

HOBBIES WEEKLY

FEBRUARY 22nd 1956

VOL. 121

NUMBER 3147

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Testing! Testing!

1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 zero

Make this

'MIKE' FROM AN EARPHONE

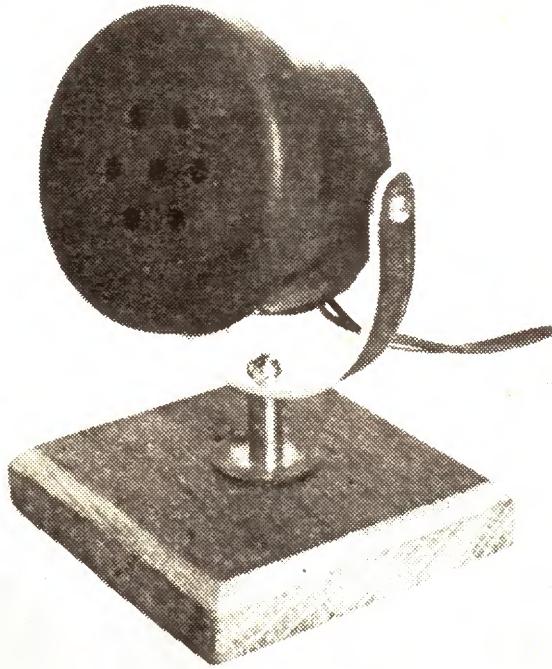
SUITABLY connected, many headphones will act quite well as a microphone, and can be used in a simple telephone circuit, or with a radio set or amplifier. Any earphone to hand can be used. If, however, one is to be purchased, then the balanced-armature type, obtainable from stockists of ex-government supplies, is most suitable for telephone circuits. For reproduction through a radio, the moving-coil type is best, as it gives better quality to musical sounds.

A simple stand for the earphone can be made as shown in Fig. 1. The base is of wood, 2ins. square and $\frac{1}{2}$ in. thick, a long bolt holding the curved strip in place. This strip can be cut from any thin metal, and two $\frac{1}{2}$ in. long bolts (6 or 8 B.A.) are fixed in place as shown. Most earphones have pivot holes with which the headband fitting engaged, and the ends of the bolts clip into these, being kept in place by inward pressure of the curved strip. The points of the

*Described
by our
Radio
Expert
F. G.
Rayer*

bolts may need filing to engage the holes properly.

If the phone cap has very small holes, these should be drilled out to $\frac{1}{2}$ in. diameter, or the whole centre part of the cap should be cut away with a fretsaw. The cap should be unscrewed to do this.



Two flexible leads are taken from the phone terminals. With some phones the fixing screws for these may be inside, only visible when cap and diaphragm are removed. Ordinary twin flex is suitable for these leads. If the free ends are touched momentarily on a small dry

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

*For Modellers, Fretworkers
and Home Craftsmen*

4D

PAGE 305

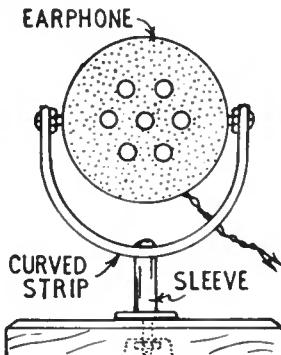


Fig. 1

cell, the phone should click loudly. If it does not, it is defective, or has damaged windings, and cannot be used.

Using the Microphone

Satisfactory results depend very largely on the way the microphone is used, which depends on the purpose in view. Three methods of connecting up are shown in Fig. 2, and the appropriate system must be used.

At (A) a simple telephone circuit is given, and the leads from mike to phones may be of almost any length. For best results, the resistance (or impedance) of microphone and earphones should be similar. If the mike is made from a high-impedance phone (2,000 ohms or so resistance) then high-impedance phones are required for listening. But with a low-impedance mike, low-impedance phones are wanted. If one item is low-impedance, and the other high, volume will be very weak.

Conversation can easily be carried on up to a few hundred yards, with this system, but volume equal to that from a G.P.O. telephone must not be expected. For a 2-way circuit, two microphones and earphones are wanted. Full details of such circuits have appeared in past issues.

It will probably be desired to use the microphone with a radio set, and a high-impedance microphone is connected to the pick-up sockets as at (B). The volume obtained will depend largely on the type of radio set. Connections are exactly the same for an amplifier.

'Howling'

If sound waves from the loudspeaker reach the microphone strongly, howling may commence. To prevent this, the microphone is kept away from the loudspeaker, preferably in another room, or at least at a distance of several feet. Such howling usually begins when the receiver volume control is turned towards maximum, and ceases when the microphone is covered with the palm of the hand.

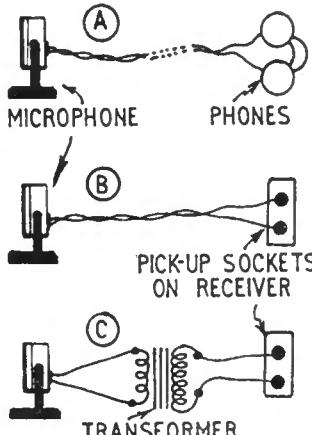


Fig. 2

Another cause of howling, not halted by covering the microphone, arises from coupling between the microphone leads and loudspeaker wiring, or other wiring in the receiver. If this happens, the microphone leads may need moving, and they should not be run near mains connections or other wiring. In bad cases it may be necessary to use screened cable for the microphone connections, the screening being connected to the receiver chassis. If howling does not arise, this is not necessary.

When a moving-coil or other low-impedance phone is used, a transformer

is required, as shown at (C). Its primary is wired to the microphone, and its secondary to the receiver or amplifier. It will usually be best to have the transformer near the receiver, so that the secondary leads are short. It should be of the type designed for the particular kind of phone used.

In all cases the best distance for the speaker or performer can be found by trial. The volume of reproduction will not be so great as when tuning in radio stations, but will generally be sufficient, except with those receivers of a type having very little audio-frequency amplification. Such a microphone was used with a standard tape-recorder, and gave sufficient volume with ease.

PRIZES WORTH £200

Are you aiming to win that voucher for 15 guineas worth of Hobbies goods which is the first of many prizes valued at £200, to be awarded in our 1956 Fretwork Competition? There are open and junior sections and entry is free. All you are required to do is make up Design No. 3124 which is for a novel trump indicator and card box. Full details were published in our Sept. 14th 1955, issue, obtainable from the Editor, price 6d.

CLOSING DATE APRIL 30th

For the Hall

Make a Galleon Lamp

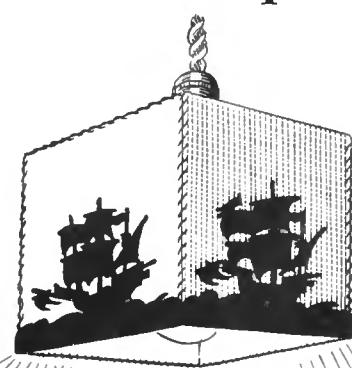
THIS attractive lamp looks most pleasing and distinctive when made up and can be cut out quite easily with a fretsaw.

Cut four of the galleon patterns shown on page 319 and mitre the corners as shown by the sections. Secure them with glue and screws or pins as shown by the small inset diagram. Note that the galleons are cut from $\frac{1}{4}$ in. wood.

See Patterns on
page 319

They should be painted to contrast with existing colours in the hall. Black looks extremely well, and the galleon shows up distinctly whether the light is on or off.

Make up the wire frame as shown in diagram (A). It should just fit inside the box formed by the galleons. Cover it with bias binding and secure it to the wood by means of fretpins bent over in the form of staples. Cover the wire framework with crinolene and bind



with plastic thonging all round as shown in the diagram (B).

If you possess a fretmachine it is possible to save time and cut the four galleons at once. It would be advisable in this case, however, to use $\frac{1}{8}$ in. wood instead of $\frac{1}{4}$ in. Fasten the four pieces together by means of fretpins in the waste wood when cutting. (M.p.)

Have fun in learning with

Simple Science Experiments

In his previous article T.A.T. described simple experiments which can be made at home to determine what causes water pipes to burst. Continuing this theme he shows what takes place in the

Domestic Hot Water Supply and Central Heating

Required:—a flask; some glass tubing; a lamp chimney and a Bunsen burner. If a Bunsen burner is not available you can make quite a good methylated spirits burner from an old tobacco tin filled with cotton wool saturated with methylated spirits (Fig. 9).

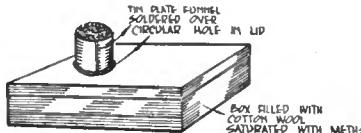


Fig. 9

WHEN water above 4°C . is heated its density is diminished. If only part of the water is heated the difference in density thus produced causes currents to be set up. The action of these convection currents is to carry the warm water away from the point at which it is being heated, whilst its place is taken by colder water from surrounding parts.

Fill the lamp glass, tubes and flask with water after you have arranged them and supported them in some way (Fig. 10). Add a little ink to the water in the lamp glass. Heat the water in the flask and the path of the convection currents set up will be indicated by lines of coloured water.

Make a small paper box with drawing paper as shown (Fig. 11). The flaps may be stuck down with glue.

Suspend this box with thin string and half fill it with water. You will find you can boil this water by holding the box over a Bunsen flame or a methylated spirit burner, while the paper will not be scorched where it is in contact with the water. The water conveys the heat away from the paper as quickly as it is communicated to it.

This experiment also illustrates the great heat capacity of water; that is, the



Fig. 10

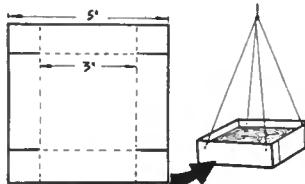


Fig. 11

great amount of heat required to raise the temperature to boiling point and then to change it from water, at the boiling point, into water vapour.

* * *

Model Domestic Hot Water System

FIG. 12 shows a method of making a simple model domestic hot water system. You may like to try to adapt this to fit into a simple model house if you can obtain or make one.

(A) is an empty metal polish tin which acts as the boiler. A small hole is drilled near the bottom of this tin and over this a short piece of copper tubing is soldered. A length of glass tubing (B) is connected to the copper tubing with a short piece of rubber tubing. (C) is a larger tin can which has three short pieces of copper tubing soldered over small holes near the bottom, as shown. (D) is an empty treacle tin with a short piece of copper tubing soldered over a small hole on the base. (A), (C) and (D)

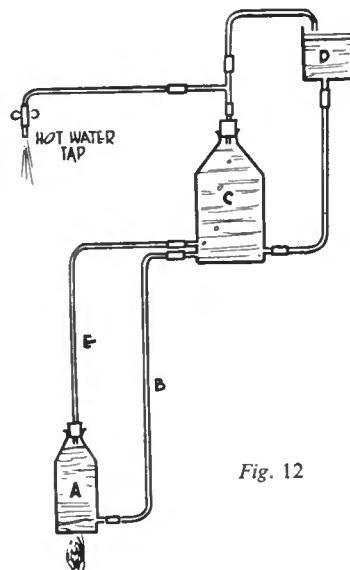


Fig. 12

are connected with glass tubes fixed to the copper tubes with short pieces of rubber tubing and a glass T-tube is fitted through a cork in the neck of (C). This T-tube is connected to other pieces of glass tubing as shown.

The whole apparatus is filled with water by pouring it into the treacle tin (D) which serves as the cold water storage tank, which you usually find at the highest point in the bathroom. Heat the water gently in (A). Small air bubbles will show the path of the hot

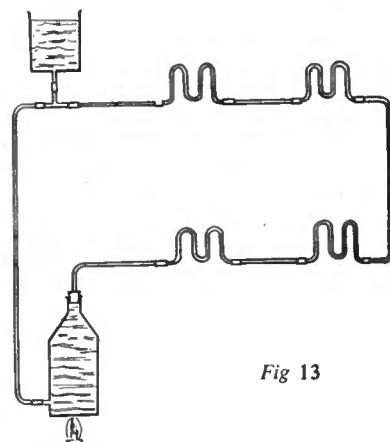


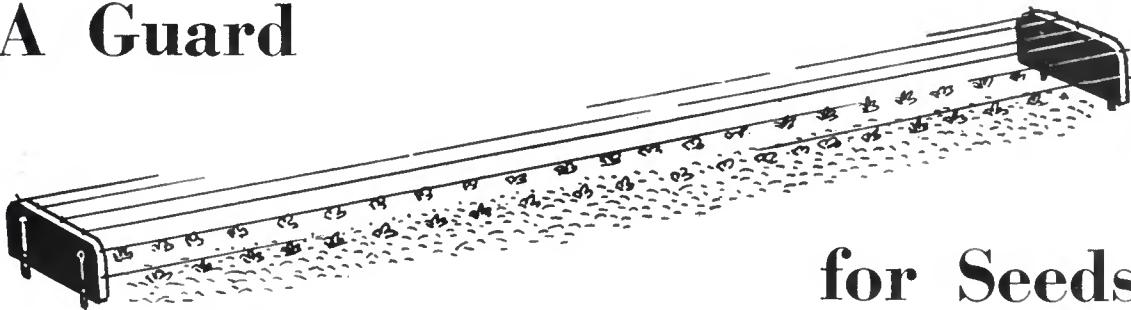
Fig. 13

water up the tube (E) into the can (C). Cold water will descend down the tube (B) and enter at the base of (A). When the upper part of the can (C), which serves as the hot water storage tank, becomes really hot, place a little ink in (D), run off some of the hot water at the tap and watch carefully the path of the coloured water through the 'pipes'. You should learn how cold water is automatically fed into the system when water is run off at the hot taps, and how to prevent water in the hot water storage tank from losing heat.

You can adapt the apparatus used for the last experiment to make a simple central heating system for a model house, as shown in Fig. 13. The radiators consist of pieces of glass tubing heated in a Bunsen flame and bent into shape. The radiators, glass connecting tubes and tin cans are connected with short pieces of rubber tubing.

The apparatus is filled with water by pouring it into the treacle tin and it is gently heated in the boiler. You should note the direction of movement of the water by watching the small air bubbles in the tube.

A Guard



HOW many times have you grumbled about attacks by birds on your seeds or young plants? They can be a nuisance at times, particularly when they strip the leaves off early peas.

The method described here of preventing such depredations has proved entirely successful. It consists of supports put in at each end of the rows and stringing black cotton across from one end to the other. Do not use coloured cotton; only black is effective. The strands need not be closer than 3ins. Even 4ins. will be quite effective.

Use black cotton

The success of this method lies in the fact that the birds cannot see the black cotton. They alight on the rows and touch the cotton with their wings. This seems to scare them sufficiently to keep them off the rows entirely. Try this method and you will never use any other.

Make the end supports from pieces of wood about 12ins. by 6ins. by $\frac{1}{2}$ in. and fix to the back two stakes made from

heavy gauge wire. They should be secured by screws and staples as shown in Figs. 1 and 2. Brass pins are inserted round the edges of the boards at intervals of about 3ins.

For stringing the guards with black cotton, use the method shown in Fig. 3.

for Seeds

Obtain a piece of stripwood about 3ft. by 1in. by $\frac{1}{2}$ in. and fasten a nail in one end. The cotton reel is simply placed on the nail as shown, and after attaching the cotton to one of the supports, it is easy to string it backwards and forwards. (M.h.)

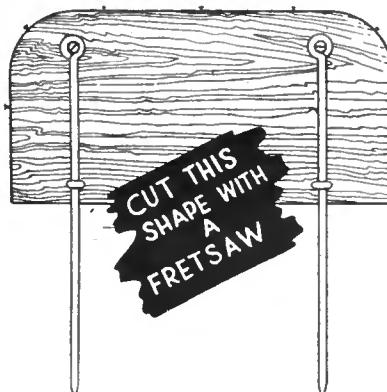


Fig: 1

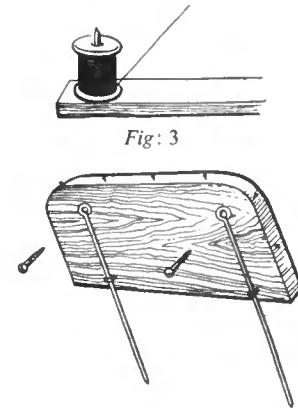


Fig: 2

Fig: 3

Fill in Unwanted Fireplaces

THE old-fashioned fireplaces which are not used usually present a problem. A floral arrangement or firescreen helps to hide the unsightly gap, but fails to stop the draught that invariably comes down the chimney. Filling the space in altogether is more satisfactory, especially if there is alternative ventilation.

Measure the space, and nail together a frame that will fit in exactly and tightly. This frame need only be a rough effort made from odd pieces of wood, as it will not show. Fit the frame into the gap and hammer it into position, about $\frac{1}{2}$ in. back from the surrounding tiles of the fireplace. A wedge of wood will keep the frame quite secure.

Cut a piece of hardboard or three-ply to fit in the fireplace flush with the tiles. Fix this on to the frame with headless nails. Once the foundation is thus laid there are all the exciting possibilities of

decorating the board to enhance the room.

For a nursery fireplace the board can be covered with the wallpaper in the room. This can be decorated with a nursery cut-out to be repeated in a series on the walls.

Behind an electric fire ordinary white cartridge paper treated with linseed oil, which gives a parchment effect, is attractive. Stick the paper to the board. Decorate the paper surrounding the electric fire with flowers, cut from magazine covers. Clear varnish over the whole gives a very pleasing finish.

Anyone with a little artistic ability can decorate the board themselves, but a needlework transfer ironed on to paper and then coloured to match the furnishings is an easy way out for people who cannot draw their own designs.

A piece of embroidery could be stretched across the board, but as this will need washing from time to time it

must not be permanently fixed. If these ideas will not blend with the rest of the decoration, use wallpaper. If one wall is picked out in a striking modern design, repeat it in the fireplace. The decoration of the board gives rise to endless ideas, which must be personal to be pleasing.

The finishing of the edges needs attention when the board is complete. A fine wooden picture frame if one can be found to fit the fireplace exactly, adds great distinction to the finished appearance. Beading is the simple solution, however. Narrow $\frac{1}{2}$ in. beading for a tiny bedroom fireplace, or the patterned 1in. variety for larger ones. This needs to be mitred at the corners, and cut to fit exactly over the join of board and fireplace. If the ends of the tiles are curved and there is a gap between tile and board, fill it up with tile cement. Then the beading will adhere to an even surface. (P.T.)

Recipes for the Winter

THE home chemist can do a good deal towards easing the family's way through the rigours of winter. There is no suggestion you turn out vitamin concentrates and cough mixtures, however! Yet there can be made simple preparations to keep the skin unchapped and smooth, anti-rusting compounds for the workshop, tools, anti-freeze for the car radiator, pastilles to burn to help keep the winter germs at bay, or products to proof footwear against the winter slush. For your own department, this article also gives details of cheap freezing mixtures using snow or ice for experiments where low temperatures are essential to success, such as with diazo-compounds.

Hand Conditioners

For keeping the hands smooth and free of chaps we have four types of product—solids, creams, jellies and liquids.

Camphor ice is an old fashioned and still popular example of the solid type, and there are no difficulties in its preparation. You will need 4 parts white petroleum jelly, $2\frac{1}{2}$ parts paraffin wax and 1 part camphor—all parts by weight. Melt the petroleum jelly and wax in a water-bath. When the mixture is clear remove it from the bath and allow it to cool a good deal but not enough to set (if it does begin to set, warm it up somewhat).

It is at this point that the camphor must be stirred in. The camphor must be powdered and the easiest way to do this is first to cut it up fairly small when you put it into the mortar and then to sprinkle it with a few drops of eau de Cologne. It will now grind down easily. This way you kill two birds with one stone, for you incorporate perfume as you powder.

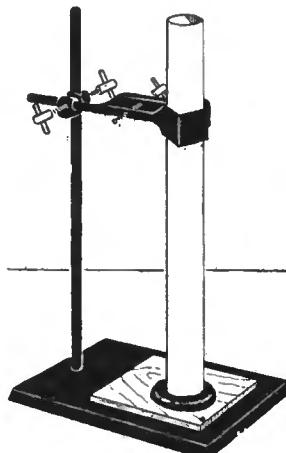
After the addition of the camphor keep on stirring the cooling mixture until it shows signs of setting. Pour it into a cylindrical mould and allow it to become cold. The sticks can be wrapped to half their length with metal foil and then given an outer wrapping of cellophane.

A suitable mould can be made from a clean aluminium tube of about $1\frac{1}{4}$ ins. internal diameter. Its length depends on the number of sticks you wish to make at a time. For a single stick let it be $3\frac{1}{2}$ ins. long. If you intend turning camphor ice out in quantity, the tube can be 1 ft. or more long. Press the lower end of the tube into a disc of modelling clay on a board and clamp upright as shown in the diagram. To remove the camphor ice, pull away the

mould from the clay, insert a length of clean broom stale and push out a little of the camphor ice. Pare away and reject any soiled by the clay and then push out the remainder, cutting into suitable lengths as you go in the case of the long mould. If the camphor ice sticks in places, warm the outside of the mould slightly by passing it rapidly through a flame.

Hand Cream

For a good hand cream, bring to a temperature of 95 degrees Centigrade (about 205 degrees Fahrenheit) in a water-bath, 15 grams white wax (bleached beeswax), 45 c.c. medicinal liquid paraffin, 12 grams anhydrous lanoline and 15 grams spermaceti.



Camphor ice mould

Also bring to the same temperature a solution of 1·25 grams borax and 0·5 gram sodium benzoate in 25 c.c. water. With rapid stirring slowly add this solution to the hot mixture in the water-bath. Remove from the bath when the whole whitens and continue stirring until it cools to thickening point. Add perfume and continue stirring until tepid. It should then be left to itself overnight, stirred and packed into jars.

Hand jellies leave no stickiness, but their action is not so immediate as with solids or creams. An easily-made example contains 2·34 grams boric acid, 2·34 grams glycerine, 94 c.c. water and 1·6 grams gum tragacanth. Warm the water and dissolve in it the boric acid and glycerine. Allow it to become cold and then stir in the gum tragacanth. Leave the mixture overnight, so that the

gum may swell. If any lumpiness can be seen in the mixture, the gum has not completely swollen and it may be completed by warming in a water-bath. Stir in perfume when cold and pack into jars.

Pharmacists still sell large quantities of glycerine for use as a liquid hand conditioner, despite the unpleasant stickiness it leaves on the skin. By diluting it with two or three volumes of water before use, this stickiness is eliminated and a cheap efficient hand conditioner results. In fact, this is the principle behind the also popular 'Glycerine and Rose Water'. The only difference between the two is the perfume, though sometimes boric acid is also incorporated. To make the fully developed product, mix 33 c.c. of glycerine with 66 c.c. rose water and dissolve in it 1 gram boric acid.

Anti-rusting Compound

To protect tools during the winter damp, a mixture of lanolin and solvent naphtha is convenient. Warm 2 fluid ounces of solvent naphtha in a water-bath which has just boiled and the flame been extinguished (solvent naphtha is inflammable) and dissolve in this 1 ounce of anhydrous lanolin. Remove the vessel from the bath and let it cool somewhat. Pour out into a warmed screw-top jar and allow it to grow cold. This is simply wiped on to the metal, so as to give a thin coating. It is easily removed with a dry cloth when the tool is required for use.

Anti-freeze

A simple anti-freeze liquid for car radiators is made by mixing 1 volume technical grade glycerine with 3 volumes water. It is used neat and will stand 22 degrees of frost without freezing. It is also non-corrosive to the metal.

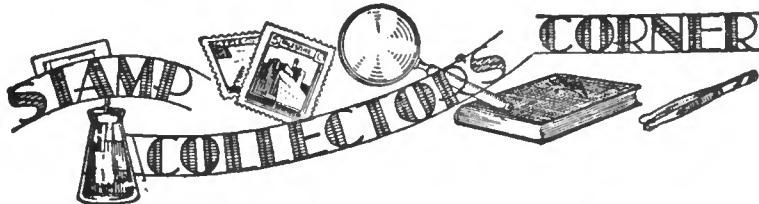
Germ-killing Pastilles

Fumigating pastilles which burn with a pleasantly mysterious Oriental fragrance are useful to kill off germs when colds are rife. Simply light one on a tin lid and it will smoulder for a considerable time, giving off disinfectant fumes. You will need first, 62 grams charcoal, 17 grams cascara bark, 15 grams gum benzoin, 6 grams potassium nitrate, all in fine powder. Mix them thoroughly by rolling them about on a big sheet of paper.

10 c.c. of either oil of sandalwood or oil of cassia is then sprayed evenly over the spread-out mixture. It now only remains to form these into small cones

● **continued on page 316**

CORNER



QUITE a large number of people are restricting their collecting to the issues of Queen Elizabeth's reign, and they certainly have a very interesting number of stamps at their disposal.

For one thing the designs of stamps are getting far more interesting than they were years ago. Looking at a catalogue of the stamps of Great Britain and her Colonies one cannot help being struck by the sameness in the designs of the various colonies. There was the 'key and duty' plate and in this the design of the stamp was printed at one operation and then the name of the colony and the value was printed at a second operation, so that it was only necessary to change the title of the country to make the stamp available for one of many areas.

Twelve from Nigeria

Now, however, we are having picturesque stamps which must come from one area only, as the scene can only indicate one place. Seychelles, St. Helena, and Nigeria for example; all had very similar stamps for the early ones, but now look at the difference. Nigeria has twelve different designs for the Queen set, large stamps all showing something interesting about the region. Nigeria has thirteen stamps valued from ½d. to £1, and they are all different and equally interesting. Seychelles has five designs on fifteen stamps.

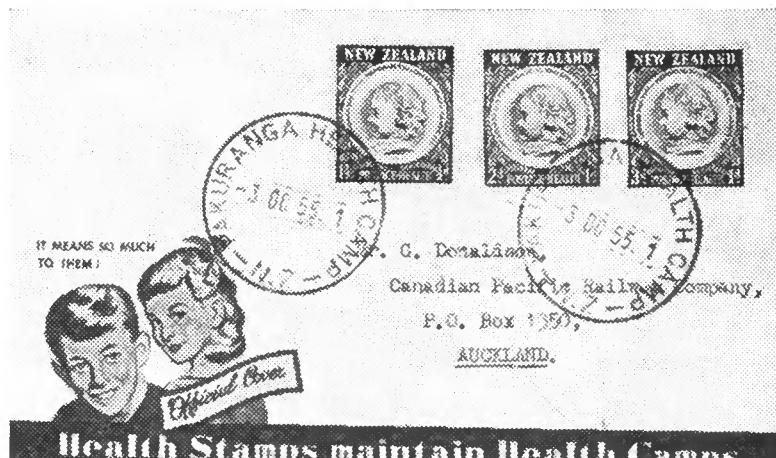
Before we pass on to the latest of the issues there are one or two changes from

Queen Elizabeth there were eight designs used, two of them being well worthy of mention—the ½d. and 6d., also the 1/- and 2/6. The former shows a native up a tree tapping for palm wine. It is the way in which the native has fastened himself to the tree so as to leave

INTERESTING CHANGES By L. P. Veale

there is a reader who does not know the castles that have been shown, they are:—2/6, Carrickfergus Castle, Northern Ireland; 5/-, Caernarvon Castle, Wales; 10/-, Edinburgh Castle and £1, Windsor Castle. That brings three more famous British scenes on to the stamps.

Now Australia has just honoured the



Health Stamps maintain Health Camps

Mr Donaldson's first day cover

both hands free that is interesting. The other design is that of a woman hoeing. The tool, instrument or weapon, call it what you will, certainly seems rather large and clumsy for the job.

The Queen stamps for Gibraltar have

nursing profession with a stamp. On it there is a picture of an Australian nurse and behind her there is Florence Nightingale—the Lady of the Lamp. At the bottom of the stamp there are the words 'A Tradition of Service'. Aus-



Pakistan Jute
Mill

Australia and
the Y.M.C.A.

Rhodesia and
'Livingstone'

Nyasaland and
'Stanley'

the stamps of the previous reign that should be noted. Gambia, although having a change from the key type for the stamps of King George VI, yet one design did duty for all the values. But with the set that was issued for H.M.

introduced a variety from the 'Rock'. On one there is a picture of tunny fishing and another has the coaling wharf.

Let us now discuss some of the latest issues. First we should mention the latest of the British stamps. Just in case

Australia also gives us a new form of world map to commemorate the centenary of the Y.M.C.A. Have a look at this illustration and compare it with the world map shown on the Canadian stamp of

● Continued on page 311

Make this novelty

The Bombardment Game

THIS is an exciting game which will give many hours of pleasure to people of all ages. Any number can take part, but it is not advisable to have too many, as only one person can operate the board at a time. When a large number take part there is a long wait between each turn, and this may become rather monotonous.

The game consists of a circular board with a series of numbered compartments round the outer edge. A number of marbles are placed in certain positions near the centre and a spinning teetotum dropped among them. This will cause them to scatter in all directions and many will come to rest in the compartments while some may remain in the unnumbered centre portion. Add up the score, replace the marbles in the centre and let the next person have a go.

There have been many versions of this old game and under different names such as 'Cannonade' or 'Castle Bagatelle'. In this last named game the compartments were in the form of castles into which the marbles are shot.

By A. F. Taylor

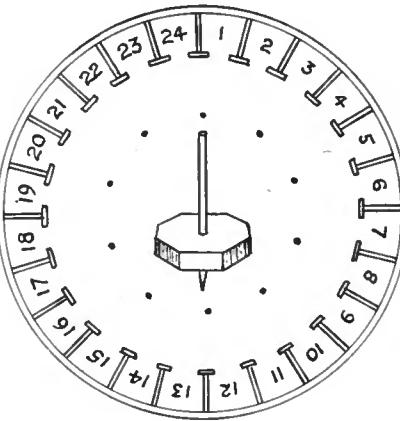
Make the baseboard quite substantial, and for this plywood not less than $\frac{1}{4}$ in. thick should be used. Cut a piece 12 ins. diameter and make it quite smooth with fine glasspaper, so that the marbles will roll easily at the slightest touch.

For the guard rim round the board thin plywood is used, but if you find this difficult to bend you can use cardboard or strawboard instead. The rim does not need to be more than 1 in. above the baseboard and allowing for the thickness of the base a strip $\frac{1}{4}$ ins. wide will be ample. You will need about 38 ins. to go round once, but if you use card it is better to have three thicknesses glued together. A few fine panel pins can be used with advantage to help strengthen the assembly.

24 Equal parts

Divide the perimeter of the board into twenty-four equal parts which will be slightly over $1\frac{1}{2}$ ins. apart. Cut the partitions, twenty-four in number, 1 in. long, 1 in. wide and $\frac{1}{8}$ in. thick, and glue firmly in position. In front of each piece and at right angles to it is a similar piece of wood but only about $\frac{1}{8}$ in. long.

Before cutting and fixing these you should examine the marbles to see their actual size. The opening between each partition should just allow the marble to enter easily.



The numbering as shown in the diagram is from 1 to 24, but you can adopt any other system such as from 5 to 100 at intervals of 5, and the remaining four spaces 250, 500, 750 and 1000. It is a good plan to write the numbers neatly with Indian ink on paper and then stick them in the partitions.

Dots should be painted on the centre portion where the marbles are to be placed, so that every one starts off with the same advantage. You can decide for

●Continued from page 310

Queen Elizabeth Stamps

1898. Look also at the New Zealand map of 1923 and the Irish map of 1922. What a difference there is in these, showing that as knowledge progresses so must the design on the stamp progress. Maps make a delightful subject for a thematic collection and this makes a valuable addition.

It is not so very long ago that one thought of India and Pakistan purely as agricultural countries, yet India sent us stamps showing a caterpillar tractor, a mill-hand at work and a weir capable of producing many millions of units of power. Now Pakistan has issued four stamps. The 2½ annas shows a paper mill, the 6 annas a textile mill, the 8 annas a jute mill and the 12 annas the Sui gas works.

I wonder how many readers find that when they look at one stamp it makes them think of another stamp issued from quite a different portion of the globe. For instance that from Rhodesia and Nyasaland showing a portrait of Livingstone. How about the issue from the Belgian Congo showing the portrait of Stanley?

yourself how many to use but ten is a good number and these may be arranged in a circle a little distance from the centre to allow the teetotum room to spin before scattering the marbles.

The teetotum is a six- or eight-sided piece of wood about 1 in. across and $\frac{1}{8}$ in. thick. In the centre drill a $\frac{1}{8}$ in. hole perfectly upright and glue in a pointed dowel. Keep the block rather low, so that it can strike the marbles easily, but not too low to prevent it spinning properly.

You will soon devise different ways of playing the game, one way being to use all the marbles and let each person have a turn, then total up, the one scoring most being the winner. Another method is to use coloured marbles—say, four people have three of a different colour each which are placed in position and the teetotum spun. Each person spins the teetotum in turn and the score is added up at the end of each round.

Instead of having numbers the compartments can be painted in the same four colours as your marbles. Getting a marble into your colour compartment scores a point, but any other colour scores a point to the owner of that colour. You can also have both colours and numbers, so that both versions of the game can be played.

For those who are mathematically minded Greece has just brought out a set of stamps that should be of great interest. It was in connection with the Pythagorean Congress. The 3d. 50 stamp shows a small right-angled triangle in the centre and on each side there are squares—nine on the shortest side, sixteen on the next and twenty-five on the largest. Nine plus sixteen equals twenty-five; in other words the sum of the squares on the shortest sides is equal to the squares on the hypotenuse.

Once again we have to thank Mr. Donaldson for sending along the Health Stamps from New Zealand. For many years we have been able to illustrate these issues early because of his kindness. This year there are three stamps—the 1½d. postage with a premium of 1d. for the cause, the 2d. and 3d. bearing a premium of 1d. each. Mr. Donaldson sends a first day cover from the Pakuranga Health Camp. This has the three stamps, and notice how beautifully they have been cancelled, only the corner of the stamp marked, and the date perfectly clear.

Tips for photographers

A Camera at the Zoo

MOST people enjoy a visit to the zoo, and it's a fine place to take your camera on a big-and-small game hunting foray—in safety. The following tips may help you to avoid a few snags that do crop up in zoo photography.

(1) Concentrate on the subject matter. Although it may well be obvious that your snaps were taken in a zoo, remember that it is the animal you are photographing—and not a mass of thick cage bars. The larger and dangerous animals kept behind heavy bars do not, in general, make good subjects—

animals in chest-high, wired enclosures—such as pelicans and other large birds, some of the small rodents, etc. A good plan here is to choose a viewpoint which allows you to tilt the camera downwards towards the subject—thus cutting off the top line of the wire where it would otherwise form a distracting eye-catching line in the final print. This is clear from illustration No. 1: if the camera had been held at normal level, the thick metal posts and wire in the background would have formed a hard line against the sky. By tilting the camera slightly the sky and distant tree-

(3) Focusing. Must be as accurate as possible. If the animal is one of the quick repeatedly moving ones, the only way to focus is to choose one spot in the enclosure, focus on it—and wait patiently until the animal reaches it. With the larger and more sedate animals, or with pelicans or penguins for example, you will have time to focus accurately.

Focus on the eyes

A good point to focus upon in these cases is on the eyes. Again, remembering the first and most important rule—to concentrate on the subject matter—don't hesitate to use as large an aperture as possible consistent with your shutter speed, in order to throw the immediate background out of focus behind the animal. This dodge of differential focusing is useful in two ways here. It makes the subject stand forth sharply against a blurred background—and it also avoids a background being an eye-catching distraction in the print.

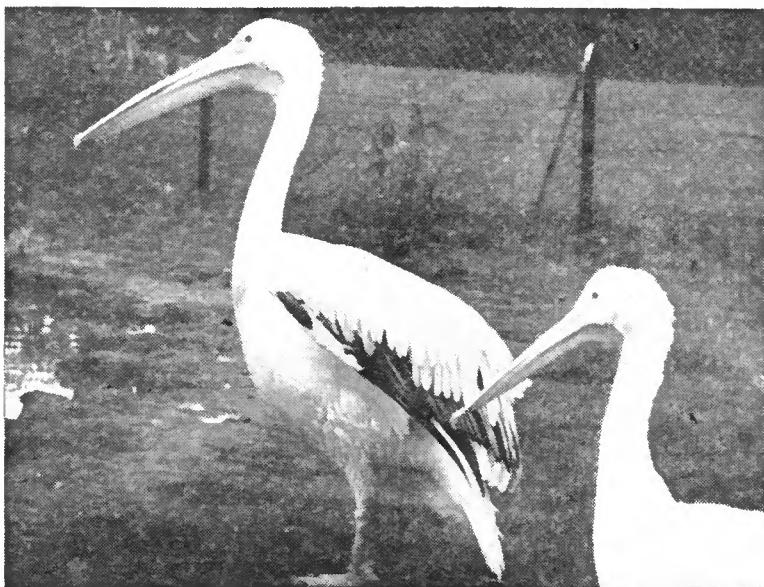


Fig. 1. By tilting camera down slightly, the wire mesh behind merges with the dark, low, level background

unless you find them in the open, such as in a lion pit, or polar bear swimming pit. And if they are out of doors, and you can view them clearly without heavy bars intervening, it is useful to have a telephoto lens, as these pits are often quite large—and you are well away from the animals which means they form only a small image on your negative frame. If you haven't got a telephoto or long focus lens, then the only thing is to choose a spot which brings you as near to the animal as possible.

Sometimes, although it is possible to avoid having bars or heavy wire mesh directly in front of the camera, it is not possible to avoid having it forming some part of the picture. This is often the case with the smaller and non-dangerous

tops were cut out, and the wire almost becomes unnoticed against the dark, low, level background.

On the spot decision

Each case has to be decided by you on the spot—but you will not go far wrong in any zoo snaps if you remember to concentrate on getting as much of the animal on your negative frame as possible, and getting as little of everything else as possible.

(2) Lighting. A good diffused sunlight is preferable to strong unclouded sunlight which causes harsh shadows and too great a contrast in the lighter-coloured or feathered animals. Diffused side-lighting is generally the most useful; back lighting is seldom of use here unless you wish to show sheer bulb silhouettes against the light.

(4) Wire-netting. With many of the smaller animals, birds for example, visitors are allowed right up to the wire. In these cases you can safely hold the camera right up to the wire with no fear that the mesh will spoil your negative—it will be too close and too much out of focus, and too small in bulk, to cause even a blur, provided you do hold the camera with the lens almost touching the mesh.

Pre-focusing

(5) Water subjects. Remember that the heavy hippos and polar bears move rapidly in the water. You will probably find a pre-focused setting best, waiting until the animal reaches the point focused upon. Remember, too, that by tilting the camera downwards slightly you may be able to avoid the artificial rocks, etc., or heavy bars forming a background to the pool.

(6) Reptiles. Although these are often immobile for long periods, remember that the artificial lighting in their glass cases will call for a longer exposure time than out-of-doors. Watch out, too, for reflections on the glass itself. Here, and in the insect house, it is useful to use a supplementary lens, or extension tubes if your camera has a detachable lens, which enable you to focus right down even as close as 9ins. or 10ins.



Pre-focus is best for Hippo in the water . . . try to catch him as he surfaces.

Remember, however, that at these close distances, focusing must be extremely accurate and depth of field is very small indeed.

Points to remember

Although stress has been laid on accuracy of focusing and filling the negative frame with as large an image of the animal as possible, the user of the simple type of box or folding camera need not hesitate to try his hand at zoo photographs—provided he remembers that his camera may have only two focusing positions for the lens, marked for example, 'Groups' and 'Views' (or 'Close-up' and 'Distant').

In general the nearer focusing position here gives sharpness of objects at between 6ft. to 9ft., the 'view' position giving overall sharpness from 9ft. or 10ft. to infinity. It is wise to check this by reference to the instruction leaflet of your particular camera, or ask a dealer if you have no instructions.

The Art of French Polishing

By B. Lomas

FRENCH polishing gives a note of sleek elegance to the work of the amateur woodworker. Professionally, it is mainly used to finish high-class furniture and cabinet work. However, with a little patience and practice the amateur can become proficient.

The tools needed are both simple and cheap. The polish itself, a mixture of shellac in methylated spirit, can be bought at any dealers. Besides the polish the following items are needed: a few ounces of plaster of paris; a small bottle of raw linseed oil, and a bottle of methylated spirits. The main item is, however, the 'rubber'. This is quite simply a wad of cotton wool enclosed in a piece of fine linen or calico.

Before the polish can be applied, the surface of the wood must be prepared. Firstly, smooth the wood with a fine-grained glasspaper. Then the pores of the wood must be filled with Plaster of Paris. This is to give a smooth, level foundation for the polish.

The plaster is applied with a piece of clean damp rag. The rag is dipped into the powder, and then worked firmly across the grain of the wood. The whole surface is filled in this way.

When the filler is hard, again use a fine glasspaper on the surface. Now, it is ready either for stain or the polish. If a stain has to be used, apply it smoothly, and when dry, rub over with glasspaper. It is imperative that when glasspaper is used, all traces of dust are removed.

To prepare the wood for the polish, place it firmly on the bench. Now,

using a piece of cloth soaked in linseed oil, work the surface thoroughly. When finished, rub all the oil from the surface, using a clean fluffless rag. The surface is now ready for polishing, so great care must be taken not to mark it.

Next, charge the rubber. To do this: soak the cotton wool with polish, so that on being worked over the wood, the polish is squeezed through the wrapper. Starting work in the top left-hand corner, work the pad lightly over the wood. The whole surface should be treated in this manner, broad circular sweeps being used. While this preliminary coat is drying, the rubber may be kept in perfect condition by storage in an airtight tin.

When the polish is hard, smooth it down with a fine-grained glasspaper. Again great care should be taken in removing all the dust. Now is the time for the 'bodying-in'.

Charge the rubber with polish, and add a drop of raw linseed oil to the bottom, and apply as before. Use broad circular sweeps, and avoid putting too much pressure on the rubber, or too much polish will be squeezed through. This 'bodying-in' process should be repeated until you have a surface that you consider satisfactory.

To finish, charge the rubber with equal proportions of polish and methylated spirits. Taking every care not to have the rubber too wet, run over the

whole surface, using horizontal strokes. To test if the rubber is correct, it should be applied to the back of the hand. A correct rubber always feels damp, never wet.

If the result seems smeary, there was too much oil on the rubber. To rectify, a completely new rubber must be made. Charge this with methylated spirits, and move it over the complete surface, using horizontal strokes.

Now the work is finished. The wood, when dry, will have a hard brilliant finish. However, a few words of advice. Take care to use fluffless rags at every stage of the operation. Carry out each piece of work thoroughly. Do not put too much polish on the rubber, and never allow the surface to become tacky. If possible, do your french polishing in a room free from dust.

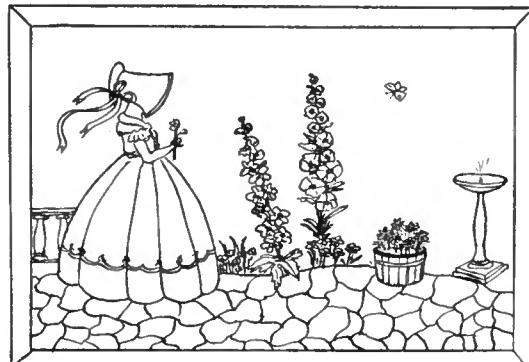
Bearing these facts in mind, you will greatly enhance the beauty and value of your work.

RE-SHARPENED FILES

We have had the opportunity of testing files offered by the Phoenix File Co., 22 East Union St., Manchester, 16, and these have proved eminently suitable for jobs undertaken by the modelmaker or handyman, etc. By a special acid process, these files have been sharpened to perform like new, and at 12/6 for an assortment of 12 sizes, they would appear to be a good buy for the worker who has need for a variety of cutting edges and shapes—at a reasonable outlay.

A type of marquetry

PAPER MOSAIC WORK



MARQUETRY is one of those old crafts which is now enjoying a phase of extreme popularity. Pictures made by inlaying different coloured papers instead of wood, however, is not so well known, although it may probably be just as old.

The art of marquetry was practised by the ancient Egyptians and Chinese, who were experts at piecing together some very intricate designs.

Some really remarkable works of art have been executed in wood marquetry, but there is even more scope when paper is used. There is such a wide range of colours and different textures that it is possible to carry out almost any scheme.

The British Museum has a large and valuable collection of exquisite flower pictures made with coloured paper by an old lady almost 200 years ago. Today with a much wider range of material to choose from, it should be easier to piece together and make up designs.

Make a start by collecting all the coloured paper you can; the types of picture which you intend to make will determine to some extent the shades you need. Besides the various colours you can obtain different effects with the texture of the paper, such as glossy or matt and smooth or rough in different forms.

Use of crepe paper

The light and shade of crepe paper can very well depict the ripples in water or the furrows of a ploughed field. Shaded paper is well suited for flowers where the petals are deeper towards the centre. Many other effects will occur to you as you progress with the work.

A wallpaper pattern book if you can get one from a friendly decorator will give you a wealth of useful material. Even the gay colours of some postage stamps are very useful at times for a tiny item of detail. Assortments of

*Described by
A. F. Taylor*

coloured paper either plain or gummed are made up for craft work, or separate sheets of a colour may be obtained. Poster paper or tinted water colour or pastel paper, too, are very useful.

A sharp pair of scissors with fine points is the only tool really necessary, but some people may find a razor blade or set of knives with different shaped blades a great help in cutting out certain intricate shapes. To complete the simple kit for making paper pictures a brush or two and a pot of adhesive are needed.

It must be left to your judgment to choose the gum, paste or glue best suited for your requirements. Different papers may need a different adhesive to obtain a perfect join, but a few trials will soon show what is best to use.

The background or foundation on which to build your picture is important—it should be substantial in proportion to the size of the picture and of a colour to tone with the subject, or set it off to the best advantage. For flowers black is excellent for setting off their beauty, but some may be equally attractive in a delicate pastel shade.

Care with background

It is advisable to give careful thought to the background, as all the pictures are built up on this, and it cannot be altered once you have started. After spending very many hours on an intricate design it would be a great pity to find that you did not like the background. Of course, you cannot always tell what the effect will be until the job is well advanced, but you generally have quite a good mental picture and can work accordingly.

Having decided on your picture and got the background set, it is a good idea to very lightly pencil the outline or at least a few guidelines on which to work.

There are several techniques which may be used in building up the picture, or you can combine the different methods. Inlaying every piece of paper similar to wood marquetry needs a certain amount of skill in cutting and fitting them together, and gives a somewhat flat effect. An easier method is to build up from the background by sticking one piece on top of another, giving

it a third dimension, and when done, carefully, this is very attractive. It is advisable, however, not to add too many thicknesses, and it shows a more skilful picture when it is kept reasonably flat.

Extra effect can sometimes be obtained by painting in certain parts, and while this is not true paper marquetry, it is permissible if not overdone.

Practically any type of picture may be executed by this medium and the illustration is an excellent example of making a charming picture. Do not attempt anything too ambitious to start with: it is much better to try a simple design and to do it well.

Some people have introduced coloured foils and even butterfly wings into their pictures with quite good effects, but there we are encroaching on another craft which cannot be classed as paper mosaics or marquetry.

Mounting the finished picture can be done in several ways, and for small work ordinary passe-partout is quite good, while a wood frame is more suitable for larger pictures. You need not confine your attempt to framing. It can be equally attractive made into a tray with a glass or plastic covering or a firescreen.

Repairing a Slated Roof

SPLITTING slates usually arise from the use of poor quality nails, and high winds will lift slates without dislodging the nails, thus causing the slates to crack.

To make an effective repair, all the loose or cracked slates must first be removed, and two courses of sound slates above the defective area.

The original number of slates of equal size must then be made up, and working upwards from the bottom, each slate must be nailed with the exception of one. This one must be secured firmly with a lead or copper clip which should be turned under the head of the slate below and over the tail of the nearest last slate. Alternatively, it can be nailed to the nearest batten. If head nailing is used, all the replaced slates in the highest course must be secured with clips.

When patching will not render the slated roof watertight, and reslating is not possible at the time, a remedy of a purely temporary nature is to completely cover the roof with a fairly weak mix of cement slurry, working it well into the interstices. This must not be expected to last long, however, as slurry eventually cracks.

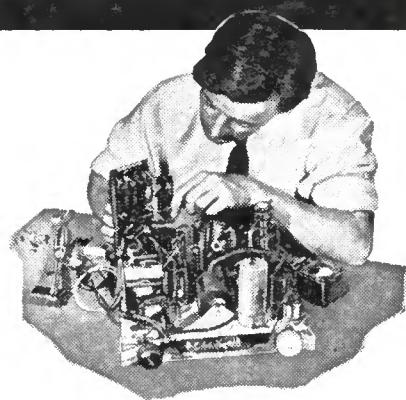
(E.M.B.)

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Replies to Readers

Is this YOUR Problem?

Gold Edging on Card

CAN you tell me a method for placing gold or fancy edging on card or paper? (D.C.—Port Talbot.)

GOLD edges can be applied to cards and the like, by first printing or painting on by hand, the desired design, using a fine gold-size solution. Directly this becomes tacky, sprinkle gold dust over the design; it will adhere to the tacky gold-size, but not elsewhere. Remove all surplus gold dust by shaking or blowing it off, into a clean box or the like, so that it can be used again. Gold-size and gold dust, or gold paint in the dry powder state, can be obtained from most good oil and colour shops. Raised or embossed designs can only be at-

tained by the use of a suitable press and the appropriate moulds or press tools; these are generally expensive and are made to order by specialist firms. There is also a method known in the printing trade as 'cut and crush', but this requires the proper machines, press tools, and knowledge of the craft.

* * *

Laying Terrazzo

COULD you please give me details of the mixing and laying of Terrazzo? I am contemplating renewing a small front door-step in same, and would like to know how to obtain the various colours, etc. (J.S.—Liverpool.)

THE pavement is composed of cubes or chips of marble, embedded in Portland cement. The surface on which it is laid must be rendered quite flat beforehand. The design of border is made first, and the centre filled up afterwards. When the cement is set hard, a slab of gritstone, with sand and water, is worked over the surface to level it off. When level, the sand is omitted, the slab covered with coarse flannel and the

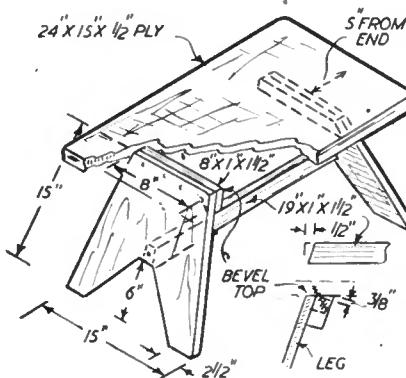


TABLE IN PLYWOOD

THE easy-to-make ply table shown with its dimensions, features $\frac{1}{4}$ in. thick ply top and legs cut from $\frac{1}{4}$ in. thick ply. The legs taper from 15ins. at base to 8ins. at top. The top brace (8ins. by 1in. by $\frac{1}{2}$ ins.) is chamfered off $\frac{1}{4}$ in. before screwing and gluing in place. Then bevel off ply edge of the legs to match. The 19ins. rail is trimmed with $\frac{1}{4}$ in. bevel on each end.

Assemble the two legs on the rail with screws and glue, and then fit to underside of ply top, drilling and screwing upwards through top braces. The top of the legs is positioned 5ins. from each end of the top. When the construction has been thoroughly glasspapered it may be finished as desired. (R.H.W.)

rubbing continued, using putty powder, until a polished surface is effected.

Enclosing a Bath

FOLLOWING the publication of a reply to a reader W.H., of Scarborough, on enclosing a bath, we have received the following information from the Fibre Building Board Development Organisation Ltd, which we are pleased to pass on to other readers.

TO box a round end bath, first prepare a suitable wood framework of 2×1 " battens. Fix these securely to the floor and walls at each end of the bath with uprights at the ends and at intervals of about 12 inches on the long side and on the round end. Keep the whole framework back about $\frac{1}{4}$ in. from the outer edge of the bath.

Thoroughly damp the reverse side of the hardboard with water as recommended by the manufacturers, as this will permit it to bend readily. Commence securing the hardboard where the rounded end of the bath meets the wall and work round the curve, fixing to uprights and finishing to an upright placed to coincide with the end of the length of the board. An 8 feet length will provide sufficient to cover the round end and full length of the bath.

Remember to use non-rusting screws or pins to fix the hardboard, otherwise the painted work will be disfigured after a time with rust stains.

● Continued from page 309

Winter Chemistry Recipes

about 1in. high and $\frac{1}{4}$ in. wide at the base. For this you will need a binding medium, and this you can make by allowing 1 gram gum tragacanth to swell in 100 c.c. water. If any lumps remain after standing overnight and stirring, warm the gum mixture in a water-bath. Mix enough of this mucilage with the pastille powder to give a very stiff paste, mould this into cones between the fingers and set them on a board to dry in a warm room. Do not attempt to hasten the drying by putting them in the oven or on the oven top, for slow-drying is essential.

Leather Waterproofer

To make a waterproofing product for your footwear, melt together in a water-bath 1 ounce paraffin wax, 1 ounce yellow petroleum jelly and 2 ounces lanolin. The mixture should be made and kept in a small press-lid tin, for it sets on cooling and the tin will need warming when the product is used. The tin should feel comfortably warm to the hand. If it is too hot to hold, let it cool until you can just hold it without discomfort. Rub it plentifully into the

soles and lightly into the lower part of the uppers.

Freezing Mixtures

There are many freezing mixtures. Some of them involve the use of mixtures of chemicals which cannot afterwards be conveniently separated. Consequently, they are wasteful and expensive. There are two very effective ones, however, which do not belong to this class. A mixture made in the ratio of 33 grams of salt to 100 grams crushed ice will produce a fall of 21 degrees Centigrade under good insulating conditions. Crystallised calcium chloride in the ratio of 220 grams of the substance to 150 grams crushed ice gives the tremendous drop in temperature of 54 degrees Centigrade—cold enough to freeze mercury!

As radiation at these low temperatures is rapid, as large a quantity of the mixture should be made as possible—not less than a quart—if you wish to reach the lowest limit and maintain it for any length of time. Lagging the vessel at side and bottom will substantially reduce radiation, too. (L.A.F.)

Wolf Cub

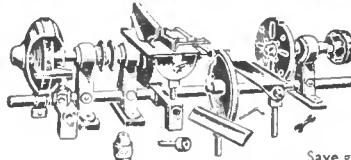
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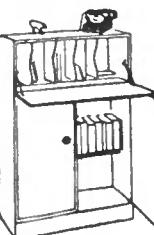
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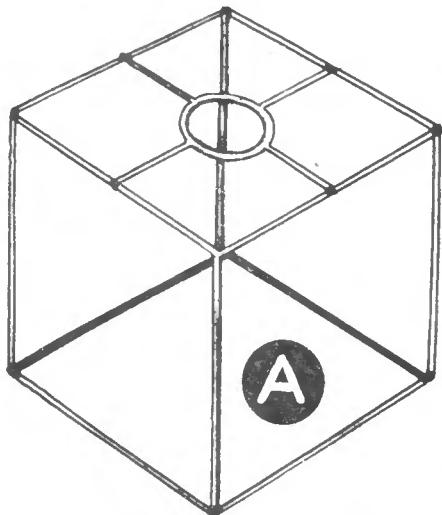
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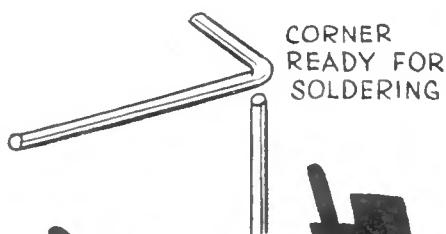


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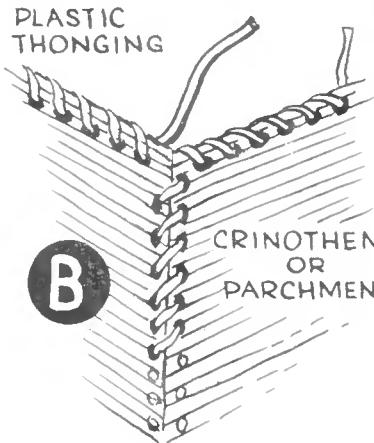
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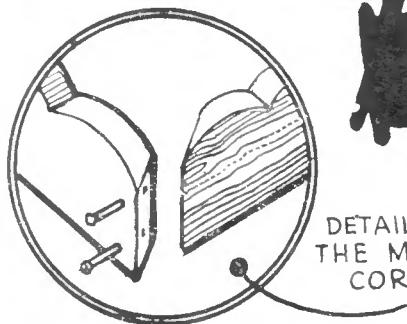


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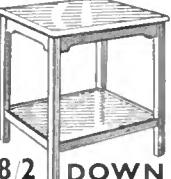
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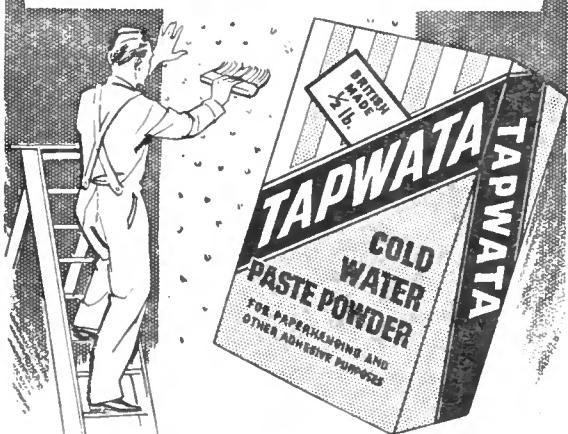
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