HOBBIES WEEKLY

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IN THIS ISSUE

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ILLUMINATED SHOWCASE FOR MODELS

MATERIALS REQUIRED

1 15in. square ⅜in. plywood. 1 panel ¼in. plywood, or hardboard, 2ft. by 1ft. 10ins. 2 posts 1ft. 9ins. by 2ins. by ½in. 1 post 1ft. 9ins. by 2½ins. by ½in. 4in. square of tin.

FITTINGS

1 pair 1in. hinges with ½in. screws or pins. 1 small metal button. 1 pair brass wall plates.

THIS illuminated showcase provides an excellent means of displaying a favourite model to the best advantage. It is quite simple to construct, and costs little to make. Many readers will find enough material to hand without having to purchase.

The dimensions given will accommodate the majority of models, but it should not be too difficult to amend these to hold some of the larger model galleons or planes. A larger base, or extra height, is quite easy to allow for in most cases.

The show case is intended for a corner of the room, where it is out of the way of existing furniture. A plan view (A) and front (B) assembly are given in Fig. 1.

You will need a 15in. square of ⅜in. plywood, which, cut across diagonally, will provide both top and base of the case. In what will be the top, at the point indicated in (A) bore a 2in. hole to allow for the insertion of an electric lamp to illuminate the interior.

For the vertical posts, seen in both (A) and (B), wood of ½in. by 2in. section will be needed for the two front ones, and wood of ½in. by 2½in. section for the rear one (C). Position these as in the drawings, and screw them to the top and bottom plywood parts, already cut. Use

round-headed screws for this job, two screws to each post at top and bottom, to make a strong joint.

Cut a sheet of cardboard to a width of 21ins. and long enough to bend round inside the case to a semi-circle, as at (E). Allow a length of about 2ft., which should prove ample, and leave a strip over to cut off. Ensure that the cardboard, when bent round, contacts all three posts, to which it should be subsequently fixed with tacks or small screws. This forms the background to the model, but before finally fixing it in position, cover it with paper of any suitable colour. If you have any artistic ability, paint on it a scenic background applicable to the model.

Touch of luxury

The bottom of the case should also be covered, either with matching paper, or such suitable material as green baize, or if you prefer a touch of luxury, velvet. The interior of the top of the case should be painted white, or have white paper pasted over it to deflect the light.

For illumination an ordinary household electric lamp will serve, with normal bayonet type fitting. Where the shade would normally be sandwiched between the screwed rings on the fitting, substitute a 4in. square of tin, as shown at (D). The corners of this are bent over to rest upon the wood top, leaving a space of, say, ¼in. for heated air to escape. This tin part and the outside of the top and bottom of the case should be

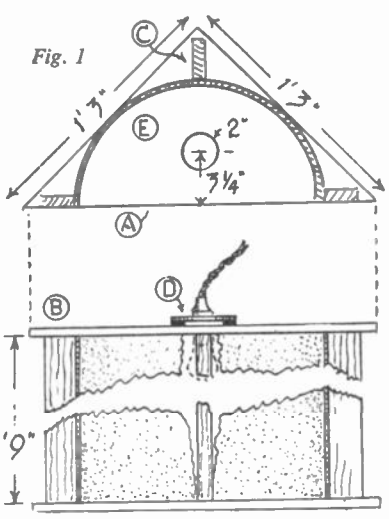


Fig. 1

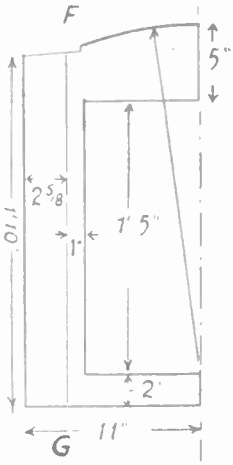


Fig. 2

black enamelled. All that remains now is to make the front.

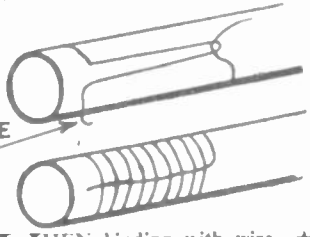
This can be cut from ¼in. plywood, or hardboard. A half-size pattern for this is given in Fig. 2, the right-hand half being the same. Mark out on the wood and note the curved top. This can be struck from a central point at the bottom of the panel opening. At points (F–G) (both sides) cut along. The central part is, of course, the door, and this should be hinged to open. Fancy hinges to be screwed to the face side of the wood must be employed here owing to the thickness of the material.

Clean up the sawn edges with fine glasspaper, and fix the side pieces to the case with screws, driven into the posts. A small metal button, which can be bought or shaped up from a scrap of sheet metal, should be fitted to the right side of the front to keep the door closed. A glass front is not absolutely essential, but has the advantage of keeping out dust. This is easily added.

Cut the glass ¼in. larger than the opening all round, and keep it in position with a pair of thin metal clips top and bottom, and a single small round-headed screw each side to prevent the glass moving sideways.

The front can be painted or enamelled in any colour preferred. Hang the case in the selected corner of the room, using plugged-in wall screws and a wall plate fitted to each side of the case. (W.J.E.)

★★★★ BINDING TIP ★★★★



WHEN binding with wire, twine, or other materials, the problem of finishing off arises when you come to the free end. You can tuck it in the last round of binding, but that is rarely very satisfactory.

Make a loop just long enough to cover the distance of the binding to be done, and bind over the loop, as shown.

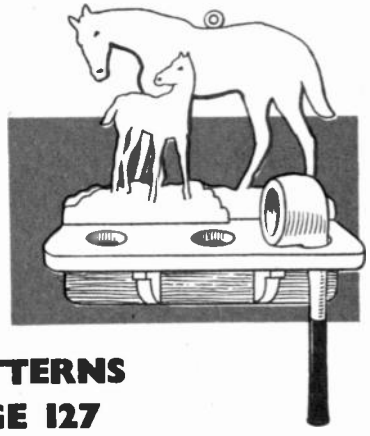
When you come to the free end, all that is necessary is to pass the free end through the loop just protruding, then draw back under the binding by pulling on the free end. (G.H.H.)

Mare and Foal Pipe Rack

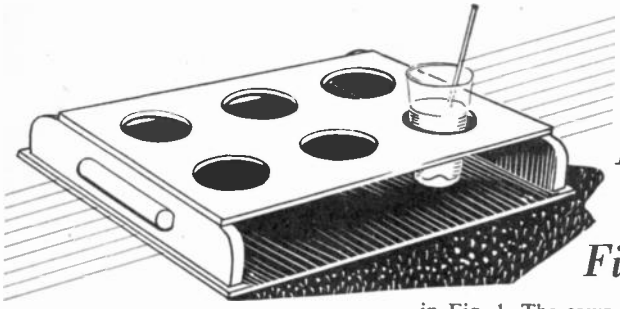
HERE is a chance to make something useful with your fretsaw. Trace the patterns on page 127 and transfer to wood by means of carbon paper. Pieces (A), (B) and (C) are ¼in. thick and piece (D) ⅛in. Glue the rack (B) to (A) in the position shown by the dotted lines. The brackets (C) are glued underneath.

Piece (D) is now glued in front of (A) and a brass hanger screwed in position at the back of (A).

Clean up and paint, giving two or three coats if necessary. A good effect can be obtained by coating the animals with flock spray. (Mp)



FULL-SIZE PATTERNS ARE ON PAGE 127



SERVER FOR DRINKS

Described by Finlay Kerr

THIS tray is used for serving six glasses at once. Each glass fits into a hole in the top member and this enables it to be held perfectly safe while being served, thus avoiding any embarrassment resulting from spilt contents. The server is very simple to make and the construction is as follows.

It is desirable to obtain your six glasses before attempting to make the tray. The sizes given in the accompanying sketches are suitable for standard sized glasses measuring 2¾ins. diameter at the top, 2¼ins. diameter at the bottom and 4½ins. high. If, however, you find that the sizes of your glasses are different from these, then you will have to alter the given measurements to suit.

The base piece is made from plastic topped hardboard. Cut a piece 13½ins. by 11ins., and afterwards smooth off the sawn edges. Black is a most desirable colour to choose, so that the sawn edges can be easily touched up with some black enamel to match the top surface.

After this, cut the two ends from ½in. thick timber to the size and shape given in Fig. 1. The sawn edges of these two members should also be smoothed off with glasspaper.

A piece of plywood 13ins. by 9ins. is now required for the top of the server, and six holes are cut in the positions shown in Fig. 2. The diameter of these holes should be slightly larger than the corresponding part of the glass. If a standard sized glass is used, then the diameter should be 2½ins. When cut, glasspaper smooth.

Fig. 1

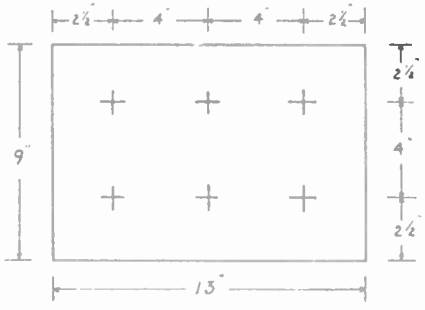


Fig. 2

The handles are made from two short lengths of ¾in. diameter dowelling. Plane a flat portion on each handle and fix on to the ends with glue and screws as shown in Fig. 3.

Once the four members have been cut to their correct sizes and properly prepared they should be assembled. The top piece should be secured to the two ends with panel pins, but when fixing the base member in position, use wood screws.

To complete the drink server, remove the base member, polish or enamel the remainder and reassemble.

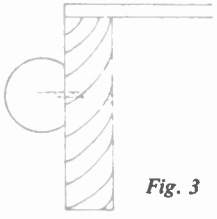
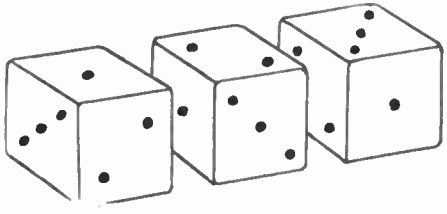
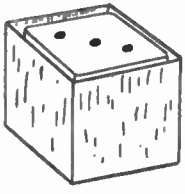


Fig. 3

SEEING THROUGH DICE





ON looking at the three dice in our sketch you will find that the three sides showing reveal values of one, two and three. Without further examination, could you tell the values on the bottom or other two sides? Perhaps not, but this little secret gives you the power of seeing through dice.

You will observe that the sketch includes an illustration of a single die enclosed in a small box without a lid, revealing the value on the upper face. By the way, did you know that the single cube is known as a *die*, while the plural of the word is dice?

Prepare a small box as shown, hand a die to a friend asking him to note the value on one face, placing this side face downwards in the box so that only the opposite side shows. Your task is to penetrate the die so that you can read off the selected value. In our picture the value shown happens to be three and the correct answer is four. How is it done?

If you examine any correctly made die you will find that the sum of the values on opposing faces is seven, so all you have to do is to subtract the number showing from seven for the correct answer.

Here is another variation you may use now you know the secret of our trick.

Hand a friend three dice, asking him to select three face values which are to be added together, afterwards placing the dice with the selected values in contact with the table top. By totalling the values shown on the upper faces and subtracting from 21 — that is, three times the total of two faces — you will be able to give the correct answer. Using our illustration the total showing is six, which subtracted from 21 produces an answer of 15, and here is the proof. Underneath the one will be six, underneath the two will be five, and underneath the three is four, and this can be easily tested by yourself. (S.H.L.)

Constructor's Radio Guide—7

Condensers and Resistors

By F. G. Rayer

IN all but the simplest receivers there will be a range of condensers and resistors of various types and values, and it is helpful if the constructor can identify these. This is not difficult when it is understood what the markings mean.

Resistors present resistance to the flow of current, the value being given in ohms, or shown by colours. In radio circuits, the symbol 'K' is often seen, and this indicates 'thousands of ohms'. Occasionally, this is shown as 'K-ohms', which is exactly the same. For high values, the term 'megohm' is used, a megohm being 1,000,000 ohms. It will thus be seen that markings of ·25 megohm, ¼ megohm, 250K, or 250,000 ohms, would all mean the same thing. All these markings may be found in old circuits. But in modern circuits, values over 100K are usually given in megohms, while values under 1K are given in ohms.

The colour code

Old resistors often have the value printed on them. Modern or new resistors, however, are colour coded. Both the methods shown in Fig. 1 are encountered. With the one type, the body colour is read first, then the tip colour, then the dot colour. With the other type, the colours are read off from the end, in the order 1, 2, 3, as indicated. It is necessary to read the colours in the correct order.

The colour code is as follows:

Colour	*Figure*
Black	0
Brown	1
Red	2
Orange	3
Yellow	4
Green	5
Blue	6
Purple	7
Grey	8
White	9

The first two resistor colours give the first two significant figures, while the third colour gives the number of noughts, as above. The following examples will make this quite clear.

Red body, green tip, orange dot = 25,000 ohms. Orange body, red tip, red dot = 3,200 ohms. Brown body, black tip, yellow dot = 100,000 ohms.

In many circuit positions, an exact value is not required. As a result, apparently odd values are employed quite often. For example, a manufacturer would probably use 33,000 ohms, instead of 35,000 ohms, merely because the 33,000 ohm resistor would only require orange-orange-orange markings, instead of a mixture of colours.

If no other colours are present, the resistor is within 20 per cent of its marked value. This is known as the 'tolerance'. In some circuit positions, this is not sufficiently accurate for proper working. Resistors marked with a silver band may then be fitted, and this shows that the value comes within 10 per cent of that marked upon it. When a resistor has a gold band, this shows its actual value is within 5 per cent of the marked value.

Power resistors

Small carbon resistors, with wire ends, such as those in Fig. 1, are used in most circuit positions. In mains receivers, a heavy current may pass in the power supply section, and this would overheat a small carbon resistor. Power resistors are used in such positions, and are usually wire-wound.

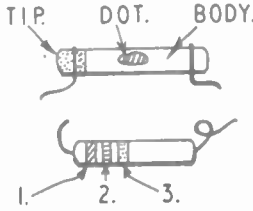


Fig. 1—Resistor colour code

Small power resistors are only a little larger than carbon resistors. Larger power resistors may have resistance wire on a porcelain tube, mounted on feet. In some AC/DC sets, the resistance wire is wound on a long piece of asbestos string, bound with other string, and this forms a 'line cord'. It resembles thick flex, and grows quite hot in use. This heating does not indicate a fault, and will not be serious unless the line cord is coiled up so that air cannot reach it freely.

If the voltage across a resistor is multiplied by the current flowing, this gives the 'wattage' dissipated. Carbon resistors are usually up to 1 watt rating, as in normal circuit positions less than 1 watt will be dissipated. When much current flows, so that a 1 watt resistor would be overheated, the required wattage will be shown. A smaller resistor should then not be used, or it may break down.

Fixed condensers

Condensers consist of two sets of plates, separated by an insulator. The latter may be air, mica, paper, or other non-conducting material. In small condensers, the plates may be metal foil, rolled in a tube. This gives the tubular type of condenser, as in Fig. 2. Such condensers are usually from about ·001μF to 1μF. The value is normally marked on them. The letters 'MFD' are sometimes used instead of 'μF' and both are an abbreviation of 'microfarad'.

It is sometimes important (as in high tension circuits) to know what voltage a condenser will withstand. This is thus marked on most paper condensers. In Fig. 1, the 350V. marking shows that the condenser could be used on any voltage up to 350V. In battery sets, 150V.

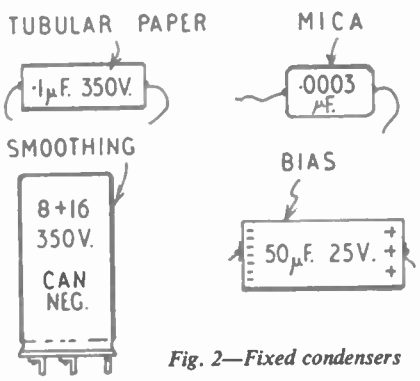


Fig. 2—Fixed condensers

or 250V. condensers are often used, but 350V. or 450V. condensers would, of course, be perfectly satisfactory.

Very small condensers often have mica insulation. These will withstand an extremely high voltage, if necessary, and have better insulation than the paper types.

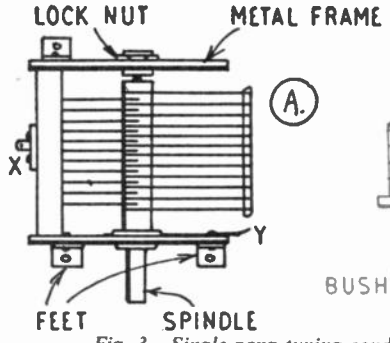
Condensers are often known by their function, so that one of 8μF or 16μF is often termed a 'smoothing' condenser, as it is used for smoothing H.T. supplies in mains sets. Similarly, the 'bias' condenser is most often used in grid bias circuits.

Large value condensers (over about 4μF) are of electrolytic type, and because of this they have to be connected into circuit in the correct polarity. The polarity is therefore marked on them. In Fig. 2, the smoothing condenser has a negative can, or metal case. The

bias condenser has positive and negative markings.

The polarity of an electrolytic condenser may be shown by positive and negative markings, or red may be used to indicate positive, and black to indicate negative. Or, with cardboard cased condensers, red and black flexible leads may issue from the case, for positive and negative connections.

When two condensers are made in one can, as with the 8μF plus 16μF smoothing condenser, both condensers will have a common negative tag, so that there are only three tags in all. A smoothing condenser may be of a single type, when it will only have two tags or leads. Broken-down condensers of special type, having two or three condensers of various value in a single case, can always be replaced by separate single condensers, except in midget sets where space may be limited.



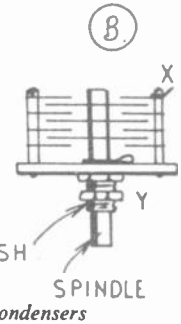


Fig. 3—Single gang tuning condensers

Variable condensers

These are used for tuning and other purposes. A modern type of single air-spaced tuning condenser is shown at 'A' in Fig. 3, and would be found in crystal sets and simple valve sets. The spindle is turned by a control knob or drive, varying the amount of overlap between fixed and moving plates. 'Y' denotes the moving plates connection, a spring contacting the spindle. 'X' is the fixed plates connection.

Old condensers of this type often have Bakelite frames, and terminal connections. They are useful if moving and fixed plates do not touch. The condenser cannot operate if one set of plates touches the other, and it may be necessary to loosen the lock-nut and adjust the end screw to correct this.

For long-wave and medium-wave sets, a tuning condenser of ·0005μF is usual. This will have about 20 to 24 plates in all, the exact number depending on their size and the space between them. Condensers with fewer plates are not suitable for L.W. and M.W. tuning, as high wavelengths would not be reached.

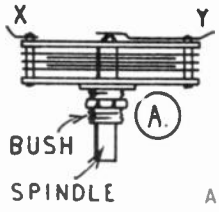
For short waves, smaller condensers are used, often of about ·0001μF to ·0002μF value, and some of these are made as shown at 'B' in Fig. 3. 'X' and 'Y' again indicate fixed and moving plates respectively. This type of condenser can be fitted to the receiver panel by means of the bush and nut.

With fixed and variable condensers of small value, the capacity is quite often indicated in 'Micro-Microfarads'. This may be shown by the letters 'mmF' or 'pF', the latter being more usual. This avoids the decimal point, and several noughts. For example, a 500pF condenser is the same as a ·0005μF condenser. Similarly, 150pF = ·00015μF; 100pF = ·0001μF; 50 pF = ·00005μF, and so on.

Solid dielectric condensers

Variable condensers are also made with thin sheets of mica or other insulating material between fixed and moving plates. This allows the same capacity to be obtained with a very much smaller condenser, such as that shown at 'A' in Fig. 4.

Such condensers are usually of ·0002μF to ·0005μF capacity, and are termed 'Reaction' or 'Solid Dielectric' condensers. (Those in Fig. 3 are 'Air Dielectric' condensers.) They can work quite well for tuning purposes, but are a little less efficient than the air spaced type, in this circuit position.



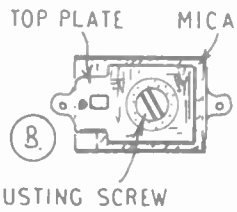
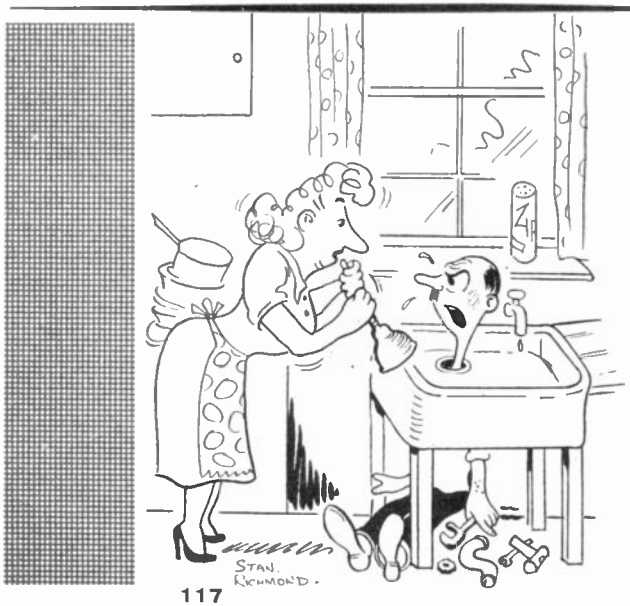


Fig. 4—Reaction and pre-set condensers

Pre-set condensers

As their name suggests, these can be pre-set to some particular value, after which they are left. They are often used for trimming purposes (that is, cancelling out or equalizing small stray capacities in receiver wiring). They are also used when the best value has to be found by trial, as in series with the aerial.

Small pre-sets, for trimming, are usually of 50pF capacity. Larger pre-sets, for other purposes, may be up to 500pF capacity, or more. In all cases, the capacity is the *maximum*, with the top plate screwed tightly down against the bottom plate. By loosening the screw, lower capacities can be obtained, as desired.



THAT'S DONE IT!

RENOVATING OLD HULLS

ALTHOUGH primarily a canoeing man myself, I have frequently been asked to help my friends who have bought ancient hulls, hoping to make them water worthy. At the present moment I am working on an old hull on my own account, hoping eventually to have a cabin cruiser.

Old hulls are plentiful enough, and the greater proportion of them are by no means too far gone to do something about them. The average boatsman, with only a limited amount of experience, should be possessed with enough judgement to tell if a hull has any possibilities at all.

Once the hull is bought, it should be taken to where it is to be worked on, and placed on the stocks or trestles upside down. A good substitute for trestles are oil drums. A single oil drum stood on its end with a plank on it is as reliable as any wooden trestle.

The hull should first be cleaned. Old pitch generally flakes off quite easily. Old rubber sheathing can be removed fairly easily with the aid of a sharp knife and a paint scraper. For the removal of the topside paint or enamel it would be unwise to use a blowlamp, because of the dangers of warping the timbers. The best tool I can advise for this job is a Skarsten paint scraper.

Seal by sheathing

Once sheathing and topside paint is removed, the hull should be glasspapered all over to ensure that the last vestige of sheathing and paint is obliterated. Some of my friends have even gone so far as to scrub the hull after glasspapering.

Once the hull is perfectly clean it can be closely inspected for flaws. Since the hull itself could never be expected to be made completely water-tight, the main purpose of this inspection is to ensure there is a sound base for sheathing. It is the sheathing that is the principal sealing agent. I have known some renovators place so much reliance on the sheathing that they have been content to cover large holes on the bottom of the hulls they were working on by merely tacking over a sheet of aluminum. However, I would not advise such an expedient. If planking is rotten, by all means replace it. The minor flaws can be covered in with marine glue, putty or plastic wood. Except in cases of very wide cracks or badly separated seams, cotton caulking need not be used.

When the hull is completely overhauled and the flaws attended to, then is the time to consider sheathing it. Now there have been many excellent developments in the field of sheathing. I am sure that most of these new methods are highly efficient. Certainly, from what I have seen myself, they tend to improve the appearance of the craft. However, from the point of view of both economy and efficiency I strongly recommend black rubber sheathing. This is a black paint mixed with rubber solution, priced about 32/6 per gallon can. It is applied on the white-wash principle, and need only be used where the boat takes the water.

If the bottom is really in a bad way it could have a thick canvas fixed on to it. By the use of rollers it should be made to fit the planking perfectly. I think, myself, that if the sheathing is conscientiously carried out such an expediency is totally unnecessary.

After giving the bottom about two coats of sheathing, and as soon as it has dried, the next job is enamelling or painting the topsides. Most ship's chandlers sell yacht enamel or special topside paint. I need hardly mention that this job is of the utmost importance, because, while a badly painted hull can spoil the look of graceful lines, an ugly shaped hull can be redeemed by the use of imagination and good taste in the paint work.

Overhaul Accessories

As soon as the paint has dried, the accessories can be overhauled, and where needed, renewed. I have frequently noticed with old hulls that the metal keel strip has rusted badly and is broken in several places. In my own case, it was so encrusted with rust that it had to be sawn off, since the screws had lost their threads. It is of the greatest importance to have a runner along the keel that is in perfect order. I have seen a crowd of fully grown men toiling and sweating to get a boat on the bank, only to find that the keel strip had curled up under the craft.

What accessories should be fitted on to the renovated hull depends, of course, on whether you wish to have a rowing or sailing boat, or a cabin cruiser.

(G.E.G.)

SAUCEPAN LID RACK

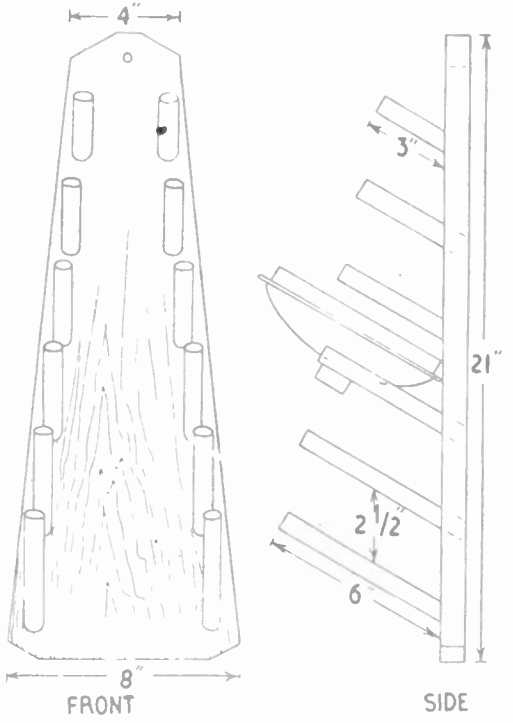
WHAT do you do with your saucepan lids? It's an even bet they're something of a nuisance in the kitchen. Make this novel holder in an evening for less than 3/-.

From a length of 1in. thick deal, 2ft. by 9ins., cut the back board, as shown. Drill two rows of six ¼in. holes at an angle and in a line 1in. from the sides of the wood. Drive in and glue, ¼in. dowelling cut at increasing lengths to hold all sizes of lids.

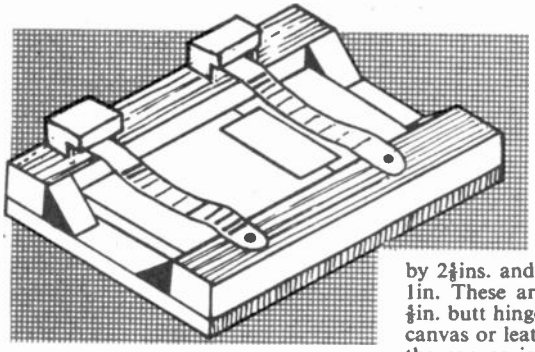
Drill a hole at the top of the board to hang the fixture on the kitchen wall if desired, or it may be used lying flat on a shelf or table top.

Clean well down with glasspaper and use in whitewood or, if preferred, finish with hard gloss enamel.

(E.C.)



MAKE YOUR PRINTING FRAMES



Says Edward Marshall

STRONG and durable printing frames can quite easily be made from cheap stock materials.

The base of the frame consists of $\frac{3}{16}$in. or $\frac{1}{4}$in. plywood with strip wood and right-angle corner moulding for sides and ends. The folding back may be made from $\frac{1}{4}$in. stock timber or $\frac{1}{4}$in. plywood.

The illustration shows the completed frame, the dimensions of which will of course be made to suit the size of the negative, but we shall assume we are going to make a frame for a 3$\frac{1}{2}$in. by 2$\frac{1}{2}$in. negative.

Use your fretsaw

First obtain a piece of $\frac{3}{16}$in. plywood about 4$\frac{3}{8}$ins. by 3$\frac{3}{8}$ins. and glasspaper the edges square in all directions, then mark out a rectangle in the centre 3$\frac{1}{4}$ins. by 2$\frac{1}{4}$ins. This must be in the centre or your photograph will not have an even white margin all round. Cut out the rectangle with your fretsaw, leaving a frame.

Cut 2 pieces of $\frac{3}{8}$in. by $\frac{3}{8}$in. dressed timber 4$\frac{3}{8}$ins. long and glue and pin along the edges of the plywood frame. Four pieces of $\frac{3}{8}$in. by $\frac{3}{8}$in. right-angle moulding each $\frac{3}{8}$in. long are next fixed in place with glue. These pieces prevent the glass from slipping out at the end and allow the edge of the printing paper to be easily lifted for inspection. Bevel the edges of the hole in the base on the outside to prevent the light from casting any shadow upon the negative when it is being printed. Clean with glasspaper and the body of the frame is now complete.

The back is made of two pieces of $\frac{1}{4}$in. thick wood or plywood, one piece 2$\frac{3}{8}$ins. by 2$\frac{3}{8}$ins. and the other about 2$\frac{3}{8}$ins. by 1in. These are fixed together with two $\frac{3}{8}$in. butt hinges or with a piece of stout canvas or leather to make a hinge. Glue the canvas in place and leave under a weight till glue is thoroughly set and dry. The inside face of the back should be lined with green baize or thin felt glued to each part to keep the printing paper flat and in its correct position without moving when the back is opened for inspection.

Two pieces of springy brass or steel about $\frac{3}{8}$in. wide are required about 3$\frac{1}{2}$ins. long, slightly bent as shown. One end is drilled for a small screw. The two clips are positioned as indicated and their free ends are slipped under blocks suitably positioned in the other side rail. Staples could also be used here. These hold the negative, printing paper and back, etc., firmly in position preventing a double printing caused by any slight movement of either the negative or the printing paper.

Glasspaper all over to remove any rough or sharp edges and finish according to taste with either varnish or paint.

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Next week's free design will be for a cabinet to hold records and books, etc. MAKE SURE OF YOUR COPY.

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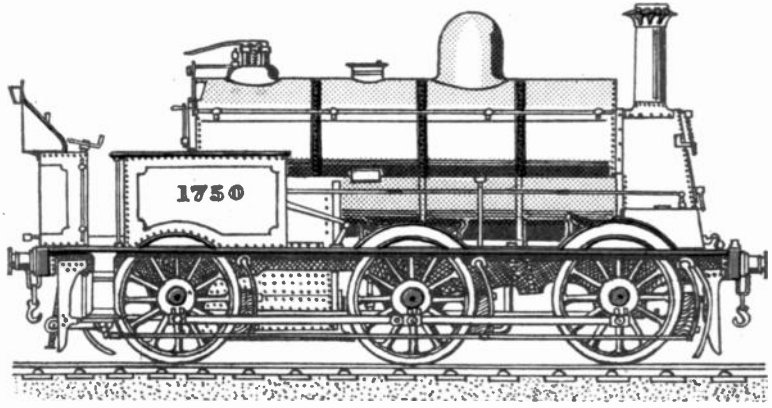
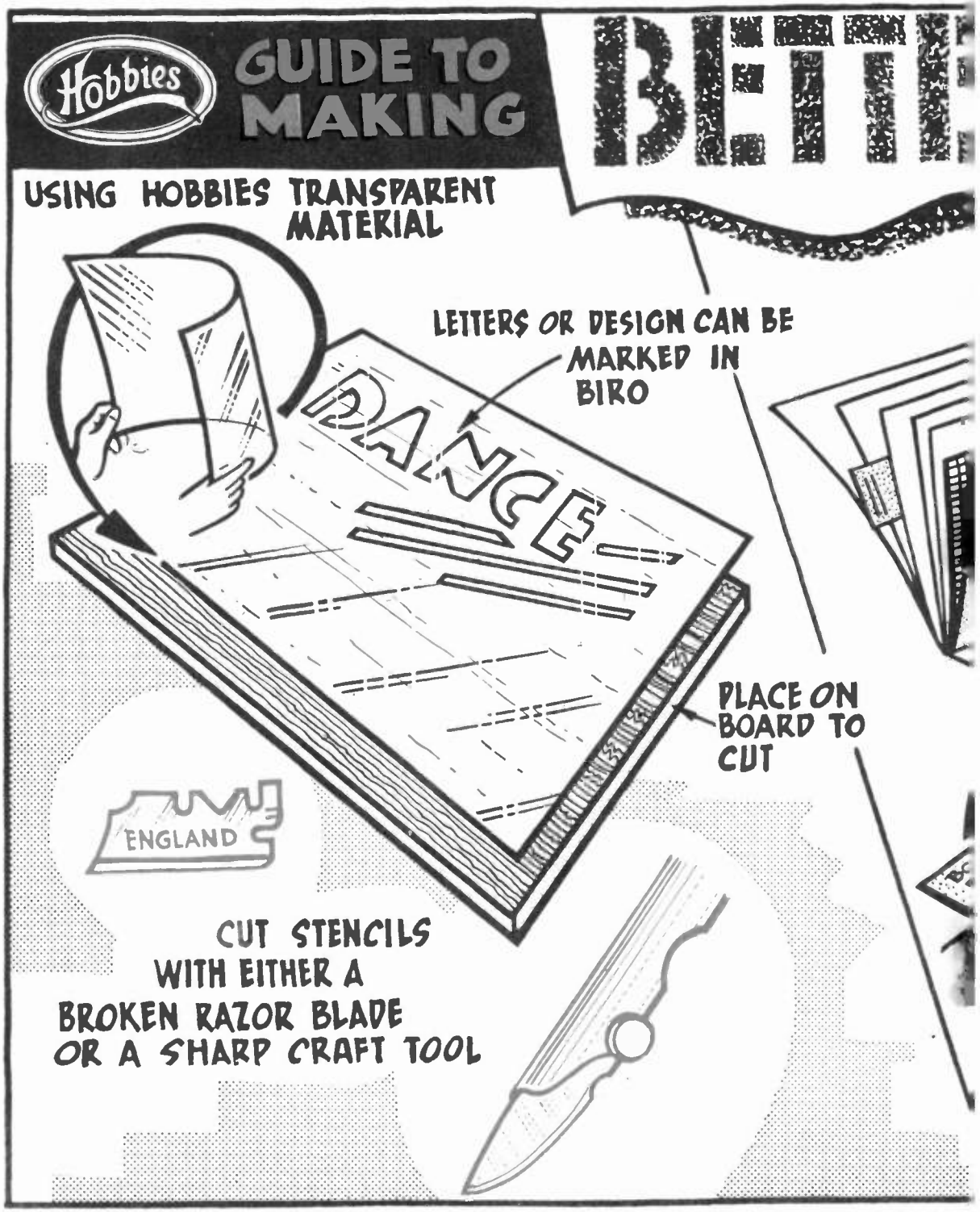
Interesting Locos—No. 9



THE 4ft. 3in., six wheels coupled Saddle Tank Shunter shown in our illustration was designed and built by Mr. John Ramsbottom, the distinguished Locomotive Superintendent of the London & North Western Railway in 1870. No. 1750 built in April of that year, and the 1,310th engine to be built at Crewe was the first of a class of 260 of these excellent little engines. They were to be seen on goods and shunting work on all parts of the L. & N.W.R. and many survived to be taken over by the L.M. & S.R. in 1923, including No. 1750, which became L.M.S. No. 7221. The class is notable in that it was Mr. Ramsbottom's final design for the L. & N.W.R. before he retired early in 1871. As first built, they were not provided with cabs, having only a small weather-board, with spectacles of 8$\frac{1}{2}$ins. diameter protected by small metal hoods. They were finished in Mr. Ramsbottom's olive green livery, picked out with a 2in. black band, and had the usual Ramsbottom ornamental chimney. Mr. Webb later provided the engines with cabs, fitted his standard chimney, and painted them in his well known black livery. The following were the leading features, wheels diameter 4ft. 5$\frac{1}{2}$ins., cylinders 17ins. by 24ins. Total heating surface 1069·0 sq. ft. Boiler working pressure 150 lbs. per. sq. in. The saddle tank had a capacity for 600 gallons of water, and the bunker carried 1$\frac{1}{2}$ tons of coal. (A.J.R.)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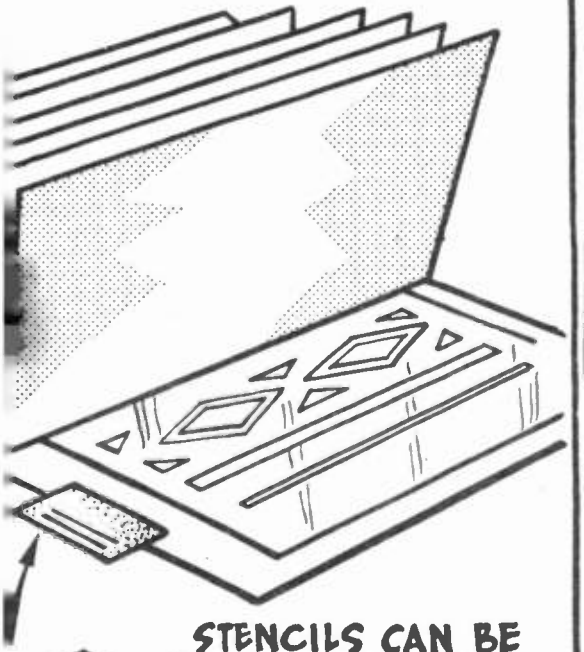

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THREE DIFFERENT TYPES OF LETTERING SUITABLE FOR STENCILS

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" THAT SHARP KNIFE COULD CAUSE A BLUNT FINGER

IN your first letter to prospective pen friends don't forget to print (not write) your full name, address, age and official club number at top of page. Then introduce yourself in a friendly way, something like this:

Dear Friend: As a fellow member of the 'League of Hobbyists' I should like to open a pen friendship with you.

PEN FRIENDS

The club secretary has explained that we follow the same hobbies and that you wish to exchange stamps and labels of your country for those of mine. I am sending some English stamps and labels for exchange. If you like them I can send more, but, to avoid unnecessary duplication please send want list — mine is enclosed herewith.

As you probably know, the G.P.O. have decided to issue pictorial stamps. Our match labels are now mostly pictorial and of great thematic interest. English hotel, cheese and trade labels have always been recognised as some of the world's best, so you can expect a promising mail from me.

My favourite school subjects are . . . .

My favourite sports . . . .

I must close now, but look forward to your reply with happy anticipation.

Yours sincerely,

The illustration shows the type of material to send at first. Include about 25 current items. Don't send advanced or high cat. material.

Wait for your correspondent to send his want list and make suggestions. Then you can act accordingly. When in any doubt write to the secretary for advice.

Americans make good pen friends. Spaniards, although rather abrupt, are reliable. The Portuguese and French are very prompt in replying. Belgians seem to prefer British pen friends. The Dutch are shy. The Germans, many of whom speak good English, are great letter writers.

We have a large list of pen friend addresses from many parts of the world. So if you have not already joined the 'League of Hobbyists', now is the time to write for full details.

THOSE who seek guidance from the words of Holy Scripture will derive great help and pleasure from a collection of stampevised texts. Many beautiful texts may be illustrateu in stamps. Here are some suggestions.

'*I have loved the Habitation of Thy House*' (Psalm, 26. 8.) And the stamp: New Zealand 1950, 1d. green and blue — Christchurch Cathedral (cat. 2d. mint).

'*My sheep hear My Voice.*' (St. John, 10. 27.) Italy 1950, 50 lira violet — Shepherd and Flock (1d. used).

'*The Righteous shall flourish like the palm-tree*' (Psalm, 92. 12.) Samoa 1935, 1d. black and carmine — Palm Trees (4d. mint).

'*Unto Thee Will I sing with The Harp.*' (Psalm, 71. 22.) Ireland 1953, 2½d. green — Harp (1d. used).

'*Despise not Thy Mother.*' (Proverbs, 23. 22). Austria 1935, 24 groschen blue — Mother and Child (6d. used).

'*The Earth is the Lord's*' (Psalm 24. 1.) Australia 1948, 1/6 blackish brown — Globe (6d. used).

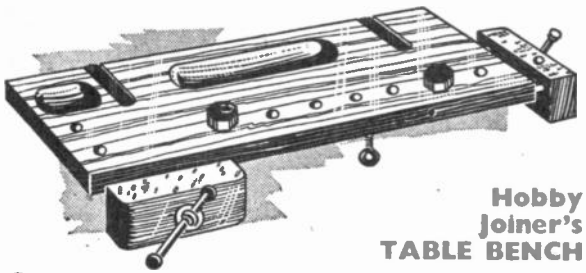
'*Whatsoever a man soweth that shall he also Reap.*' (Galatians, 6. 7.) Ireland 1945, 2½d. blue — Sower (1d. used).

'*Love Thy Neighbour as Thyself.*' (Leviticus, 19. 18.) Saar 1948, 10 cent red — Clasped Hands (2d. mint).

'*Blessed are the Peace makers.*' (St. Matthew, 5. 9.) Australia 1946, 2½d. scarlet — 'Peace' (3d. used).

It is possible to form a complete calendar of stampevised texts, a collection which could become very valuable.

STAMPEVISED SCRIPTURE TEXTS



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CHEMISTRY IN THE HOME

AMMONIUM CARBONATE EXPERIMENTS

CENTURIES ago alchemists, the forerunners of the modern chemists, made their chemicals in all sorts of strange ways. One remarkable recipe for making ammonium carbonate was that 'five pounds of the skulls of persons who have been hanged must be distilled with two pounds of dried vipers'! Those who had difficulty in finding enough dead criminals had to make do with distilling other animal matters such as hartshorn, bones, etc.

Because it was volatilised in these processes it became known as sal volatile, or salt of hartshorn. We have all heard of sal volatile, for it forms an essential part of the spirit of sal volatile used for counteracting faintness. Not so well known is that it is used in smelling salts.

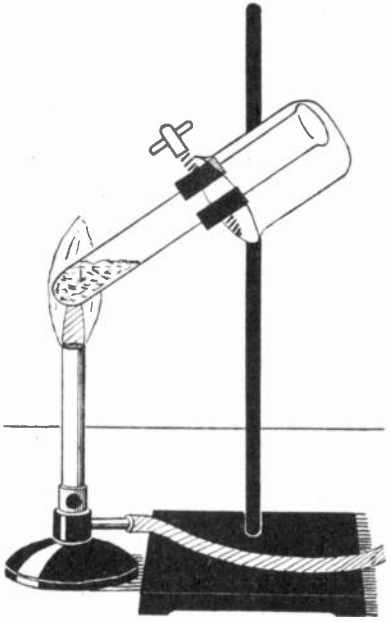
Smelling Salts

You may like to start your experiments by making up a jar of smelling salts, for you never know when they may be useful. Put an ounce of ammonium carbonate into a wide mouthed jar, preferably fitted with a plastic screw top. Add 3 c.c. of strong ammonium hydroxide (use a measure, not a pipette) and then 0·3 c.c. of oil of lavender or of oil of eucalyptus. It is an advantage to cut a circle of sheet rubber to fit the inside of the screw top. This both makes an airtight seal and prevents the ammonia fumes rotting the usual cork disc in a screw top.

Ammonium carbonate is made industrially by combining carbon dioxide with the ammonia of the ammoniacal liquid which distils over in making coal gas and also by heating ammonium salts with calcium carbonate. It is interesting to show its formation by the latter method. Grind together 1 gram of ammonium sulphate and 2 grams of precipitated chalk (calcium carbonate) so as to obtain an intimate mixture.

Put this into a hard glass test tube clamped securely and topped by a small dry beaker, as shown in the diagram. Heat the tube gradually to a red heat. White fumes of ammonium carbonate sublime and condense on the walls of the tube and in the beaker. Dissolve the sublimate in a little water and dip into the solution a slip of red litmus paper. It will be turned blue, showing the substance to be strongly alkaline. As ammonium carbonate is so cheaply bought from a pharmacist there will be no advantage in making your own by this method.

Although the substance is always referred to as ammonium carbonate it is really a mixture of ammonium carbonate and ammonium hydrogen carbonate. When kept for a long time it is converted



Making ammonium carbonate

entirely to ammonium hydrogen carbonate. When the fresh substance is dissolved in water ammonium carbonate is decomposed into true ammonium carbonate and the solution reacts like a mixture of ammonium carbonate and ammonium hydrogen carbonate, which for practical purposes is quite satisfactory, especially if we desire to make ammonium salts by the carbonate-acid method.

Keep for stock

To make ammonium hydrogen carbonate put a few grams of ammonium carbonate in an evaporating basin, cover with a sheet of paper to keep out dust and leave it exposed to the air for about a fortnight. The ammonium carbonate becomes whiter and opaque thus showing that ammonium hydrogen carbonate has been formed. It may then be bottled for your stock.

Ammonium sulphate is an important chemical, for it is widely used as a fertiliser. Less known is that it may be used for fireproofing fabrics. It is easily made from ammonium carbonate. Dissolve about 10 grams of ammonium carbonate in about 50 c.c. of water. Gradually stir in dilute sulphuric acid until a drop of the solution just turns blue litmus paper purple. This proves that the acid has neutralised the ammonium carbonate to form a solution of ammonium sulphate.

Carbon dioxide is given off in the reaction and causes effervescence, so be sure to add the acid gradually otherwise the contents of the beaker may froth over. Now boil down the solution in an evaporating basin until a drop of the solution taken up on a cold glass rod, crystallises at once. When this is the case let the solution cool down overnight, when white crystals of ammonium sulphate will separate out. Filter these off and open out the filter paper on to a clean porous brick to dry. A further crop of crystals may be had by evaporating the filtrate.

Fireproofing materials

To show the fireproofing properties of ammonium sulphate, make a 10 per cent solution by dissolving 2 grams in 20 c.c. of water and dip in the solution a small piece of white cotton cloth. Squeeze the cloth and hang it up to dry. Now apply a flame. The cotton chars but does not catch fire. If you wish to fireproof larger pieces of cloth, dissolve ammonium sulphate in the proportion of two ounces to the pint of water.

Ammonium chloride, or sal ammoniac, is another important chemical easily made from ammonium carbonate. Once more dissolve about 10 grams of ammonium carbonate in about 50 c.c. of water, but this time gradually add dilute hydrochloric acid until blue litmus paper shows the solution to be neutral. Evaporate as you did the ammonium sulphate solution and let it cool and crystallise overnight. Filter off the crystals and dry on a porous brick. White ammonium chloride remains. It is much used in dry batteries.

The tartrates of ammonium are interesting. They are ammonium tartrate and ammonium hydrogen tartrate. With

●Continued on page 126

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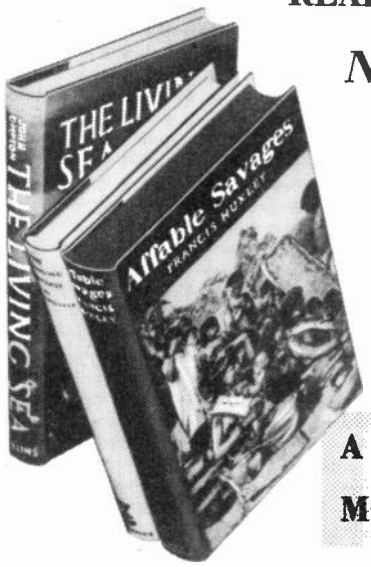

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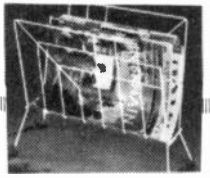

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Learn to swim—5

BACK STROKES

WE have now dealt with the two main swimming strokes, and the two back-strokes should be mastered by every competent swimmer, if only as a variation from the front strokes.

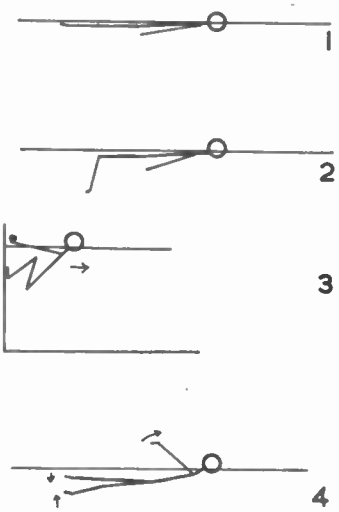
The back leg-kick stroke is of great value in life-saving and should certainly be learnt. For life-saving, the arms must be free to grasp and tow a victim, and so the legs alone are used. The actual leg kick is somewhat similar to the breast stroke movement upside down, but is not exactly the same. Imagine yourself lying on the surface with your legs stretched straight out and together (Fig. 1). The legs are allowed to bend at the knees until the lower parts are almost vertical, with the knees slightly apart (Fig. 2). The legs are then flung outwards and upwards and closed forcibly together where they remain as at the start for the gliding stage. The reason for the modification of the typical breast-stroke movement is because the latter, used on the back, would cause the knees to come above the surface, and this must be avoided.

To practise this in the water, the best plan is to start with a back glide. Stand facing the side of the bath, grasping the rail. Bring your feet up to rest just under the rail, with your knees bent (Fig. 3). Simultaneously let go with your hands and straighten your legs as hard as you can. You will then glide backwards on your back. To practise gliding in this manner and to see how far you can go, you may fling your hands above your head and lie straight out, but for the leg back-stroke it is better to keep your hands by your sides or clasped behind your back. Having launched yourself, perform the leg kick as described. Since the mouth is above water all the time, there are no breathing difficulties. This stroke is quite pleasant without arm movements, but if you wish to add them, the arms, starting from the sides, are raised together out of the water and upwards above the head to enter the water again somewhat beyond shoulder level. They then pull together towards the sides again. This movement alternates with the leg kick. Alternatively, the arms may be slid up the sides of the body under the surface until the hands are near the armpits, and then flung outwards and pulled to the sides as before.

The other back-stroke we will describe is the better-known back crawl. The leg movement of this is just as already described for the front crawl, but performed on the back. Start a back glide again and with your arms at your sides or above your head, move your legs up and down in the leg thrash, allowing the hip muscles to do most of the work, as in the front crawl. After some practice, you will find that you can progress quite easily in this manner, and when you feel fairly confident, fold your arms on your chest. In this position, the correct body posture for the back crawl is obtained by raising your head slightly, so that you can look over your folded arms to your toes, which should just break the surface. Practise this until you can do a length of the bath before attempting any arm movements.

Tendency to roll

The arm movements consist of raising each arm alternately from the side out of the water in a rounded sweep above the head and down to enter the water again beyond shoulder level and pulling just below the surface until the thigh is reached. The hands should be relaxed whilst in the air and, of course, turned inwards in the water. At first you will find a tendency to roll; this is accentuated by pulling too deeply and will be overcome with practice. The correct body position is shown in Fig. 4.



Some people prefer a bent arm recovery; in this case the upper arm is first raised from the water, allowing the forearm and hand to hang limply. When the upper arm is raised to its fullest extent, the whole arm is flicked straight to enter the water as before.

The concluding article in this series will deal with floating and simple diving.

SOLUTION TO CROSSWORD No. 16 PUBLISHED LAST WEEK

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● Continued from page 124

Ammonium Carbonate Experiments

tartaric acid and ammonium carbonate you can prepare both.

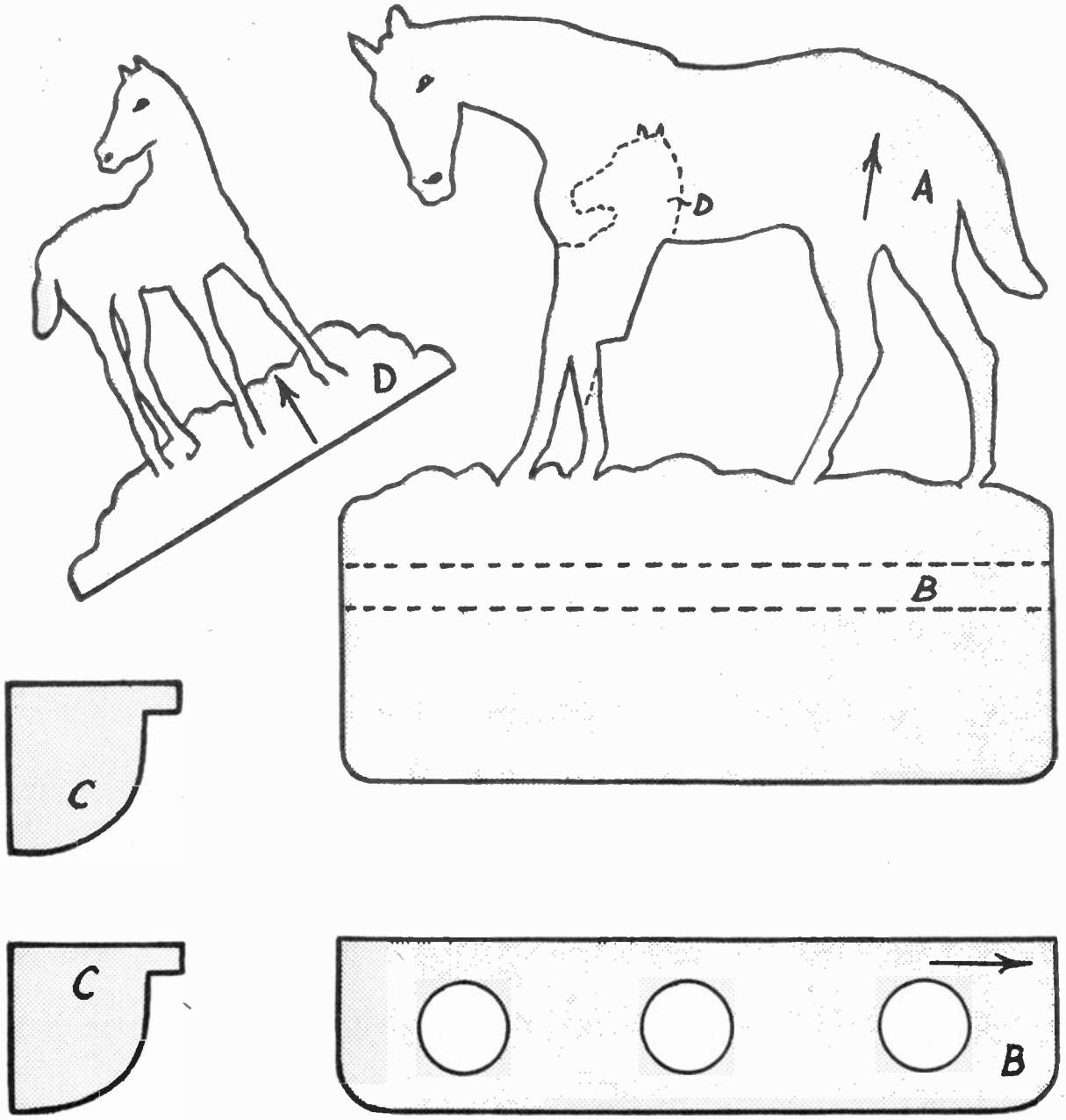
First ammonium tartrate. Dissolve 8 grams of tartaric acid in 20 c.c. of water. Test the solution with blue litmus paper; it will be reddened. With constant stirring add a little at a time a strong solution of ammonium carbonate until a drop of the mixture no longer reddens blue litmus paper. You now have a solution of ammonium tartrate. The solid white salt may be isolated by evaporating the solution on a water-bath. You will find a pinch of this dissolves very readily in a few c.c. of water in a test tube.

Ammonium hydrogen tartrate on the other hand is much less soluble. Again, dissolve 8 grams of tartaric acid in 20 c.c. of water and add ammonium carbonate solution as before. Add to this a solution of another 8 grams of tartaric acid in 20 c.c. of water. A white crystalline precipitate of ammonium hydrogen tartrate appears, showing how much less soluble in water it is than ammonium tartrate. Filter it off and dry it in a warm room, or in an evaporating dish on a water-bath. You will find a pinch of this will not wholly dissolve in a few c.c. of water. On warming it will do so and mostly separate out again on cooling.

Full-size patterns

See page 114

MARE AND FOAL PIPE RACK



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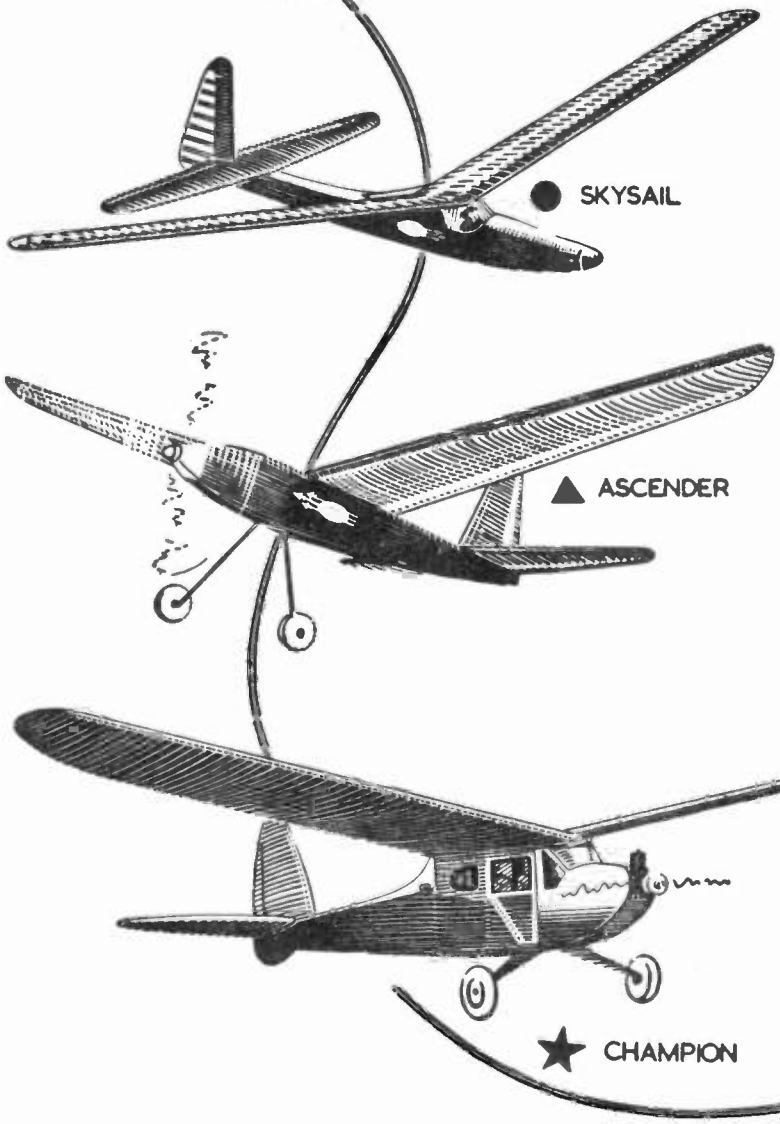

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