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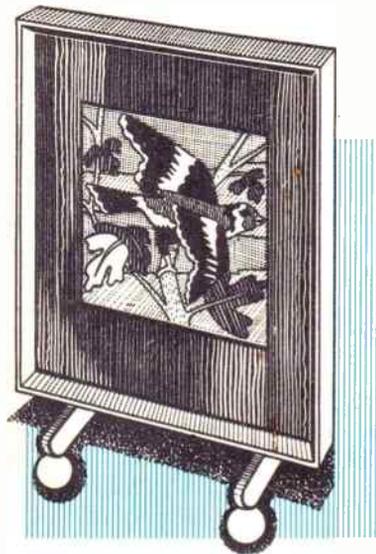
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All correspondence should be addressed to the Editor, Hobbies Weekly, Dereham, Norfolk

★ *FREE design inside to make*

MARQUETRY FIRESCREEN



A **FIRESCREEN** is always acceptable in the home and makes an ideal gift at any time of the year. The modern look of the one illustrated, with its bird motif in marquetry, makes a particular appeal.

The marquetry picture stands out, as it is applied directly to the hardboard background. The screen is framed with contemporary picture moulding and stands on modern ball feet.

The hardboard panel (piece A) is 24ins. by 18ins. by $\frac{1}{4}$ in. (supplied cut to size in Hobbies kit), and the position of the marquetry picture is shown in Fig. 1. Mark the position carefully from the measurements given, and transfer the marquetry picture from the design sheet on to the hardboard panel with carbon paper.

In making up their marquetry picture it will be noted that workers will make their own selection of veneers and an indication of colouring can be gauged from the shading on the finished drawing. Make sure to contrast your veneers so that the bird itself stands out from its background.

For those using a Hobbies kit, apart from the hardboard panel there is also supplied a pack of veneers, contemporary picture moulding for the frame, and the ball feet, etc.

The veneers are applied direct to the hardboard panel, and it should be emphasized that the outside edges of the picture must exactly conform to the traced outline in order to ensure squareness.

Make a start on the picture in the top left-hand corner by cutting the veneer for the sky piece indicated as piece 1 in Fig. 6. As already stated, the outside edges will conform exactly to the traced outline, but where this piece joins the tree (piece 2) a slight overlap is allowed. Glue piece 1 to the board and then trace the tree (piece 2) on to its selected veneer. Parts of this which form the outside edge will again be cut square and the sides marked X (Fig. 6b) also cut exactly to shape. An overlap is again allowed on the remaining edges of piece 2 where they will join up with the next veneers.

Now lay piece 2 over piece 1 and cut piece 1 to the shape of piece 2 at X, thereby using piece 2 as a template and ensuring a perfect join. Remove the surplus veneer from piece 1 (Fig. 6c and 6d), and then glue piece 2 into position. Continue in like manner all round the outside edge of the picture. From these outside edges complete the picture by working to the centre, overlapping as already described wherever possible in order to obtain perfect joins.

The attractiveness of the finished

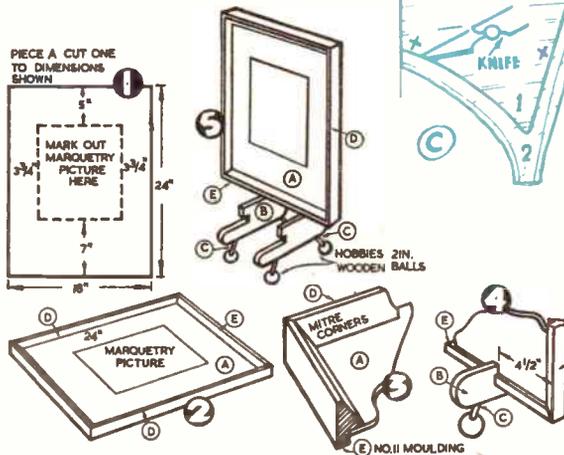
screen will depend a great deal on the result obtained when polishing the veneered surface. Begin by scraping the veneered surface. Then by scraping and glasspapering. A very satisfactory method is to use the edge of a piece of glass for scraping until a fair level has been obtained. This must not be attempted, of course, until it is assured that the glue is thoroughly hard. After scraping, finish with a glasspaper block, working down from medium to fine grade until the surface is perfectly smooth.

Warning

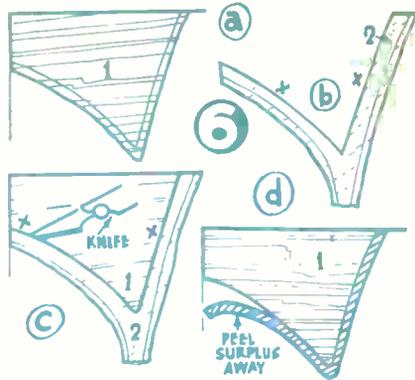
A word of caution is perhaps necessary. Be careful not to apply too much pressure with the scraper or glasspaper so as to rub away the veneers completely and thus reveal the base. When as flat a surface as possible has been attained, the picture is ready for polishing. Apply white wax polish with the finger tips, rubbing well into the veneers. Then go over lightly with a duster and give a rub down with fine grade glasspaper. It will be necessary to change the paper about frequently because the wax will fill it up. Repeat this process of waxing, polishing and glasspapering until such time as a high gloss finish is obtained. Remember that the more work you put into this operation, the better will be the finish and the more satisfaction gained.

Next the hardboard can be finished as desired. A pastel shade of paint would be pleasing. The application of a hardboard sealer is recommended, followed by enamel or lacquer. This should be applied in an atmosphere free from dust. If desired, of course, the hardboard can be polished.

Figs. 2 and 3 show how the contemporary moulding (pieces D and E) is added for the frame. This is Hobbies No. 11 contemporary moulding, which is neatly mitred at the corners. The hardboard panel will fit into the underneath rebate and the frame can again be finished as desired.



The addition of the feet is shown in Figs. 4 and 5. Pieces B shown on the design sheet are enlarged to 3/4 in. squares and cut from 3/4 in. wood. Holes are drilled at an angle into the bases of pieces B to take the 2 1/2 in. lengths of 3/4 in. round rod shown on the design sheet (pieces C). These in turn are dowelled into four Hobbies 2 in. ball feet. The feet assembly should be painted before gluing to the frame in the positions shown in Fig. 4.



Hobbies Kit No. 3262 for making the Marquetry Fire-screen contains all hardboard, moulding, veneers, etc. Price 15s. from branches or Hobbies Ltd., Dereham, Norfolk (post free).

HOBBYSCOPE

By T. S. Richmond

NOVEL "DACHSHUND"



BY INCREASING THE ROW OF BOOKS, YOU INCREASE THE LENGTH OF THIS 'SAUSAGE' DOG!

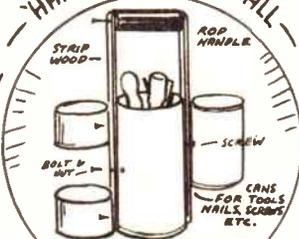
PATTERN O

BASE
5 1/4" x 5"
1/2" THICK.



BACK 7 1/2" x 5"

'HANDY ANDY' HOLDALL

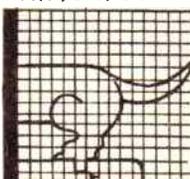


BOLT TWO UPRIGHT WOOD STRIPS TO LARGE TIN CAN, FIXING ROUND ROD HANDLE BETWEEN TOP. SCREW SMALLER TNS TO UPRIGHTS.

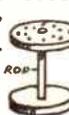
BOOK ENDS PATTERNS.

PATTERN X

COPY DOG PATTERNS OVER 1/2" SQUARES • CUT FROM 1/2" THICK SOFT WOOD • LEAVE 1/2" SQUARE BLOCK ON FEET & ROUND OFF TO PROVIDE DOWELS FOR GLUING INTO BASE



FLOWER HOLDER



CUT WOOD DISC TO FIT VASE. BORE HOLES IN IT. CUT SMALLER DISC FOR BASE & JOIN TOGETHER WITH ROUND ROD.

TUNING SHORT WAVES

SHORT-Wave reception is particularly interesting, because of the great distances which are covered by S.W. signals. On the L.W. and M.W. bands, very long-distance reception is impossible, so that only local and European stations are heard. S.W. signals, on the other hand, travel so far that world-wide reception is possible. Morse and other interesting stations will also be found on these low wavelengths.

The term 'short waves' is usually applied to wavelengths between 10 and

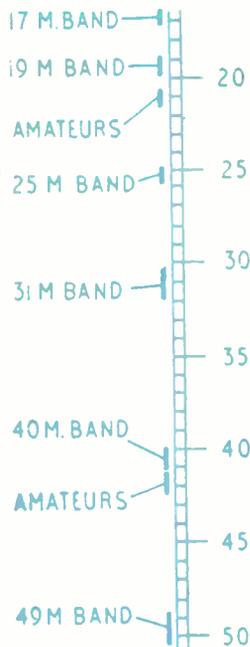


Fig. 1—Short-Wave bands

100 metres. However, most stations are found between approximately 17 and 50 metres, so that a set tuning these wavelengths will be most suitable for general S.W. purposes. A wavelength scale for 17–50 metres is shown in Fig. 1. Stations are congregated into 'bands' — for example, the 17 metre band, 19 metre band, and 25 metre band. On each of these bands may be heard a number of stations. Between the bands will be heard Morse, and other occasional transmissions.

Amateur transmitters have two bands in this range of wavelengths. These are the '20' and '40' metre bands, actually employing wavelengths around 21 metres and 42 metres, as marked in Fig. 1. For

some years commercial stations above 40 metres have been tending to interfere with the 40 metre band amateurs, but some will generally be heard during Sunday mornings and afternoons, particularly. The 20 metre band usually

By F. G. Rayer

gives good reception of U.S.A. amateurs during the afternoon and evening.

Tuning coils

S.W. coils have very few turns, and are thus easily made. It is also simple to change the wavebands tuned, if desired, by modifying the number of turns.

A typical S.W. coil for about 20–40

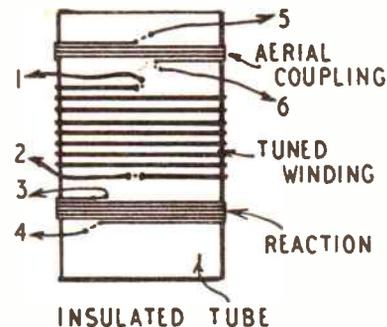


Fig. 2—Short-Wave coil

metres is shown in Fig. 2. Stout wire (18 to 22 S.W.G.) is usually employed for the tuned winding. As the turns of this winding are often separated, as in Fig. 2, bare tinned copper wire is satisfactory, though enamelled wire is equally suitable. Point '1' goes to the fixed plates of the tuning condenser, and point '2' to the moving plates, and Earth. The fewer the turns employed here, the lower in wavelength will the coil tune. For a 20–40M. coil, 8 turns of 20 S.W.G. wire, with turns spaced by the diameter of the wire, on a 1½in. diameter former, will be suitable.

Reaction is essential, for reasons explained in a previous article, and lead '3' goes to the reaction condenser fixed plates. Point '4' is taken to the valve anode. Any fairly thin wire of about 26 to 30 S.W.G. is satisfactory for both reaction and aerial coupling, and the turns are wound side by side. The wire may be cotton or enamel covered.

These two sections (tuned winding, and reaction) may be employed alone. The

aerial is then taken to point '1', via a small pre-set condenser (50pF is suitable). However, selectivity is increased by using an aerial coupling winding, as in Fig. 2. Point '5' goes to aerial, and '6' is taken to earth. For normal aerial coupling 1/3rd to ½ the number of turns employed on the tuned winding will be satisfactory. That is, 4 turns, with the present coil.

Turns must all be in the same direction, as in Fig. 2, and about ¼in. free space is

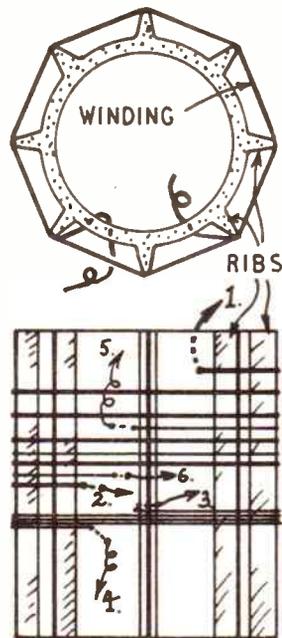


Fig. 3—S.W. coil on ribbed former

left between each section and the adjoining winding. Reaction windings consisting of 2/3rds the number of turns which are employed on the tuned winding will be satisfactory. With this coil, 6 turns are thus suitable.

Types of former

Smooth Paxolin tubes are often employed for such coils, and are quite satisfactory. Such tubes, or 'coil formers' may be purchased in almost any diameter.

Losses are reduced (especially for very short wavelengths) by using a ribbed former such as that shown in Fig. 3. The coil turns are wound round the ribs, so that they are not actually in contact with the tube itself. Such ribbed formers are often found in ex-service surplus equipment. If the ribs are notched slightly,

turns can be wound in these notches. Some formers are already notched in this way. If not, nicks can be made at $\frac{1}{4}$ in. intervals with a small file.

Points '1', '2', '3' and '4' provide the same connections as described for the coil in Fig. 2. But in Fig. 3 the coupling winding is interwound between the lower turns of the tuned winding. This method is often used with S.W. coils. Point '5'

Any detector valve will be satisfactory in such a circuit, the old type of 2-volt triode being excellent. However, such valves are not produced for all-dry operation. If an accumulator is not desired, a 1.4V. valve should thus be used, and it can be employed as a triode by joining screen grid and anode, as shown.

Fig. 5 shows a practical wiring plan

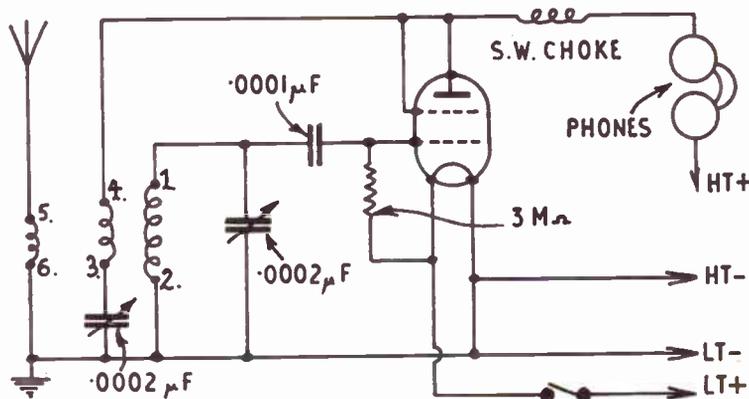


Fig. 4—S.W. 1-valve receiver

goes to the aerial. As point '6' goes to earth, it can be soldered directly to lead '2' where it issues from the coil.

Such coils may be mounted vertically, either by means of small brackets bolted to the tube, or by cutting a disc or strip of wood to fit inside the tube, and screwing this to the receiver baseboard. It is best to leave the various ends long enough to reach the other parts in the receiver, thereby avoiding unnecessary joints. A small, fretwork type drill will be useful for making the small holes through which the ends of the windings pass.

A S.W. receiver

As long distance reception is possible with even a single valve, a 1-valver is excellent for initial experiments on the S.W. band. The circuit for such a receiver is shown in Fig. 4, and is very similar to 1-valvers employed for L.W. and M.W. reception.

Either of the coils described can be used, or similar coils for other wavelengths. Figs. 4 and 5 have the coil leads numbered to agree with Figs. 2 and 3, and it is essential that the correct connections be made here.

For S.W. reception, a tuning condenser of $0.00015\mu\text{F}$ (150pF) or $0.0002\mu\text{F}$ (200pF) is usual, as the $0.0005\mu\text{F}$ (500pF) condenser employed with L.W. and M.W. receivers is of rather large capacity, so that tuning becomes difficult. A smaller reaction condenser is also usual, $0.0002\mu\text{F}$ being average.

that the socket connections in Fig. 5 are correct only when viewing the holder from above. This is more convenient with such a simple receiver, rather than using a chassis, with wiring both below it and above. If the necessary socket tags are bent out a little, and Fig. 5 followed exactly, no error in wiring the holder should arise.

With any S.W. receiver, connections in the tuned circuit should be quite short and direct. Coil winding leads are therefore cut off at suitable lengths.

A choke for about 15 to 80 metres can be made by winding about 150 turns of 38 S.W.G. (or similar) silk covered wire on a $\frac{1}{4}$ in. diameter insulated tube. One end of the winding is taken to the valve anode, and the other to the phone socket.

Tuning is quite critical, so that a large knob, with dial, is necessary. A reduction drive would also prove very helpful, especially when receiving weak stations. Because of the extreme sharpness of tuning on low wavelengths, a special method known as 'Bandspread Tuning' is often used in receivers designed particularly for S.W. reception. This will be dealt with in the next article in this series.

Reaction is used in the ordinary way, to build up volume. It will also be much

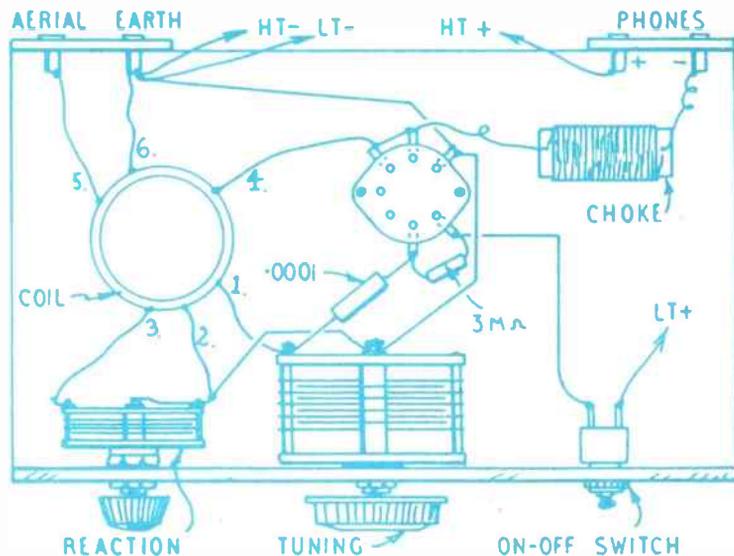


Fig. 5—Wiring plan of Fig. 4

for the receiver, and comparing this with Fig. 4 will prove useful to constructors who are not accustomed to reading theoretical circuits. Valveholder connections given are for a 1T4 valve, or equivalent, and it will be noticed that two sockets are not used. The valveholder is fitted about $\frac{1}{4}$ in. above the baseboard, on small blocks. It must be noted

more critical than with a L.W. and M.W. set. Coils for other wavelengths can quite easily be made, and the following table will allow this to be done, or tubes of various diameter to be employed. The number of turns for the tuned winding only is given, aerial coupling and reaction being approximately $\frac{1}{3}$ rd and $\frac{2}{3}$ rds

● Continued on page 69

AXEMANSHIP FOR CAMPERS

MANY people who spend camping week-ends and holidays, think nothing of spending pounds on equipment like camp-beds and super tents, etc., while one of the cheapest items of camping equipment, namely the axe, remains constantly neglected. A good camper should, in fact, have as much respect for his axe as for his tent. Unfortunately however, this is not the case. People, fastidious in their camping methods and choice of belongings, think nothing of using a blunt axe or one with a loose head.

or stick is always centred on the log and axed at that spot. Fig. 3 shows the common way of splitting small branches. This method should not be resorted to as a split limb is a likely result. Fig. 4 is a more sensible approach. Figs. 5 and 6 point out the wrong and correct methods of splitting wood.

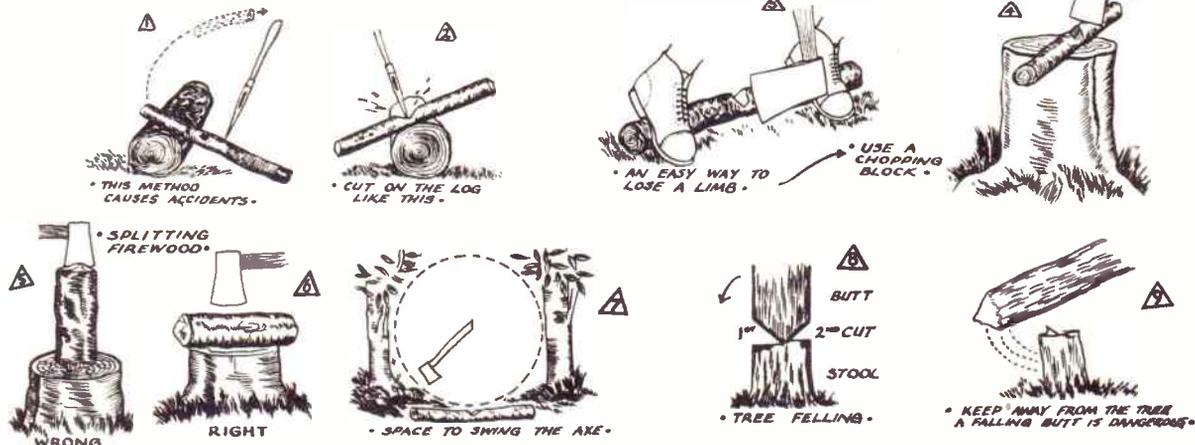
Tree felling also has its hazards and a few points worth remembering are listed below.

- 1 Never attempt to fell a tree against the wind.

faces the direction you have chosen for the tree to fall.

Two main strokes are used in felling. The first stroke at 45° to the trunk splits a wedge shaped opening. The second stroke should be as near horizontal as possible, this severs the first opening. The strokes are then repeated and varied if necessary.

Commence the kerf by making a long cut across the trunk. When that portion



An axe is a dangerous tool in unskilled hands and should *never* be fooled with. Severe accidents have been caused by a flying axehead or an axe, on its impact with wood, suddenly rebounding at an acute angle. This disagreeable habit of the axe is the cause of many a gaping wound.

Listed below are a few rules which the amateur camper will find useful:

- 1 Always clear the ground around the place where you are working; make sure no branches impede the swing of the axe.
- 2 Never use an axe which has a loose head. It is dangerous to yourself and to other people.
- 3 In camp, never leave an axe lying carelessly around. Always embed it in the nearest log or tree stump.
- 4 Keep the axe-bit covered when not in use. If you have a case for the head, use it, or wrap the edge in sacking when carrying it about.
- 5 When using the axe always keep onlookers at least 10 feet away and to the one side.

Illustrations accompanying this article also show a few 'do's and don'ts'. Figs. 1 and 2 show the wrong and correct methods of cutting firewood. The branch

- 2 Before attempting to cut down a tree decide the direction in which you want it to fall and see that its branches will not lodge in another tree.

- 3 Cut off all side branches which may get in the way of the axe (Fig. 7).

The first cut in a tree is called a kerf, and is made on the side of the tree which

has been sliced out between the two grooves, slice another kerf on the other side of the trunk one third of the tree's diameter in depth (see Fig. 8).

Once the tree begins to tremble, step sideways never backwards. Should one falling tree strike another the butt invariably strikes back from the stump and axemen may receive injuries. (J.M.)

Continued from page 68

Tuning Short Waves

this number, for each coil, as already explained. The waveband coverage listed is not exact, as this depends upon the length of connecting leads in the receiver.

Coils wound on ribbed formers will tune slightly lower wavelengths than an equivalent coil on a smooth former. For the larger coils, tuning up to 100 metres wire of about 24 S.W.G. will be satisfactory as 20 S.W.G. or similar wire will take up too much winding space.

Any of these coils can be used in the 1-valver.

Dia. of Former	No. of Turns.	Waveband.
1in.	6	10-20M.
1in.	11	17-40M.
1in.	16	20-50M.
1in.	32	40-100M.
1½in.	4	10-20M.
1½in.	8	20-40M.
1½in.	20	40-100M.
2in.	7	20-40M.
2in.	18	40-100M.

The next article in this series will explain broadband tuning written in his own authoritative style by our expert F. G. Rayer.



HAVANA, the key to the New World, opens the door to a flood of memories — vivid, colourful, as strong as the hurricanes that occasionally sweep the bay. Buccaneers, French, Spanish, and English sacked this city time and time again. Galleons, loaded with treasure from El Dorado, sought refuge in the bay. Drake threatened Havana, the Dutch blockaded it four times. The Earl of Albemarle besieged it, and made the citizens pay heavily for the expenses of his long vigil.

Modern history of Cuba begins in Havana, for the battleship 'Maine' was sunk in the harbour. The Spanish-American War broke out. So came another blockade, more bloodshed, and a new administration.

Turbulent history

Philip IV of Spain rightly called Havana the bulwark of the West Indies. It has withstood the storms of human violence, and some of the most terrible hurricanes with which Nature has ever punished the world. It has lived through the ravages of fever, fire, flood, and civil war. They will show you ominous little holes on walls, which mark where patriots stood for the last time.

And to-day it is one of the dozen greatest ports in the world — the centre of the sugar and tobacco trades.

The seed of Havana tobacco is sown at the end of August. After some forty days, when the plants are about five ins. high, they are ready for transplanting from their special beds into the fields. From the time of transplanting, the leaf takes from 60 to 80 days — according to the weather — to become fully grown, some plants attaining a height of five feet.

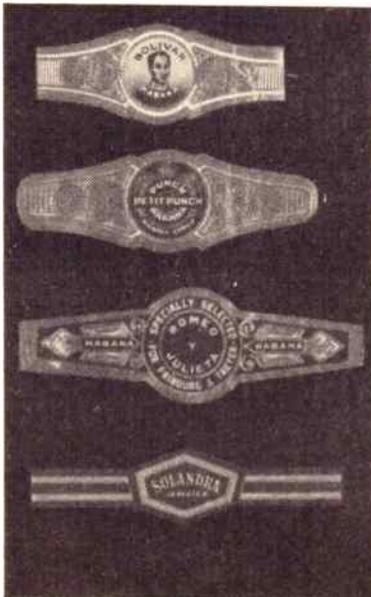
Leaves are then cut one by one from the plant, sewn together in pairs, and hung across poles in barns, or in the sun, to go through the first process of maturing. The first drying process is completed in about six weeks. The leaves are taken down and tied into bundles, which are then piled up to a height of six feet or so, being then left to go through their first fermentation.

After this, experts in the selecting houses sort the leaves into classes according to size and quality.

Blending essential

The bundles (manajos) are packed into bales of eighty, and sold to the factories. Many of the leading factories are also proprietors of plantations, but no factory relies entirely on the tobacco of its own growth, as, to manufacture really fine cigars, a blend of different growths from various districts is essential.

Where the tobacco is grown for wrappers, as distinct from fillers (the interior of the cigar), the plantations are often covered with a stretch of cheese-cloth to protect the leaves from the full effect of the rays of the sun. In this way the light, silky claro wrappers, now so much in demand, are obtained. The shade-grown leaves are lighter in colour, but the sun-grown, or unprotected, leaves are somewhat fuller in flavour, and more aromatic.



When the bales come into the factory, after undergoing the first fermentation, they are piled high, one on top of the other, in the warehouse. There they remain in their bales to undergo a second fermentation. They will stay untouched for periods varying from one to four years, according to the quality and richness of the leaf. All this time they are improving in flavour.

The leaves, being dry and brittle when the bales are eventually unpacked, are then dipped in clean water, spread out on the floors, and thus made pliable for the process of stripping — that is, the removal of the centre stem of the leaf.

From the stripping room, the leaves used for fillers are collected, dried again, and packed into barrels. Here they go through their third fermentation, often staying in these barrels for a further year, when after a series of seemingly never-ending processes, the tobacco is ready for manufacturing into cigars.

CIGAR BANDS

— By R.L.C.

Fillers are taken into the blending room, where they are mixed in various proportions according to the private formula of each factory. A good cigar usually contains tobacco from eight, ten, or even twelve different plantations, and as each factory makes several different blends, this explains why one often smokes two cigars from the same factory which taste entirely different.

The blend having been made, it is handed out to the workman, each man being given fillers and wrappers for 50 cigars at a time.

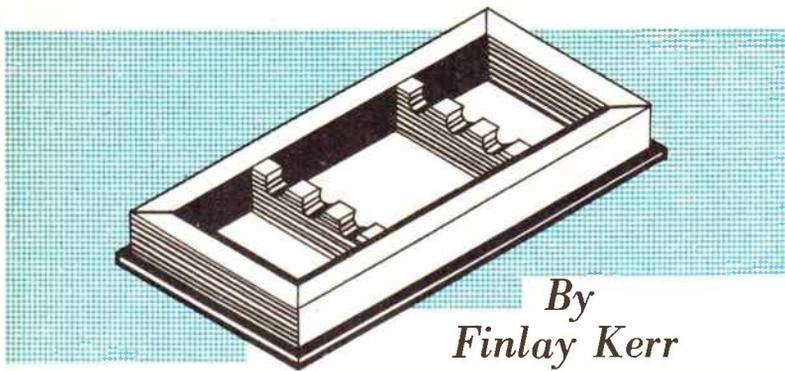
Years of apprenticeship are needed to manipulate the filler by hand into the desired shape, and then deftly to cover it with the wrapper. Superb skill is needed to produce cigar after cigar of exactly equal girth, shape, and weight.

Finished cigars are taken to the selecting room and laid out on big benches, where any of indifferent workmanship are discarded, and those retained sorted into the different colours. The different shadings are packed into boxes, marked under three main markings of Claro (light), Colorado Claro (medium) and Colorado (dark). They are then ready for despatch.

Keep these facts handy, you will find them useful if a friend when admiring your collection of cigar bands should ask you how cigars are made.

Next week's issue will contain details for making a novel 'Wheelbarrow' Plant Box, model patterns and usual features.
MAKE SURE OF YOUR COPY

A CHILD'S DESK TRAY



By
Finlay Kerr

THIS desk tray is for use on a child's desk for keeping pencils, rubbers, clips, etc. tidily together. The construction is very simple and quite suitable for the junior craftsman.

Start by making the outer frame which measures $8\frac{1}{2}$ ins. by $2\frac{7}{8}$ ins. outside measurements. This is made from $\frac{1}{2}$ in. by $\frac{3}{8}$ in. planed timber. Cut two pieces

base piece is cut $\frac{1}{2}$ in. wider and longer than the frame it should project $\frac{1}{2}$ in. all round the frame.

The next step is the making of the two inside divisions for holding the pencils. This is best done by obtaining a piece of $1\frac{7}{8}$ ins. by $\frac{3}{8}$ in. planed timber, $2\frac{1}{2}$ ins. long and boring three $\frac{3}{8}$ in. diameter holes as shown in Fig. 2. Now saw up the centre

line to make two identical pieces. Smooth off the rough sawn edges with glasspaper then glue and pin the two divisions inside the tray so that their outer edges are $4\frac{1}{2}$ ins. apart. Readers who do not possess a brace and $\frac{3}{8}$ in. diameter bit can make the divisions by obtaining two pieces of $\frac{1}{2}$ in. by $\frac{3}{8}$ in. planed timber and cutting out the curved recesses with a fretsaw.

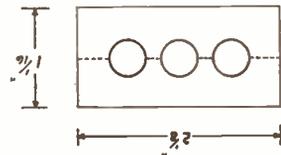


Fig. 2

If the tray is intended to be used on top of a polished surface then it is a good idea to obtain a piece of felt and glue this to the underside of the tray to prevent the polished surface being scratched.

To complete, fill up any pin holes with plastic wood then apply a coat of stain and varnish.

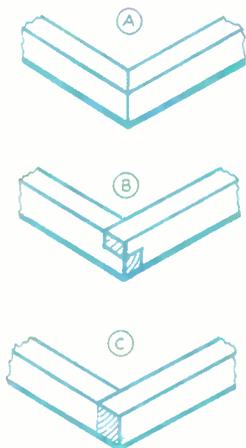


Fig. 1

$8\frac{1}{2}$ ins. long and two pieces $2\frac{7}{8}$ ins. long. The neatest joint to use at the corners is the mitred joint illustrated at Fig. 1(A). This can be accurately made by using a mitre block. Alternatively, half-lapped joints (B) or even butt joints (C) may be used if desired. If the butt joint is used then the two ends must be shortened to $2\frac{1}{2}$ ins.

After this, cut a piece of plywood $8\frac{1}{2}$ ins. by $3\frac{1}{8}$ ins. for the base. Smooth off the sawn edges with a rub of glasspaper then secure to the frame using a little glue and inserting a few fine panel pins from the underside of the base. Since the

String Holder and Cutter

DON'T throw away that old paint funnel. Give it a thorough clean and paint it in a gay, contemporary design. Hang it on the kitchen wall as a string holder, as shown.

Now, you will need a string cutter. From a piece of scrap deal, 3 ins. by $1\frac{1}{2}$ ins. by $\frac{1}{2}$ in. thick, cut out the shape shown. Cut a 'V' nick in the front portion.

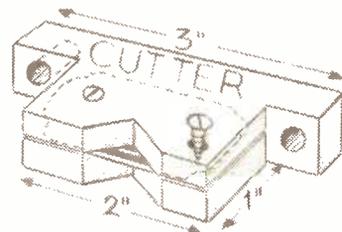
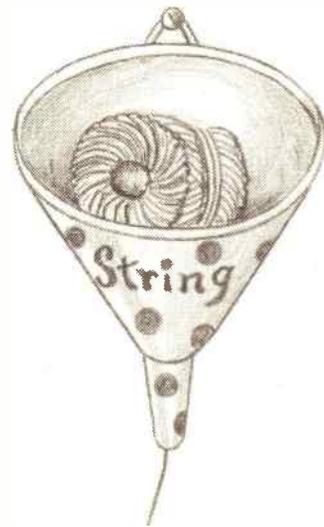
By *E. Capper*

Lengthways, and through the 'V' piece, cut a slot with a hacksaw blade, taking it right back to the flange piece at the back. This slot houses the razor blade.

Lay the razor blade on the top of the fitting and mark the position of the two outside holes. Drill through to the depth of the slot only so that the holding screws clear this hole but screw into the portion of the wood under the slot. $\frac{1}{2}$ in. holes will be sufficient.

Drill two $\frac{1}{2}$ in. holes through back flange for screws to fix fitting to wall.

A word of warning. Make the 'V' nick no more than $\frac{1}{4}$ in. in depth so that it is sufficient for the exposed blade to cut the string but not wide enough for your finger to come into contact with it.



CHEMISTRY IN THE HOME

THE name of this acid suggests that it may in some way be connected with gall nuts or oak galls. This is so. Galls contain tannic acid and by fermenting either galls or tannic acid, gallic acid is obtained. It is also formed when tannic acid is boiled with dilute mineral acids.

It comes into the laboratory as fine buff coloured crystals which are relatively light in weight. It is not very soluble in

The action of lime water on gallic acid is also interesting. Add some to gallic acid solution. A blue precipitate appears, which gradually changes to violet and then to a purplish colour.

Add a few drops of a freshly prepared solution of ferrous sulphate to gallic acid solution. If the ferrous sulphate is pure, that is, free from ferric salt, no colouration will appear, but on standing awhile an azure blue colour develops. As ferrous

FACTS ABOUT GALLIC ACID

one upon the other, and lowering the lamp by removing these wood squares one by one until the right heat is attained.

The gallic acid turns brown, melts and begins to give off gas, which is indicated by the appearance of small bubbles in the melted acid. A little whitish sublimate may appear in the tube. This is pyrogallol, but the main portion remains in the melted mass. After a time the bubbles of gas which bubble through the lime water produce a white turbidity, showing the gas to be carbon dioxide. When no more gas is evolved and the melt is in tranquil fusion, remove the flame. Take out the test tube from the paraffin bath and let it cool down.

The solid mass remaining in the test tube on cooling may now be worked up for pyrogallol. Add 15 c.c. of water and warm it in the water-bath. Much or all of the solid dissolves. Pour off the solution into a beaker and repeat the process with another 15 c.c. of water. Filter the combined extract from a small amount of brown insoluble matter and evaporate the whole to dryness in an evaporating basin on the water-bath. A brown mass of pyrogallol remains. Pure pyrogallol is white, but to remove the small amount of brown colouring matter is unprofitable on the small scale and the product is quite pure enough for all ordinary laboratory tests.

A prominent gallic acid derivative used in medicine is bismuth subgallate, which is known in medical circles as Dermatol. It is used as an antiseptic dusting powder in place of iodoform. To prepare a specimen, dissolve 5 grams of bismuth nitrate in 10 c.c. of warm glacial acetic acid, and make up the filtrate to a volume of 20 c.c. with water.

Dissolve 1.67 grams of gallic acid in 20 c.c. of hot water. Add this to the acetic acid solution of bismuth nitrate. A yellow, powdery precipitate of bismuth subgallate appears at once. Filter this off and wash it on the filter with warm water until the water running through the filter is no longer acid — which you can ascertain by letting a few drops run on to blue litmus paper when, if acidity has disappeared, the paper will no longer be turned red. Open out the filter paper and let the whole dry in a warm place, such as the top of the domestic fire oven.

Yellow bismuth subgallate remains as an odourless powder. An interesting reaction of this substance is that with

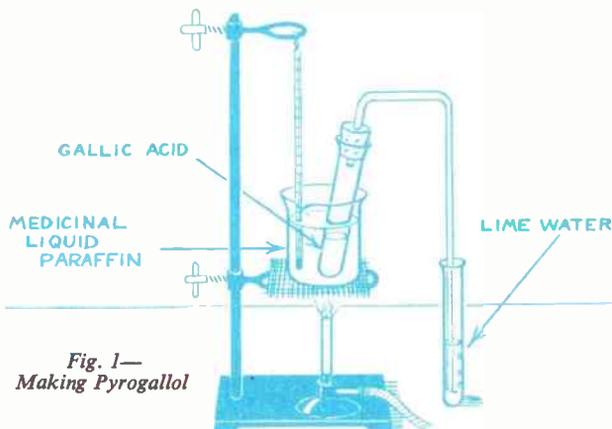


Fig. 1—
Making Pyrogallol

water, as you will see if you shake a pinch of the acid with a few c.c. of water in a test tube. Now heat the water. The acid dissolves more easily and on cooling crystallises out again.

By filtering off the crystals you will have a saturated solution of gallic acid with which to try out some interesting reactions. To a little of the solution add a drop of ferric chloride solution. A deep blue colouration or precipitate appears. Repeat the test using a solution of tannic acid instead of gallic acid. This, too, gives a similar reaction. How are we, then, to distinguish between the two acids?

Dissolve a little gelatine in warm water and divide the solution into two parts. Add tannic acid solution to one and gallic acid solution to the other. Tannic acid produces a yellowish precipitate, whereas gallic acid does not.

A further method of distinguishing them is to add solutions of each to two separate portions of lead nitrate solution. Tannic acid gives a white precipitate. Gallic acid does not.

sulphate is often not quite pure, this colouration frequently appears at once.

Finally, if you add a little solid gallic acid to a solution of potassium hydroxide a fine red solution is formed.

Having familiarised ourselves with the reactions let us turn to substances which can be prepared from gallic acid. Technically, it has proved a useful chemical for the production of substances employed in photography, medicine and for the manufacture of dyes.

'Pyro', or pyrogallol, is familiar to photographers. Gallic acid is its parent substance. It is made by heating gallic acid. To see how this is done and at the same time to prepare a specimen for your laboratory stock, rig up the apparatus shown in Fig. 1.

In the test tube put about 5 grams of gallic acid. Heat up the medicinal liquid paraffin until the thermometer shows a temperature of 215 to 220 degrees Centigrade. Adjust the flame until this temperature is constant. If you use a spirit lamp you can regulate the heat by standing the lamp on several squares of wood,

sodium hydroxide solution. Drop a little into sodium hydroxide solution. It dissolves with a red-orange colour. Drop sodium hydroxide solution on to some of the solid substance. It will turn bright red.

A typical dye made from gallic acid is galloflavin. To prepare it dissolve 5 grams of gallic acid in a mixture of 88 c.c. of methylated spirit and 100 c.c. of water, pour the solution into a wide mouthed bottle and cool it in a freezing mixture of ice and salt. When the temperature is below 5 degrees Centigrade, very gradually add 13.5 c.c. of a 28 per cent solution of potassium hydroxide, stirring constantly so that the temperature does not rise above 10 degrees.

Rig up the apparatus shown in Fig. 2 and turn on the tap above the filter pump, so that a steady stream of air is drawn through the solution. The latter turns first olive-green, then greenish-brown and soon begins to deposit a precipitate. When this increases no more close the screw clip, turn off the water tap and remove the bottle from the freezing mixture.

Filter off the precipitate, dissolve it in hot water and add dilute sulphuric acid until a strongly acid reaction is shown with blue litmus paper (turns from blue to red). Boil the mixture and let it cool. Galloflavin is deposited as greenish-yellow plate-like crystals. Filter these off,

wash them with water, open out the filter paper on to a porous tile and let the whole dry in a warm place.

Galloflavin has been used mostly for producing olive yellow shades of chrome mordanted wool. Prepare first some chrome mordanted wool by boiling 10

hour with frequent turning of the wool with a glass rod.

Let the whole cool and then wash the wool thoroughly with water. The wool is now a dull green colour. Boil a little galloflavin with water in a beaker and add a few strands of wool. Continue boiling

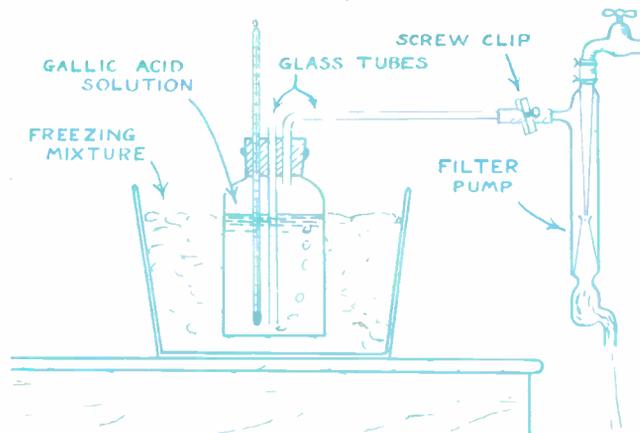


Fig. 2—
Making the
dye Gallo-
flavin

grams of white wool yarn with about 200 c.c. of water until it is thoroughly wet, lift it out, add 0.3 gram of potassium dichromate, re-enter the wool and boil a few moments, remove the wool once more, add 0.6 gram of tartaric acid, re-enter the wool and boil the whole for an

until the wool is dyed a full olive-yellow. Wash it with water and let it dry. Galloflavin dyed wool is fairly fast to light, but less so than the well-known dyestuff alizarin. Consequently, it has been largely replaced by the latter in commercial dyeing. (L.A.F.)

MAGIC NUMBER NINE

THERE appears to be something quite magical about the figure nine and by using one or both of the following methods we may use this property as the basis for tricks.

Reference to Fig. 1 will reveal a four digit number and underneath are the same digits rearranged in any order — not merely reversed. The second number is subtracted from the one above giving the resultant answer.

Now suppose you had asked your friend to think of a four digit number, told him to rearrange in any order and subtract, just as we have done, then invited him to rub out one digit, could you supply the missing figure?

See how easy it is when you know that our magical figure nine is involved, for all the digits in that answer add up to a multiple of nine, 9, 18, 27, 36, 45 or 54. In our example the answer is actually 4077, but our friend has erased the figure 0 — perhaps to puzzle us — but we know this quite readily by asking for the total of the remaining three digits which is 18. And of course, the nearest multiple of nine in this instance is 18, so

that the figure 0 must have been erased. If the answer had been $0+7+7=14$, we should have known that the erased figure was 4, merely by subtracting the total of 14 from the nearest multiple 18.

In Fig. 2 a similar principle is involved but here each digit has been added to produce the answer and when these are totalled we arrive once more at the figure nine.

How can we use this fact for a trick?

Give your friend a piece of paper for the arithmetical calculations and a book. Ask him to first write down any four digit number then rearrange the digit and subtract the smaller number. Now ask him to add the digits of the answer together to arrive at a single digit but keeping this secret. He is now invited to turn to that numbered page of the book upon which he must concentrate, and, by some uncanny power, you are able to reveal the general contents of the page. You know, of course, that the answer will be nine, unless his arithmetic is very bad indeed, so you should choose a book where it is fairly easy to memorise the contents of the ninth page.

FIG 1

5 6 4 1

1 5 6 4

4 0 7 7

4 ? 7 7

(0 erased)

FIG 2

5 6 4 1

1 4 6 5

4 1 7 6

$4 + 1 + 7 + 6 = 18$

$1 + 8 = 9$

MORE USEFUL FORMULAS

THERE is much enjoyment to be had in making up and trying out one's own products. By keeping a classified list of the formulas given in these articles, so as to be able quickly to refer back, one will usually find a recipe or method for the odd occasion. In this article is given a selection covering a wide area of the handyman's territory, and which it is hoped will feature something for everybody.

Belt edge colouring

Home leather workers will welcome, no doubt, preparations for staining and giving gloss to the edges of belts and straps which they have cut from sheet. This attention to an often neglected detail, especially in the case of straps, brings respect for your work among discerning customers.

The brown edge gloss colouring is made by dissolving $\frac{1}{4}$ ounce of borax in $6\frac{1}{2}$ fluid ounces of hot water and stirring in $2\frac{1}{2}$ ounces of shellac. Continue stirring the heated liquid until all the shellac is dissolved. Then colour the solution by dissolving therein $\frac{1}{4}$ ounce of Bismarck Brown.

Black edge gloss colouring is made in precisely the same way except that the place of the Bismarck Brown is taken by Nigrosine Crystals. These solutions will keep indefinitely in screw top jars.

Sign letter cement

An excellent general purpose cement for sticking either the older pottery or the newer plastic letters and numbers is easily made and gives a firm bond in use. Mix intimately $3\frac{1}{2}$ ounces of litharge (lead monoxide) and 2 ounces of white lead. Make this into a dough by working in small quantities of a mixture of 3 volumes of linseed oil varnish and 1 volume of copal varnish until the right consistency is reached. Only a very small quantity will be needed, so take care not to overshoot the mark. Otherwise, the dough will be too thin and the letters may fall off by their own weight before the cement has hardened. Coat the back of the letters with the preparation, press them into position and remove any superfluous cement from the edges.

Glass to glass cements

These are often useful for repairing pieces of cherished glassware, or for the odd occasion when you wish to fix together two or more pieces of glass.

Make a saturated solution of borax by heating a small quantity of water, stirring in borax little by little until no more

will dissolve and then let the solution cool and stand a few hours. Surplus borax will separate out. Pour off the clear upper liquid for use. Heat this up and stir in casein a little at a time until no more will dissolve. Allow to cool and the cement is ready for use. Clean the two surfaces and let them dry. Apply the cement, bind or weight the article and leave for two or three days undisturbed.

Another cement based on casein requires longer to harden, but once it is so, a bond is established which will resist much washing. Warm a little water glass to thin it and grind in powdered casein until a paste is formed. Use it in the same manner as the casein borax cement. If you find it difficult to work on to small surfaces it may be warmed and thinned with a small quantity of water.

Steel polish

The bright steel components of ranges and grates which have become stained or tarnished may be quickly renovated with a mixture of equal volumes of oil of turpentine and rape seed oil mixed to a creamy consistency with emery powder. Apply it on a cloth and work over the metal until all stains are gone, then finish by buffing with a clean cloth.

Britannia metal cleaner

Here is an easy and cheap method of brightening that sugar bowl or coffee pot. First rub all over the article with rape seed oil, then wash the article in soapy warm water, rinse with plain water and then polish up with precipitated chalk. The metal will show no fine scratches if you use this gentle method.

Gold solvent

You may at sometime have had occasion to dissolve gold, say from a worn gilded article, and found that the usual mineral acids have no effect upon it. This is soon done if you use aqua regia, which is a mixture of 1 volume of strong nitric acid with 4 volumes of strong hydrochloric acid. It does not matter which is added to which, but take care not to get the acids on your skin. Should you do so, flush with water and dab with a paste of sodium bicarbonate and water. The aqua regia must be freshly prepared, for it does not keep well.

If you are using it to remove gilding, either dip the article into the mixed acids or apply with a fragment of rubber sponge fixed to a stick with a rubber band. When the gold has disappeared,

rinse the article with water and dry it with a cloth.

Cockroach killer

If you are troubled with cockroaches a simple preparation can help if persisted in. Mix together equal measures of powdered borax and icing sugar and sprinkle this in the beetles' usual haunts.

A cheap gum

This gum is dark coloured, but its cheapness recommends it for many purposes where the colour is of no consequence. Dissolve 2 grams of borax in 10 c.c. of boiling water, add 4 grams of resin and continue heating until it is dissolved. In another vessel dissolve 3.5 grams of borax in 90 c.c. of boiling water and then dissolve in this solution 12 grams of shellac. Mix the two solutions, stir well and allow to cool, when the gum is ready for use.

Pale gum

Wherever a light coloured gum is needed this formula will give excellent results. Add 29 grams of gum acacia to 112 c.c. of hot water and stir well. Occasionally stir the mixture as it cools and subsequently until the gum has all dissolved. Then stir in 0.2 c.c. of formalin as a preservative.

Knife cleaner

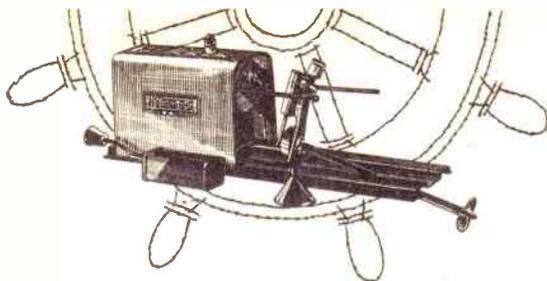
A cheap and efficient cleaner for this purpose is quickly made by thoroughly mixing $\frac{1}{4}$ ounce of pipe clay, $1\frac{1}{2}$ ounces of cattle bone, $2\frac{1}{2}$ ounces of silica, and $7\frac{1}{2}$ ounces of bath brick. All these should be in fine powder.

Marble cleaner

Fireplaces, gravestones and similar articles which have grown dingy can often be restored by the use of a special preparation. It consists of a mixture of 16 ounces of whiting, 8 ounces of trisodium phosphate and $\frac{1}{2}$ ounce of soda ash. Make this into a cream with water and apply a thin layer all over the marble by means of a brush. When it is dry wash off with water. The treatment may be repeated if necessary. (L.A.F.)

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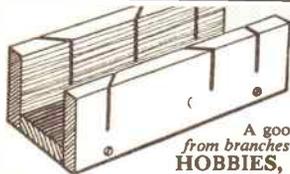


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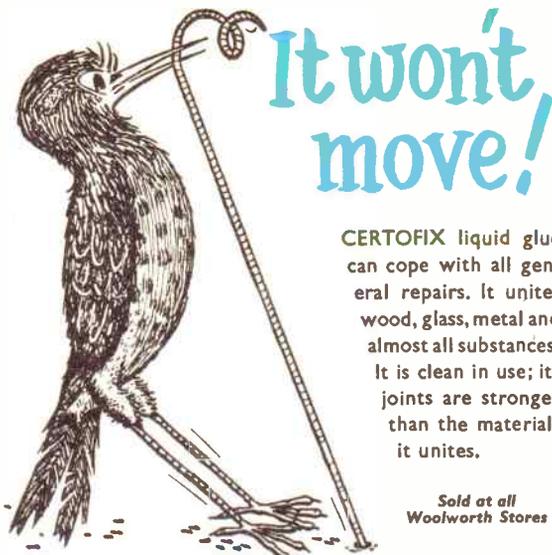
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LEG STROKES



IN the last article we dealt with gliding in order to learn how to get to your feet and now we must concentrate on more gliding as an aid to good swimming. This is often neglected by baths instructors but is most useful both to gain confidence and as an aid to good style.

The glide is the natural relaxation period of the breast stroke and if you can glide well you will learn how little effort is needed to keep you afloat. Most beginners expend a great deal of energy in the mistaken belief that they must make great efforts to keep afloat, whereas in reality this is quite unnecessary, and the energy properly applied will lead to much easier swimming.

Assuming that you have now mastered the ability to get to your feet from a horizontal position, you must practise gliding for its own sake, with the aim of crossing the bath in this manner. In order to get a really good kick off (the secret of success!) you must push with both feet. Raise one behind you as before and at the moment of pushing off, bring the other foot up with both legs bent as much as possible, and kick off hard, Fig. 1. It is important to raise the feet as high as you can so that you push yourself along the water rather than upwards, which will happen if the kick takes place too low down, Fig. 2.

Once well launched try to keep your body straight, feet together and pointed backwards, head well between outstretched arms. Keep going as long as your breath holds out. At first you will probably wobble or travel diagonally, but continue to practice and eventually you will be rewarded by feeling your fingers touch the opposite side. Although your body should be held straight, any tenseness must be avoided; the need to relax cannot be over-emphasised.

Having gained some degree of proficiency at gliding, you will be ready to start real swimming strokes. For general purposes the breast stroke should be learnt first and the much faster and more energetic crawl left until later. Often the complete breast stroke arm and leg movements are taught at once, but when this is done, the learner usually makes too much use of his arms and never

develops a good powerful leg movement, and it is the latter which is the main propulsive force in this stroke.

The leg movement must first be learnt and this is best done by holding on to the bar at the side of the bath. By gripping the bar from underneath and placing your arms against the side, you will be able to hold yourself horizontally, Fig. 3. Your legs should first be held out straight behind you, Fig. 4, and then bent at the knees, keeping the latter as far apart as possible, Fig. 5.

Next turn your feet outwards and kick your legs backwards and as wide as possible, Fig. 6. Without a pause, force them together, squeezing water from between them, Fig. 7. This is the real

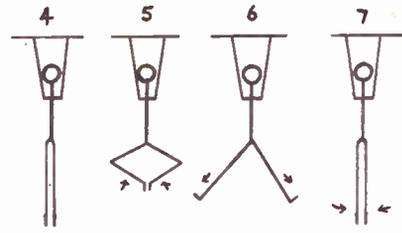
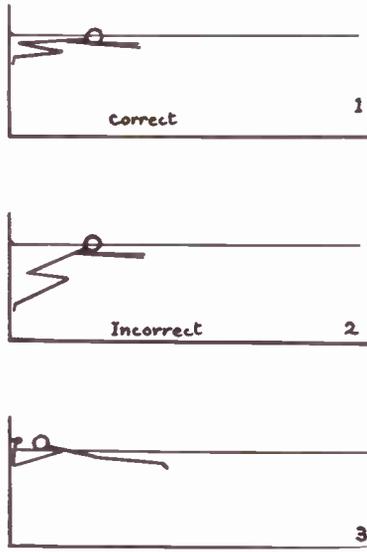
propulsive movement, not so much the actual kick as is often supposed, and considerable practice will be needed to close the legs with force and not just let them drift together. You will now be at the same position as at the start and will have completed one cycle.

To obtain the correct timing count 1, 2, 3, 4, slowly; i.e. together, bend, kick out, force together, pausing each time the feet are together in the glide position.

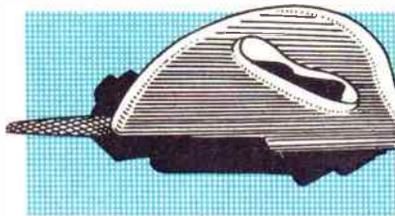
When you have got the rhythm, the next stage is to incorporate the movement into your glide. Kick off as before and when you are well launched, perform the leg movement. You will probably lose your timing at first but do not be discouraged for quite a bit of practice will be necessary.

At this stage you will find the use of a float very helpful. This will enable you to keep your head above water whilst practising the leg movement. A small, cheap air cushion is very suitable or even a small beach ball. Hold the float at arm's length in front of you, push off gently and start the leg movement. At first you will probably scarcely move at all, but continued practice will bring success. You should continue until you are able to cross the bath without difficulty. (P.R.C.)

Next: the complete stroke



A Quick-change Handle



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The saw type handle is made in two pieces, cut to the shape shown on the pattern page, from $\frac{1}{2}$ in. wood. Before gluing the two pieces together, gouge out, or cut with a chisel, grooves as shown at (X) and in the diagrams. Give two or three coats of paint after cleaning up.

The tang of the file or rasp is inserted in the hole provided and is pushed home tightly. Use the handle as if it were a hand saw. (M.p.)

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IDEAL FOR THE MODEL AND HOBBY MONEY MAKER

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HARD HITTING ACCURATE



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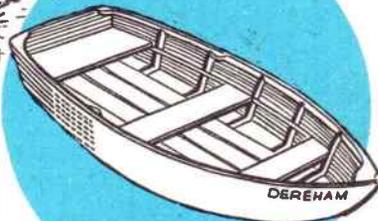
WEBLEY & SCOTT Ltd., 166 WEAMAN ST., BIRMINGHAM, ENGLAND

YOU CAN BUILD 'DEREHAM'

A Sturdy 10ft Dinghy

Designed by P. W. Blandford

For river or sea — oars or outboard motor — carries three persons and kit — light enough for two to lift. A detailed drawing showing the main frames, transom, stern and other parts full size for easy working costs only 8/6, and full building instructions are given free.



Get started on yours today

Write to: The Editor,

HOBBIES WEEKLY, DEREHAM, NORFOLK

PRODUCTS NOTED



THIS painting of a B.O.A.C. Britannia over Windsor Castle, in attractive oil colours, is the latest in the series of Craft Master oil painting sets. Other canvases in the set feature a B.O.A.C. Stratocruiser and a B.O.A.C.

DC-7C. The Britannia is the aircraft in which the Prime Minister made his Commonwealth tour. In its long range version, the Britannia is operating very fast services between London and New York.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

THIS electric soldering iron has been developed to meet the requirements of continuous small assembly and instrument work and will prove, therefore, of great help in the

radio, television, electronic and allied industries, to say nothing of the need for such a tool in the hands of every amateur wireless and electrical constructor. A Wolf product, 22/6.



★ ★ ★ ★

NEW HACKSAW FRAME

JUST released by Messrs. J. Stead and Company Limited of Sheffield, this new Steadfast Hacksaw Frame incorporates an entirely new type of amber plastic handle. This handle is claimed to give a better grip, and in conjunction with the adjustable oval tube frame, forms a beautifully balanced tool of very robust manufacture.

The frame is sold complete with a 12in. by 24T Steadfast Regular Tungsten blade, and is fitted into an attractive translucent plastic wallet, in which there is also an additional 12in. by 18T blade. A booklet describing the correct use of a hacksaw is enclosed in the wallet. The retail price is 19/6.



TO meet the growing need from handicraft workers and modellers, the Humber Oil Company Ltd., announce the introduction of a new 2 oz. pack of Plastic Polystyrene Cement which combines quick drying with excellent adhesive properties. The tube costs 1/8.



★ ★ ★ ★

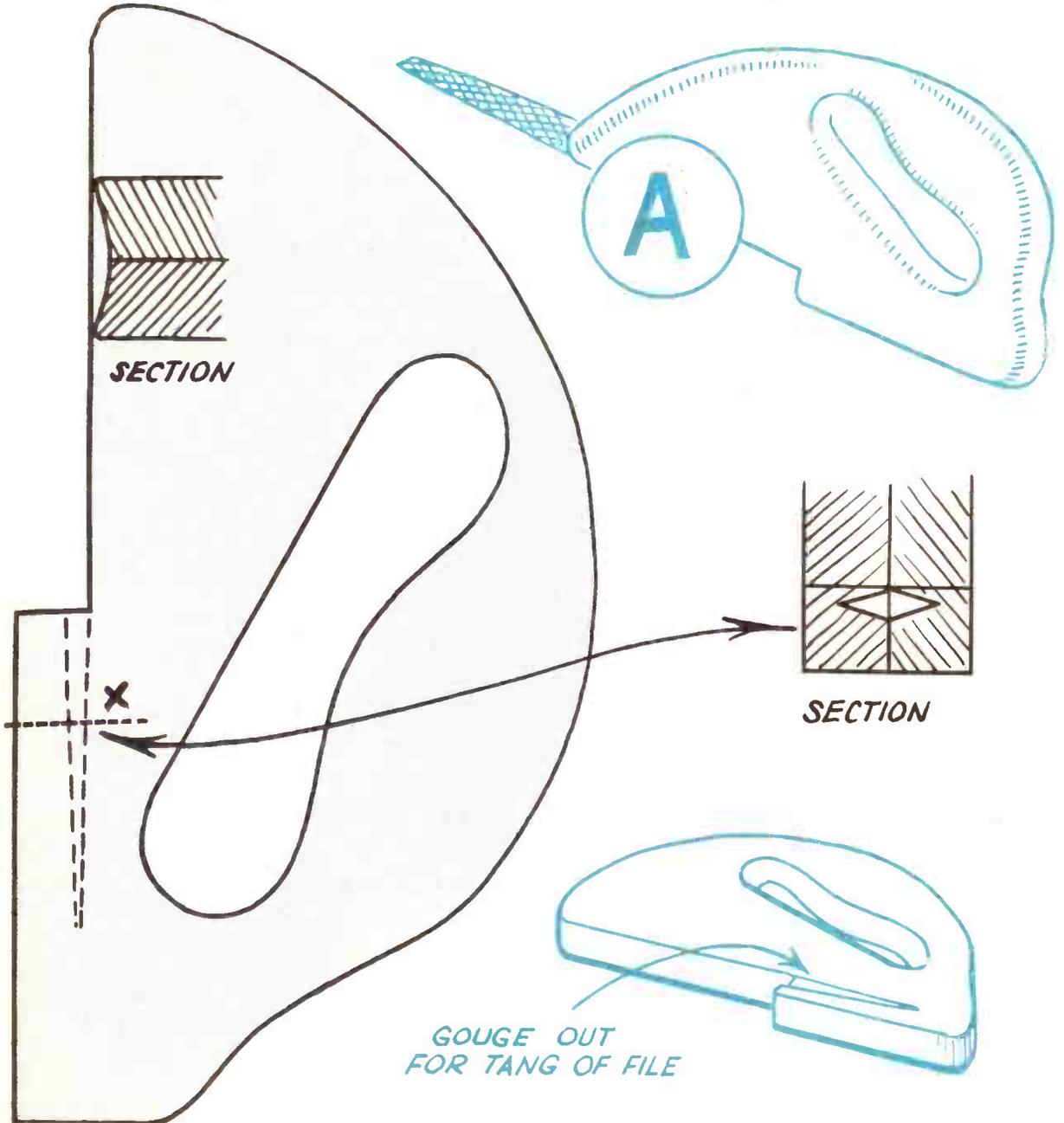
TAPE RECORDING BOOKLET

TWENTY-FIVE ideas for widening the use of tape recorders are contained in a new 12-page booklet issued free by the Minnesota Mining and Manufacturing Company Ltd. of 3M House, Wigmore Street, London, W.1, makers of Scotch Boy magnetic tapes.

A 'snapshots in sound' album for a growing family is one of the suggestions. The booklet explains how to obtain best quality recordings and gives advice on splicing tapes and other aspects of the use of a tape recorder.

★ ★ ★ ★

A QUICK-CHANGE HANDLE



Paddle Your Own Canoe



*... and make
it with the
aid of
full-size
plans from*



BUILDING COSTS FROM ABOUT £7

These plans contain all the information needed to build the canoe and its accessories. The main frames and other shaped parts are drawn full size for tracing direct on to the wood. There are plenty of constructional diagrams, with step-by-step instructions, and a detailed material list. Accessory instructions include the making of paddle, spray cover, trolley, rudder, sailing gear, etc.

All of these canoes are of the decked kayak type and are primarily paddling craft, but sail is useful as an auxiliary and can add to the fun of canoeing. If sailing capabilities are particularly required, PBK 20 is the best selection.

A canvas canoe can be built by the novice with limited equipment, and the average handyman can complete the job in about 40 hours. The structure consists of widely-spaced laths on cross frames, covered with a fabric skin. There are no difficult joints or awkward work. Plywood skinned canoes need more skill and a larger tool kit.

Building costs range from about £7 (for the PBK 10). We do not supply materials for building, but addresses of firms who do so are included with the plans.

DETAILS OF PLANS AVAILABLE

RIGID CANVAS-COVERED

PBK 10. Single seat, 11 ft. long, 28 in. beam, normal max. load 300 lb. The shortest satisfactory canoe. Economical in size and building costs. Room for lightweight kit. Price 11/-

PBK 14. A roomy single for the big man, or a two-seater for an adult and child, or two young people. 14 ft. long, 29 in. beam, normal max. load 500 lb. Popular tourer. Price 12/6

PBK 15. Single seat, 14 ft. 6 in. long, 26 in. beam, normal max. load 400 lb. The enthusiast's fast touring craft. Safe and stable. Suitable for any waters. Price 12/6

PBK 20. Two-seat, 15 ft. long, 32 in. beam, normal max. load 600 lb. Stable and seaworthy. Easily paddled and a good performer under sail. Popular with scouts and youth clubs.

Price 12/6

RIGID PLYWOOD-SKINNED

PBK 16. Two-seater. 16 ft. long, 32 in. beam, normal max. load 700 lb. Flat-bottomed. Safe and robust. Popular for local hire on sea and river. May be left afloat. Price 12/6

FOLDING

PBK 24. Single seat, 11 ft. long, 28 in. beam, normal max. load 300 lb. Similar lines to PBK 10 but longer cockpit. Only canoe which packs into one bag small enough to go on bus.

Price 12/6

From branches or direct (post free)

HOBBIES LTD (Dept 99) Dereham, Norfolk



World Radio History

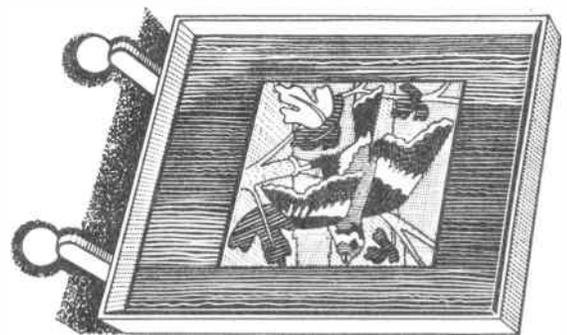
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IT'S DESIGNED FOR THE JOB

The popular general purpose liquid glue, used cold for all making and mending with wood, leather, card, etc. The best glue for sticking laminated plastics. Large tube 1/2, 8 oz. tin 2/10, 16 oz. tin 4/6



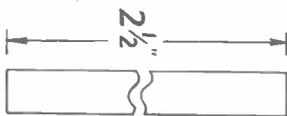
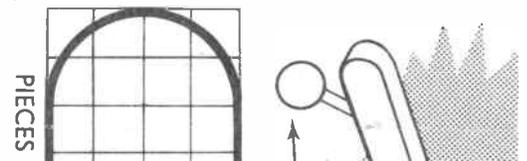
AVAILABLE FROM ALL BRANCHES OF HOBBIES LTD



DETAIL
 SHOWING
 FOOT
 CONSTRUCTION.

PIECES C,
 CUT FOUR
 1/4 in. ROUND ROD.

2 1/2"



DESIGN

No. 3262

MARQUETRY FIRESCREEN

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

SIZE
28 ins. BY 18½ ins.

PIECES B. ENLARGE TO 1/2 in. SQUARES. CUT TWO 3 4 in.



MARQUETRY PANEL. USE OWN CHOICE OF VENEERS.



