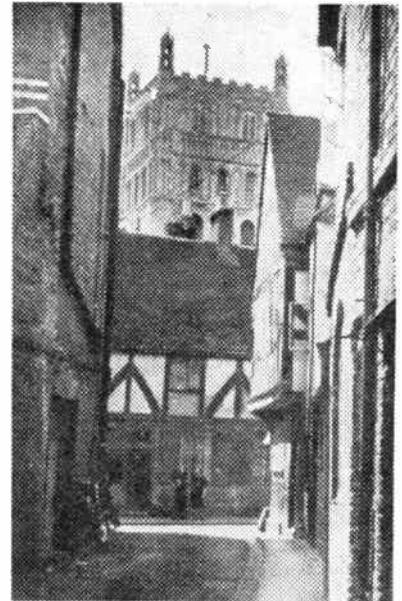


Fig. 4—Same negative as Fig. 3, but emphasis changed by selection during enlargement—tower now dominates.

half-plate sized paper and whole-plate — or even larger if you need to.

Now project the whole negative to the full size of your enlarger easel and with your L-shaped cards, placed to form the rectangle equal to the paper size chosen or used, comprise portions of this greatly enlarged image within this black frame. By moving this frame over the image the newcomer to this method is often surprised by the number of new approaches and ideas one negative can give.

A final point. You may find that the new portion chosen for emphasis will show too great a falling off in definition, or in (negative) grain size, to be printed satisfactorily at that high degree of enlargement. No matter — you have selected the new portion, and can reduce these faults simply by comprising that portion of the scene to the limits of a smaller size of printing paper. It is not what you have cut out that matters but what you fill your printing paper with — so a smaller sized final print of the chosen portion has the same shift of emphasis.

Remember to fill your negative frame as far as possible with the subject you want, but even if you succeed don't forget to try a further selective control during enlargement for a change of emphasis.

the size of printing paper you normally use. It is useful to make two sets, for

Trying out New Dyes for Raffia

SOMETIMES a rather special shade is required when working with raffia or cane. A colour may be needed to blend with the scheme of your room which, perhaps, is difficult to obtain. A little experimenting with various substances will produce perfectly fast dyes in beautiful colours.

The first thing to do is to dissolve about 3ozs. of alum in a quart of water—using a bucket or similar receptacle. When this has been thoroughly mixed steep the raffia or cane for twelve hours or longer. This process prepares the material for the permanent fixing of the dyes.

Now for the dyes, which are made from various vegetable substances. A pretty shade of rose pink is obtained by simply using the water that a couple of pounds of beet have been stewed in. While the raffia is still damp from seeping in the alum solution plunge it into the beetroot water and boil for half an hour, stirring occasionally with a wooden stick in order to obtain an even dye.

For a yellow shade leave a piece of old iron standing in water until it becomes rusty. A bright yellow dye is soon manufactured and the raffia can then be boiled in it for half an hour. Cold tea provides a pretty light brown dye.

Privet leaves can be used to produce deep yellow and lily of the valley leaves will give a light green. Pear and plum are also useful for yellow tones.

Water from boiled onions is useful in giving just the right shade of brownish yellow and you can stew the shells from walnuts to obtain a warm brown shade.

For blue, buy some indigo extract and boil the raffia in a solution made from this, adding different quantities of

water in order to obtain various shades from pale to dark navy blue. By rubbing purple iris petals straight on to the raffia the result is a rich mauve shade.

Use harmless substances in your experiments — not poisonous berries or other poisonous materials which are dangerous to work with. Iron pans must not be used for boiling, as the colours will be spoiled. The best kind to use are enamel or copper. (D.M.D.)

● Continued from page 87

Experiments with Borax

A striking demonstration of the fire-proofing properties of borax can be carried out by mixing 7 parts of borax and 3 parts of boric acid, both by weight. Put some of this in a beaker and slowly add just enough lukewarm water to dissolve it while stirring vigorously. Take care not to use too much water. Dip a strip of filter paper in the liquid and hang it up to dry. Apply a flame to the paper. It will char but not take fire. Cloth can be fireproofed in the same way.

Borax and curry may not seem to have much in common. Yet one of the ingredients of curry is used for a standard

test for borax, namely, turmeric. Shake a pinch of turmeric with about half a test tube of methylated spirit. A yellow solution will result. Let the undissolved matter settle and into the clear upper liquid dip a strip of filter paper and then let it dry.

To try out the test, dissolve some borax in a little water in a test tube, add a little dilute hydrochloric acid and half immerse the turmeric paper in the mixture. The paper turns brown. Remove the paper and apply to it a drop of either sodium hydroxide solution or ammonia. The paper now turns bluish-grey or black. (L.A.F.)

Make Jam Jar Flower Pots

GOOD use can be made of jam jars by utilising them as pots to display flowers, so welcome in the home. As the pots in themselves are not strictly speaking, objects of charm, a holder is desirable. The holder can be of the single variety, as illustrated, or a double pattern, to hold two such jars, and can be screwed to the walls.

For the single variety cut a disc of $\frac{1}{2}$ in. hardwood to diameter given at (A) Fig. 1 (ignore the arm extension). Round off the edge of the disc and mark the dotted circle shown. On this, mark off thirteen points, equal distances apart, and on each point bore a $\frac{3}{8}$ in. hole right through.

Use dowelling

From $\frac{3}{8}$ in. round wood rod, cut thirteen lengths of 4 ins. each, and glue in the circle of holes bored. The top ends should be neatly rounded off with a file and glasspaper, and any portions protruding from the bottom of the disc should be sawn off. An ordinary 1lb. jam jar should now fit inside quite easily.

For a stand, cut two pieces, also from $\frac{1}{2}$ in. wood to pattern given in Fig. 2. Half joint these together and fix with glue.

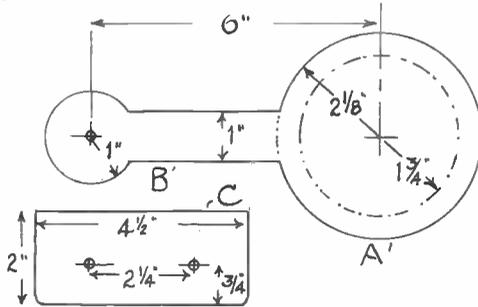


Fig. 1

Clean up the whole article with fine glasspaper and finish with one or two coats of high gloss enamel. To further disguise the jam jar, weave coloured raffia, basketwise between the rods, and tie off. The result is quite pleasing.

For the double wall type, cut two of (A), with the arm extension (B), and proceed as before, with the round rods.

In the smaller disc at the end of the arm extensions, bore a $\frac{1}{2}$ in. hole through the wood. From $\frac{1}{2}$ in. wood, cut two of (C) Fig. 1 and where indicated, bore $\frac{1}{2}$ in. holes. The hole in both parts should be

in true alignment. The outer corners are slightly rounded.

Fitting the back plate

A back plate, also cut from $\frac{1}{2}$ in. wood, is shaped as shown in Fig. 3D. The position of parts (C) are shown on this by dotted outlines, also the position of its supporting brackets beneath. At each side bore suitably sized holes for screws to fix the plate to the wall. Cut two brackets (E) from spare pieces of the wood. Now glue and screw one of parts

By W. J. Ellson

(C) to the back plate, and glue the brackets beneath it, leaving everything to set hard.

At this stage enamel all parts of the fitment, and add the raffia basketwork. When all is ready to handle, place the swinging holders in position, with the second part (C) on top, and push pins, cut from stout nails through the holes in (C) and the arms of the holders. Grip the assembly with a cramp, turn over and securely screw the top part (C) to the backplate. The holders should then be well and firmly fitted, and yet free to swing sideways, as required for each jar of flowers to spread out without touch-

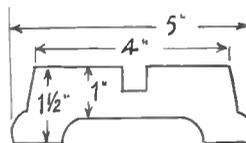


Fig. 2

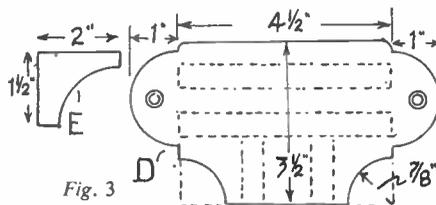
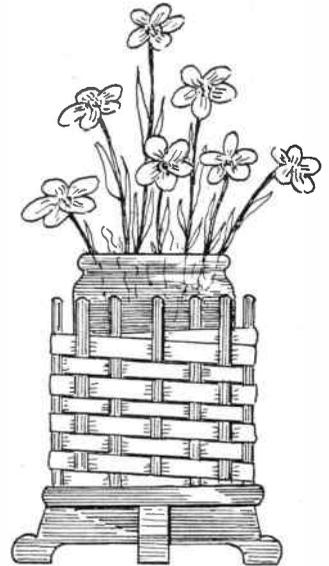


Fig. 3

ing each other.

For a firm fixing to the wall use screws, plugging the wall beforehand with Rawlplugs.

It may be added that the weaving mentioned need not be confined to raffia. Quite good results can be achieved with osiers, which have the distinct advantage of cheapness, especially in



country districts, where they can often be picked for nothing. Also there are good quality canes to be bought for basketwork, from any art stores or handicraft shops. A very good effect can also be achieved with coloured plastic.

FORMULA FOR DIESEL FUEL

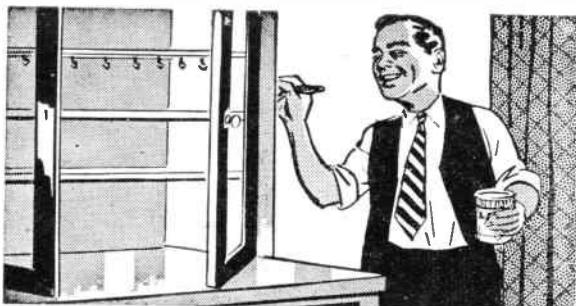
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Paraffin	37 1/2%	i.e. 37 1/2 Fl. oz.
Amyl Nitrate	2 1/2%	i.e. 2 1/2 Fl. oz.
	100%	100 Fl. oz.

For competition use Amyl Nitrate can be increased to 5%.

Add the ether to the castor oil and mix well with a wooden stick, add paraffin and amyl nitrate, mix well and filter into a glass bottle, seal the bottle and label it:—Diesel Fuel — HIGHLY INFLAMMABLE. Store away from any form of heat.

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Hints for Anglers

NOW'S THE TIME FOR A SPOT OF TROUT FISHING

MANY anglers are now devoting much time to the catching of trout — the beautiful game fish of river, brook, and lake.

A trout fishing licence covering the waters you intend to fish is, of course, essential. Never be tempted to start the new season without a fresh licence for the year. Read the document carefully, in case there are alterations in dates, fishing rules, and regulations. Licences, where in force, can generally be had from fishing tackle dealers, riverside hotels, post offices and other distributors or from the clerk of the river board for your particular region. It must be added that in addition to the trout licence for the season, you will probably require a ticket or permit, unless you are a member of an association that owns or rents fishing. Be sure and gather all authentic information regarding the trout-fishing in any district you visit, for rules and regulations vary from area to area. Always enquire locally before you fish in unknown waters.

The Outfit

Those about to commence their apprenticeship to trout-angling will doubtless, be glad of a little advice on the necessary outfit. A rod suitable for both 'wet-fly' and 'dry-fly' fishing should be of split-cane or greenheart; for smaller streams 9ft. to 10ft. long, and for bigger waters 10ft. to 12ft. Be sure that when your reel and line are fitted the rod is correctly balanced. A dressed waterproof silk line some 30-40yds. in length, soft and fairly pliable will be suitable, but it is advisable to run a length of 'backing' line on the reel, splicing it to the actual fishing line. Make sure this piece of backing line is secured fast to the reel itself. Many beginners have overlooked that point to their sorrow.

Then you will need a few tapered or level gut-casts or nylon about 1, 2, or 3 yards in length, according to the type of water and method of fishing. Casts should be of varying thickness, from 1x to 5x — a useful tapered cast should be of 1x down to 4x in size. This taper will do for dry or wet fly.

As you will know the 'dry' fly is fished floating on the surface of the water; the 'wet' fly is usually allowed to sink a few

inches below the surface.

In addition to the actual fishing tackle of rod, line, reel, casts and flies, you will need a landing-net, a bag or creel, a case or a small box for your flies, a damping box for soaking casts when necessary, a pair of scissors and a handy knife. A small tin of grease or Vaseline for treating the line when fishing the 'dry' fly, so that the line and fly do not sink under water, is also necessary.

Some handy items

A useful item is a bag for carrying fish, etc. A waterproof canvas bag with a rubber-lined compartment, and two outside pockets for your tackle, etc., is sufficient. Some anglers carry in the outer bag a loose cloth bag, with a string to draw it tight, after slipping into it the fish they catch. This bag can then be washed afterwards, thus keeping the main bag sweet and clean, if it does not have a detachable rubber lining.

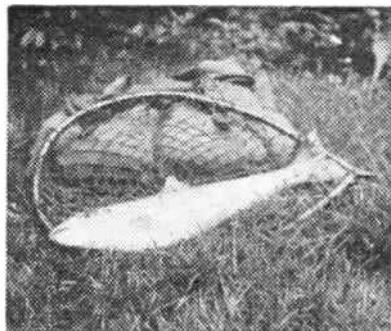
The V-shaped landing-net is handy, for it can be folded up to carry easily by your side. On some waters you will need waders, but some streams can be better fished without them. At the same time a pair of short waders, gum-boots, or rubber Wellingtons are handy if you have cause to cross a stream where there is no footbridge nearby, or if you wish to enter the water to release flies hung up on a tree or bush.

Flies likely to be useful for spring fishing include Black Spider, Partridge Spider, March Brown Hackle, March Brown Winged, Iron Blue, Greenwell's Glory, Hare's Ear, Red Quill and other hackled lures.

For transporting your artificial flies, a fly-box which has small separate compartments with celluloid lids is advised—a separate compartment for each pattern of fly. Some anglers prefer a fly-book with leather backs and inside pockets for storing flies. A pair of small tweezers to pick out the lures will be found very handy.

Methods of Fishing

The wet-fly is very good on the brawling hillside streams and brooks where the current is broken and rapid. Spiders and hackled flies kill well on becks, burns, and medium streams. Trout feed



A fine trout caught on the fly

largely in such waters on what are called nymphs, the larvae of insects which live underwater, until the time when they must rise to the surface to develop into the mature fly. When these nymphs are making the slow ascent to the surface, they are eagerly snapped up by trout, and are caught by lures representing nymphs. Some knowledge is needed by the angler of the best ways of fishing with a nymph.

In dry-fly fishing later in the season, the lure is coaxed to float over trout seen rising in the pools. This method is much practised on slow-flowing rivers, such as the chalk streams. It is thought to be the most artistic form of fishing with the artificial fly.

Alternative methods

Now for other ways. A live natural fly impaled on a No. 12 hook and cast of 3x gut can be used, lowering the lively bait on to the pools where bushes overhang the stream. Blue-bottle flies, moths and butterflies, and grasshoppers are killing baits. But first — catch your baits!

Worm fishing is good fun. We may also mention the 'sink-and-draw' method with such baits as slugs, snails, red worms, field crickets, hoppers, wasp-grubs (in due season) and dock grubs. Such baits, freshly caught, are fished on strong tackle and suitable hooks by lowering them into the water nearly to the bottom, and then gently withdrawing to the top again, repeating the process.

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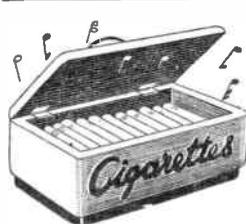
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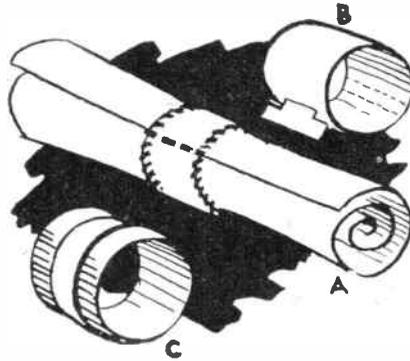
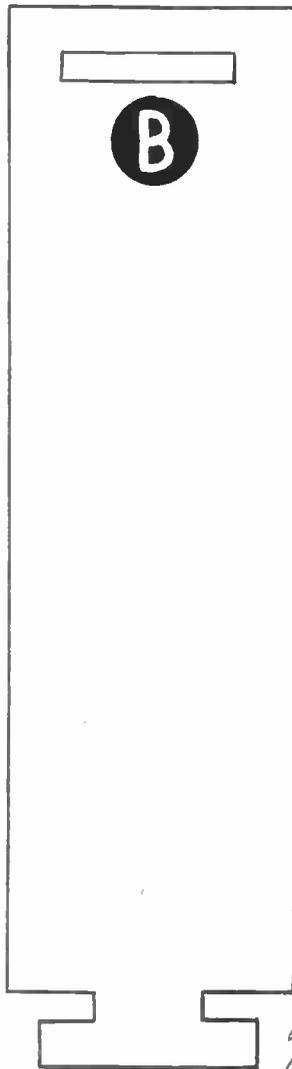
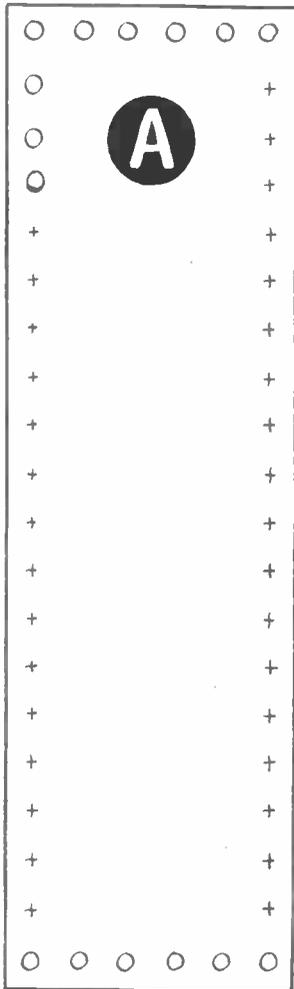
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THE PATTERNS ARE FULL SIZE

USE ODD PIECES OF CRINOTHENE



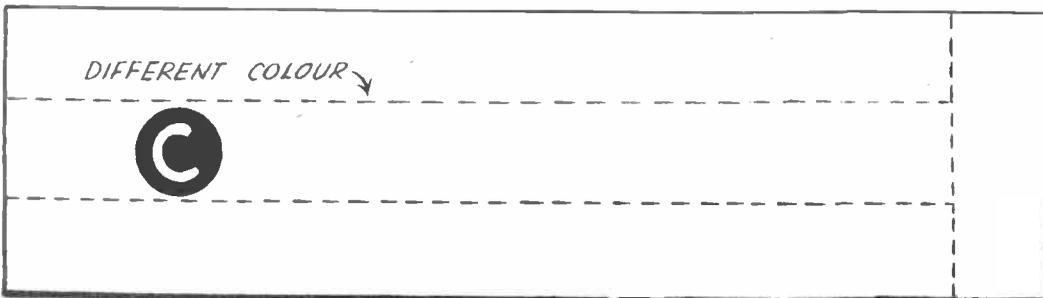
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THESE attractive rings are easy to make, in fact this is a job for the young craftworker. The rings can be made up for special occasions such as parties or for permanent use.

The idea is to use up odd pieces of Crinothene left over from previous projects. The cost of Crinothene makes it imperative to use up spare pieces rather than throw them away.

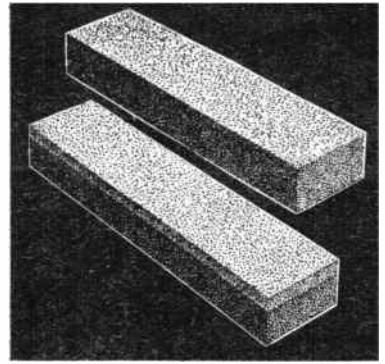
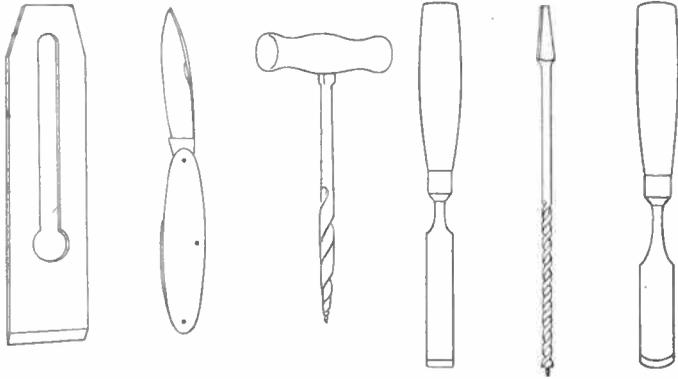
The diagram (A) shows the size of the piece to be bound with plastic thonging. Just roll the strip round, binding across and then round the sides. Piece (B) is self explanatory. The lower end is simply thrust through the slot at the top.

Lastly, the piece (C) is made up of three separate strips bound together with thonging. Use two colours to give the best effect. (M.p.)



EASY TO MAKE

For Every Cutting Tool

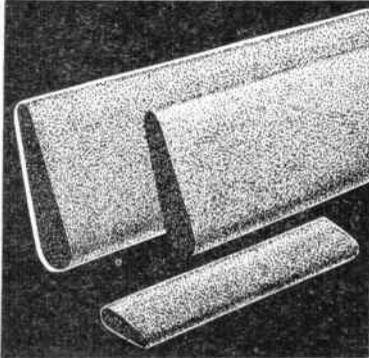


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Suitable for flat-bladed tools, and for outside curves: in coarse or fine grits of silicon carbide or of ALOXITE abrasive. Combination coarse and fine stones are also available.

FOR GIMLETS Bore two holes in hard wood with the new gimlet. When it needs sharpening, work it in one of the prepared holes with silicon carbide grit (120 to 180) and oil. Repeat in the second hole, using grit without oil.

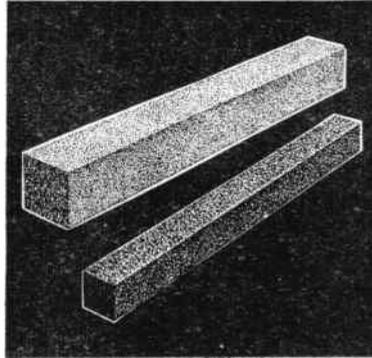
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Sharpening Stone by CARBORUNDUM

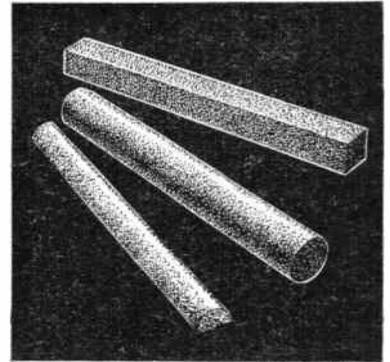


FOR GOUGES WITH INSIDE BEVELS
Slipstones of various sizes, in silicon carbide or ALOXITE abrasive, for tools that need sharpening on an inside curve.

ALOXITE is a Regd. Trade Mark



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Auger bits should be sharpened so that the bevel is on the *upper* side of the cutting blade.



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CARBORUNDUM make a range of sticks of different sections, and different grit sizes, for sharpening every small tool.

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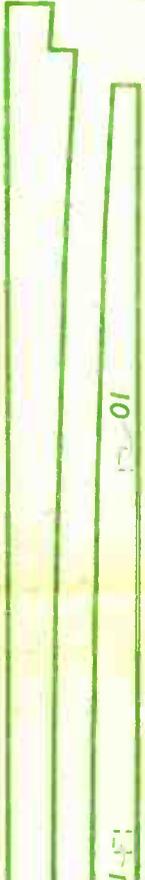
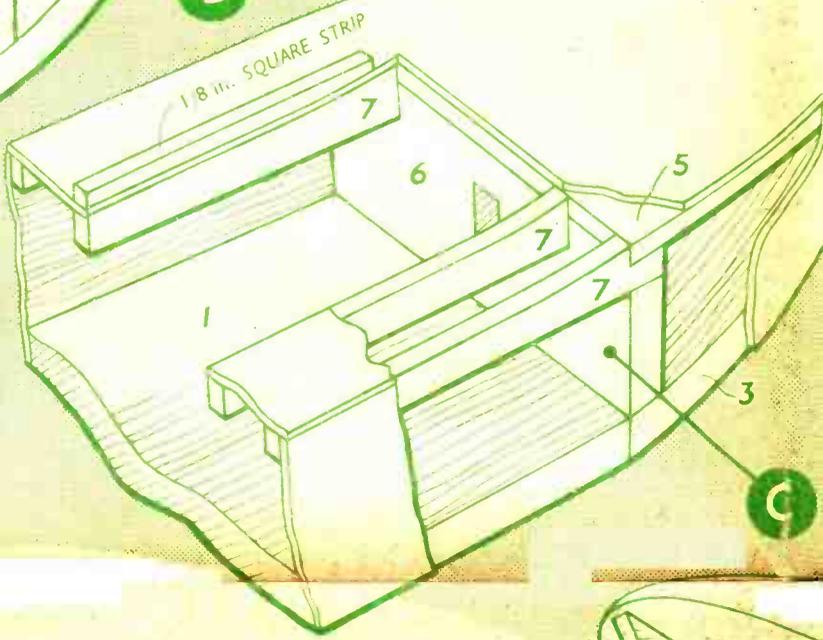
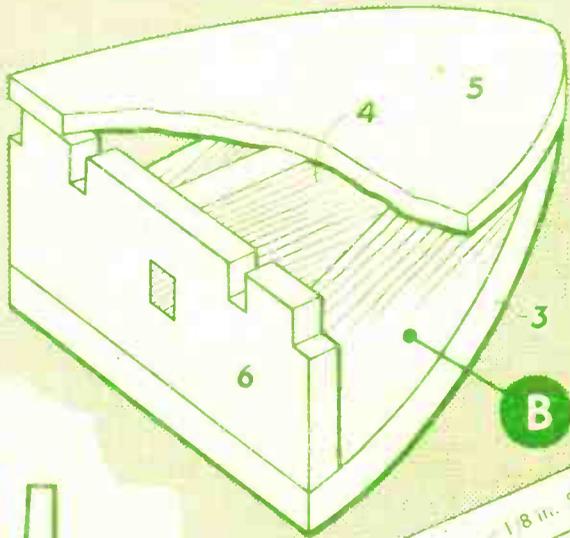
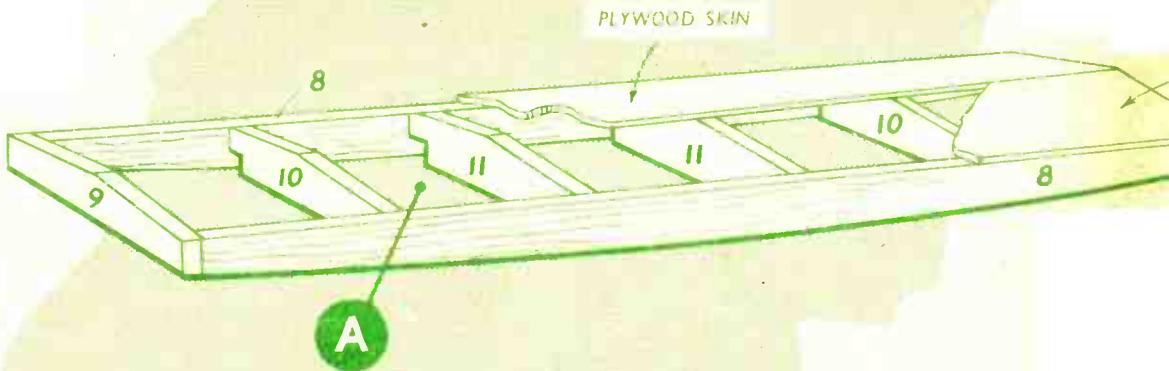
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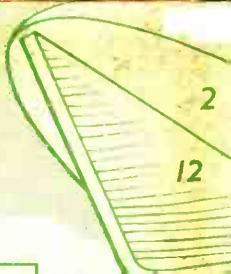
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PIECES 8. CUT TWO 1/8 in.



PIECES 11. CUT TWO 1/8 in.





DESIGN

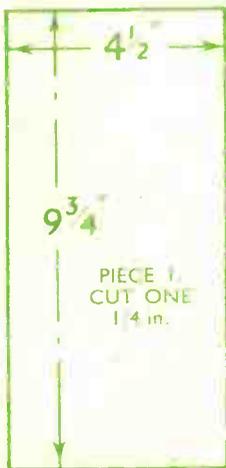
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SIZE
LENGTH 16 1/2 ins.
BEAM 4 1/2 ins.

MODEL BARGE

DESIGNED FOR USE WITH
THE TUG CLIMAX (251 Special)



A KIT OF MATERIALS FOR MAKING THIS DESIGN IS SUPPLIED BY HOBBIES LTD., DEREHAM, NORFOLK. PRICE ON APPLICATION

PIECES 17 MAKE FOUR FROM WASTE WOOD AND FRETPINS.



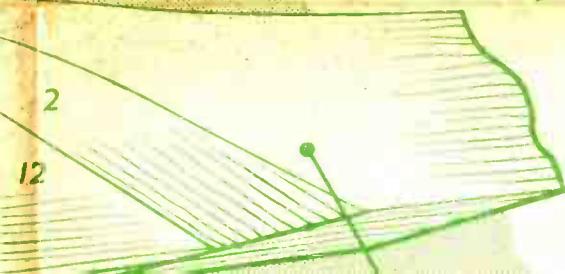
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PAINT IN TUBES
Ready for use

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THE ARROWS INDICATE DIRECTION OF GRAIN OF WOOD

10

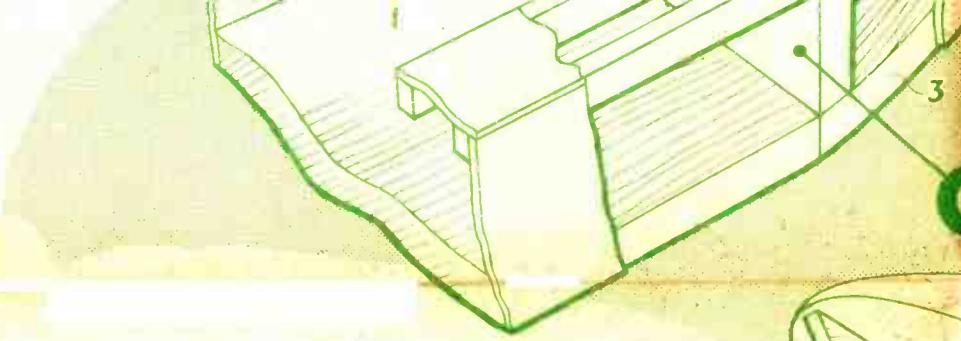
PIECES 8. CUT TWO 1 8 in.

11

11

10

PIECES 7. CUT FOUR 1 8 in.



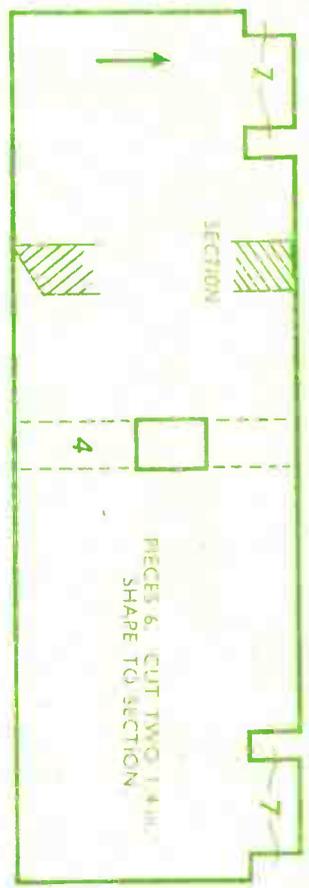
PIECES 11. CUT TWO 1 8 in.



PIECES 10. CUT TWO 1 8 in.

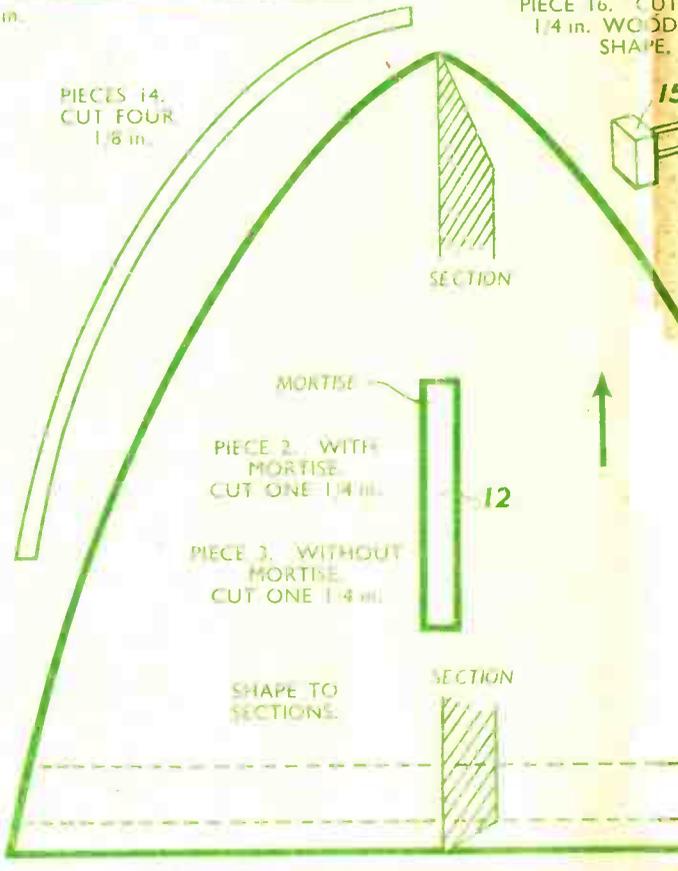


PIECES 9. CUT TWO 1 8 in.



PIECES 6. CUT TWO 1 4 in. SHAPE TO SECTION

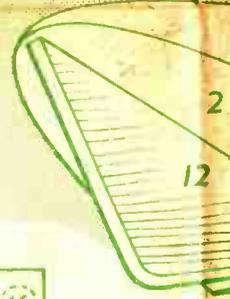
PIECES 14. CUT FOUR 1 8 in.



PIECE 2. WITH MORTISE. CUT ONE 1 4 in.

PIECE 3. WITHOUT MORTISE. CUT ONE 1 4 in.

SHAPE TO SECTION.



PIECES 15. CUT TWO 1 8 in.



PIECE 16. CUT 1 4 in. WOOD SHAPE.



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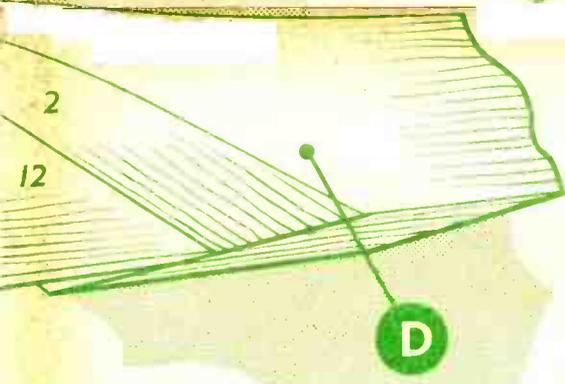
Starlon

PLASTIC ENAMEL PAINT

STARLINE, SOUTHEND-ON-SEA, ESSEX

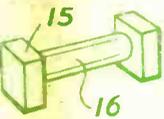


PIECES 17
 MAKE FOUR
 FROM WASTE WOOD
 AND FRETPIES.

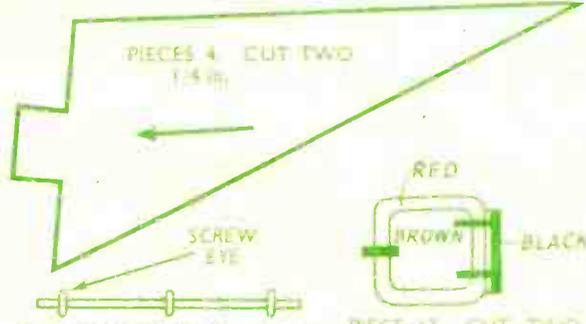


THE ARROWS INDICATE
 DIRECTION OF GRAIN OF WOOD

CUT FROM
 WOOD AND
 SHAPE.



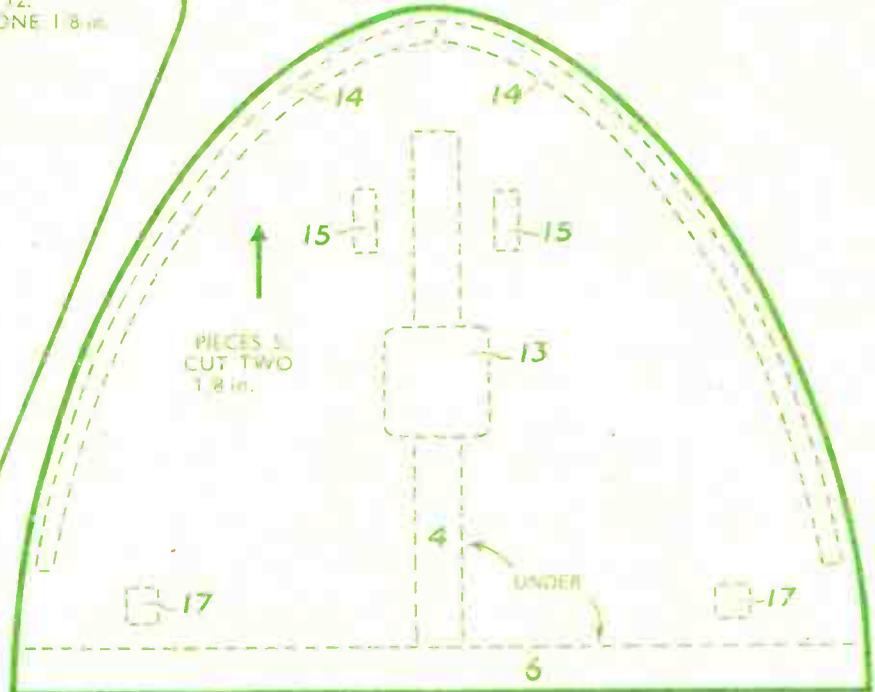
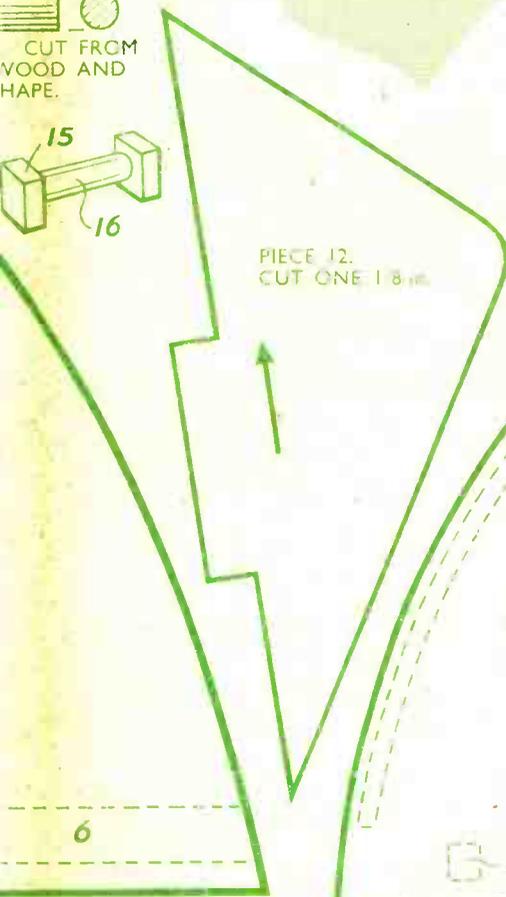
PIECE 12,
 CUT ONE 1.8 in.



PIECES 4, CUT TWO
 1.4 in.

18. MAKE 12 FROM 1/16 in.
 ROUND ROD AND SMALL
 SCREW EYES.

PIECE 12, CUT TWO
 1.8 in. PAINT AS
 INDICATED.



PIECES 5
 CUT TWO
 1.8 in.

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