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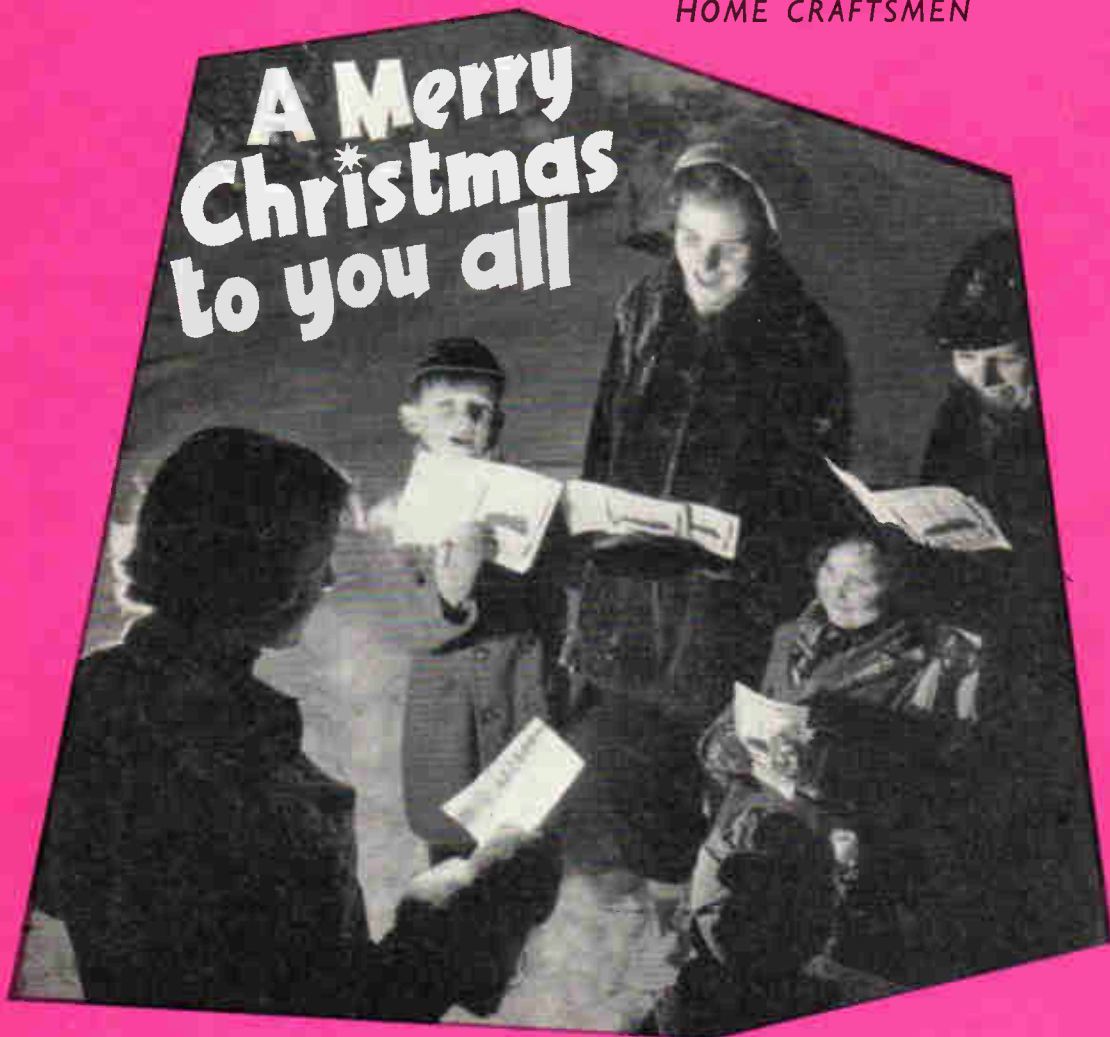
NUMBER 3393

THE ORIGINAL
'DO-IT-YOURSELF'
MAGAZINE

HOBBIES *weekly*

FOR ALL
HOME CRAFTSMEN

A Merry
Christmas
to you all



Up-to-the-minute ideas

Practical designs

Pleasant and profitable things to make

5^p



IF you collect animal stamps and labels why not get to know how animals speak to each other?

ANIMAL TALK

We all understand cat and dog language. Elephants have a whole series of sounds and signals. A shrill cry

uttered through the trunk, or a rumbling in the throat means that 'Jumbo' is angry. When he wishes to warn his friends of danger he makes a low sound which sounds like 'prut'. When happy, he makes a soft, purring noise. And when he taps the ground with his feet he is suspicious.

Serpents have the power of calling to their young. I once had a pet garden snake. Whenever danger threatened she made a peculiar whining noise. One day when she made this noise, her baby

wriggled towards her, and ran down her throat for safety.

'Cut-cut, ca-da-cut!' is Mrs Hen's way of telling us she has laid an egg, while, after the egg is hatched, a deep, monotonous 'cluck! cluck!' warns the children to remain near. Wonder and alarm are expressed by a high prolonged note like 'w-h-o-o-e', softly repeated. If she falls into the clutches of a fox or other enemy, she calls, in terror, 'c-r-a-i-a-i-o-u' over and over again. You've all heard the 'kerr-kerr-kerr' of a happy hen.

Among fishes, the eel makes a low, croaking noise, which some people consider musical. The dog-fish barks. One kind, however (the haemulon family), is capable of giving vent to a regular series of croaks and grunts, which so unnerved a certain fisherman that, after catching it, he actually gave one of them its liberty.

The phosphorescent lights which some fish possess may likewise have some significance in communication, especially as certain kinds have two or more different colours. You've probably heard that the *malacostens niger* has a golden light on one side and a green one on the other.

Did you know that some beetles have remarkable odours, by means of which they can distinguish one another?

A butterfly in South America makes a loud snapping noise when flying. It has been well named the fire-cracker butterfly. It pop-pops and snap-snaps in quite a startling manner as it flies here and there. Thus it is not only able to get away from its enemies, but to frighten them away.

Perhaps the song of the locust, the chirp of the cricket, and the fiddling of the grasshopper have some similar meaning, and take the place of our spoken words.

A collection based on 'Animal Talk' will add a new meaning to your stamps and labels.



TV Star sees Stars

JOHNN TURNER, popular star of the ITV series *Knight Errant*, has a hobby which is unique among stars — collecting old telescopes.

Says John: 'I have several eighteenth-century brass telescopes which make pleasant decorations. As I am also interested in astronomy I often put them to practical use.'

A jazz fan, John tinkles away at the piano. 'But nothing much comes out', he wryly remarks. John is a Londoner who spent his youth in Nottingham. He now lives in an old cottage near Stratford-on-Avon. He likes photography and drawing cartoons. Standing 6 ft. 2 in., he was born on 7th July 1932.

BUZZER AND OSCILLATOR

IT is necessary to have a buzzer or oscillator, when learning the Morse code, in order to practise sending and receiving. A single key and buzzer (or oscillator) will be sufficient for two or more persons, as each takes a turn at sending while the other writes down letters and words as they are received.

A buzzer means the simplest means of practice, and only needs a small dry battery. If a buzzer is to be made, this can be done as shown in Fig. 1.

The actual dimensions of the parts

Two strong card discs about $\frac{3}{4}$ in. to 1 in. in diameter are fixed to the core with adhesive. The core is covered with insulating tape or brown paper, between

By 'Radio Mech.'

these discs, forming a bobbin into which the wire can be wound.

The magnet is wound to capacity, but

The block is screwed to the base, or held with tacks and adhesive.

Iron must be used for the armature, and a double thickness of tinned iron such as is used for household containers is suitable. The armature is about $\frac{1}{4}$ in. wide and $1\frac{1}{2}$ in. long. A thin brass strip, bent as shown, is tightly attached to the armature by means of a small nut and bolt. Tin can also be used here, but brass, such as may be obtained from a discharged $4\frac{1}{2}$ V. battery, is better. The brass strip is bolted to a metal bracket, so that the armature is level with the magnet core.

The contact screw is best filed to a point, and it is held by lock nuts, as shown in Fig. 1. Electrical connections are made as indicated.

To adjust the buzzer, set the contact screw so that it bears with moderate pressure upon the brass strip, the armature being $\frac{1}{8}$ in. or less from the magnet pole. The buzzer should then work

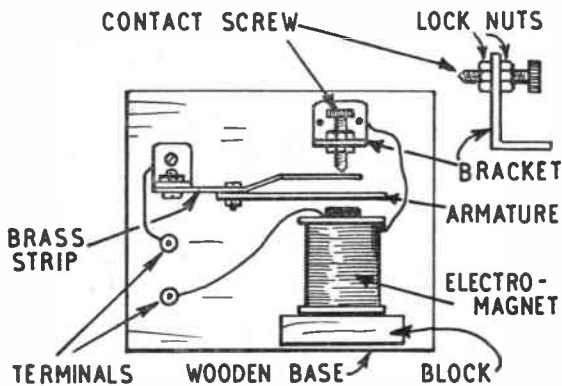


Fig. 1—Morse buzzers

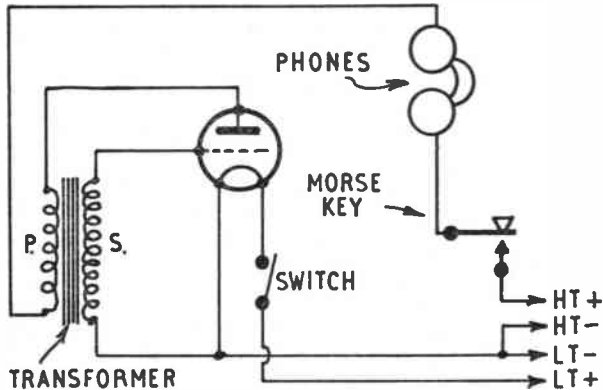


Fig. 2—Circuit of valve oscillator set

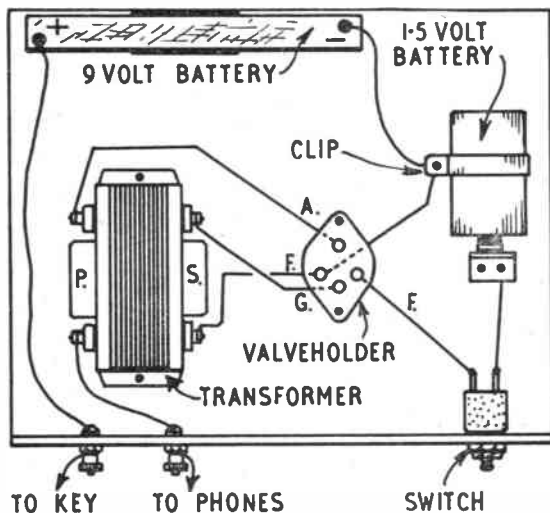


Fig. 3—Wiring plan of the valve oscillator

are not important, but a wooden base about 2 in. by 3 in. will be convenient. An electro-magnet may be to hand. If not, this can easily be wound, using 26 S.W.G. cotton-covered or similar wire.

The magnet core is of iron, and a stout, short, iron bolt will be satisfactory. Or a piece about 1 in. to $1\frac{1}{2}$ in. long can be sawn from an iron rod, strong iron nail, or anything similar. The core should preferably be at least $\frac{1}{4}$ in. in diameter.

The actual number of turns is unimportant. If a geared hand brace is secured in a vice, and the projecting core is gripped in the drill chuck, winding will be much neater and more rapid. The beginning of the wire is passed through a small hole near the core, before winding. After winding, the outer end can be secured with thread, or by passing it through a second small hole.

The core of the finished magnet is a tight fit in a hole in the wooden block.

strongly, with a 3V. or $4\frac{1}{2}$ V. dry battery. The note can be changed by further adjustment of the contact screw and armature, if necessary.

The Morse key is simply wired in one battery lead. For best results, the buzzer should have a fairly high note, and should start instantly. Contact screw and battery voltage can be adjusted to secure this. A low-pitched, hesitant buzz is very difficult to read. The buzzer or key can be any reasonable distance

apart, and may be connected with twin flex.

Valve oscillator

Though a buzzer can be satisfactory for much code practice, a valve oscillator is preferred for more advanced code work. With such an oscillator, high speeds may be sent and received, and the note is similar to that of Morse heard on a radio receiver.

A simple oscillator which will work with almost any valve is shown in Fig. 2. Modern all-dry-valves and old 2-volt battery type valves may have a $1\frac{1}{2}$ V. filament supply, so a dry cell will suffice. For high tension, only a low voltage is required. A 9-volt grid bias battery, or any similar supply, will thus do well for H.T. Battery costs are very small.

The transformer is best of the kind used for coupling between valves, and it can have a ratio of about 1:3 or 1:5. Almost any transformer of somewhat similar type will also be suitable.

Fig. 3 shows wiring for the oscillator, with a four-pin valveholder. Octal valves, or B7G valves, will require appropriate holders. Miniature 1-4V. valves work well in this circuit. In Fig. 3, 'A' denotes Anode, 'G' indicates Grid, and 'F' shows the Filament connections. If a tetrode or pentode valve is used, the screen grid can be wired to the anode, or to H.T. positive.

When wiring up the transformer, note that 'P' indicates the Primary, and 'S' the Secondary. Transformers do not

always have the tags or terminals in the same positions as in Fig. 3. If the circuit will not oscillate, when first tried, reverse the two connections which are taken to the primary terminals of the transformer.

Phones are used for listening, negative going to the transformer primary, and positive to the key. The key is returned to H.T. positive. Two terminals are provided on the panel supporting the small switch, in Fig. 3, for easy connecting up of the phones and key. For an initial test, the phones can be wired directly to these two terminals.

If the note is unsatisfactory, it can be modified by various means. One simple method is to change the H.T. battery voltage. This is readily done with a tapped 9V. battery.

Should the note be too high pitched, it can be lowered by wiring a small condenser across the primary of the transformer, or across its secondary. If the note should be too low, it can be raised in pitch by adding a resistor between the secondary terminal of the transformer and valveholder grid socket. A different note will also be obtained if the phones are wired in parallel with the primary of the transformer, instead of in series as in Figs. 2 and 3.

A valve oscillator of this kind will usually give a suitable note without any difficulty. But in a few cases the characteristics of the transformer may be rather unsuitable, and the methods of changing the tone obtained are then

worth keeping in mind.

Morse key

Good ex-Service keys can be obtained at so little cost that it is scarcely worth while making this item. The contacts should be set about $\frac{1}{16}$ in. part. When speed and accuracy in sending have been achieved, the individual user can adjust the contact spacing to his own liking, but extremely small gaps are likely to cause poor sending.

When learning Morse, each character should be keyed cleanly and accurately, so that it can be read easily. If no particular system is to be used, it is worth learning the vowels first, as they arise with maximum frequency.

If it is intended to undergo a scouts' or other code test, the speed at which Morse may be transmitted and read needs to be noted, so that progress can be watched. For such purposes it is usual to count five letters to a word. A sentence containing sixty letters would thus count at twelve words. When beginning, a reading speed of only one or two words per minute is quite usual, and need cause no despair. After a little practice, sending is generally easier than reading, but the speed of both will continue to increase.

It is often as well to leave figures and punctuation marks until the alphabet can be read at reasonable speed. A moderate speed can very easily be achieved in both sending and reading figures with a little practice.



A Table Decoration

ACHEERFUL Santa Claus table decoration will add to your pleasure during the Christmas festivities. The colourful figure is easy to make and will provide a happy hour as you fashion him round an old wine bottle. Start by wrapping bright red crepe paper securely around the bottle. Use a strip of Sellotape to hold the end of the paper in place behind the figure. The basic form upon which you will fix the various details is completed by placing a neatly fashioned cone of red paper over the top part of the bottle. The cone is made by moulding a large wedge-shaped segment of a circle and gluing the ends together.

The eyes, nose and wide whiskers are formed from cut paper and glued into the proper positions. Santa's white beard is also cut out of paper and the

long hairs are simply suggested by snipping a series of vertical cuts. Cut out a red smiling mouth and black irises for the eyes and glue them into place. Provide white centres for the eyes, and glue these upon the irises, off-centre and where they will help to give your figure a genial expression. A ball and little strips of cotton wool will provide a bob for Santa's 'hat' and a pair of fine bushy eyebrows.

Print the words 'Merry Christmas' upon a small card and suspend this below the pointed beard, by means of a loop of gold or silver tinsel. Your finished Santa Claus will stand firmly amidst the extravagant display of delicious Christmas fare and will be a welcome guest at table with children and adults alike.

(A.E.W.)

KEEP THE PARTY GOING

IF you want a really successful party, make all your arrangements well in advance, organizing a full games programme that will not have any of those awkward, silent intervals. There should always be another game ready to start when one has finished and, with this in view, the following suggestions should prove helpful.

Immediately after a meal it is always best to start with a quiet game, yet one where everyone's attention should be demanded. So our first suggestion is a card game.

Pairs

For this game you will require a pack of cards. These are all laid out singly and face downwards upon a table. Each player in turn is allowed to pick up any two cards, and should he select a pair, that is, a pair of threes or a pair of kings, he retains them until the end. The winner is the one having the most pairs at the end of the game. It will be realized that a good memory plays a large part in this game, and the positions of the cards can be better remembered if they are laid out in rows.

Slap jack

This is another card game not unlike Snap, but you will require two packs of ordinary playing cards, dealt out equally to the players. All sit round the table with their cards near to the left hand, the right elbow resting on the table so that when the hand is lowered it can strike the table near the centre.

This is the method of playing. The player on the left of the dealer starts the game by turning over a card from his pile and placing it in the centre of the table. When a Jack is turned up there is a shout of 'Jack', and the players slap down their right hands on the card without moving the elbow from its position. The player whose hand first covers the Jack takes the cards below and the game proceeds, the winner being the one who obtains all the cards or who holds most after a set period of time.

Actions

A player stands in the centre of the room so that everyone can see him perform a simple action, and the game is to guess what he is doing. This can be quite amusing and baffling if the action is confined to a simple movement like pressing an electric light switch. On one occasion, a boy stood in the centre doing nothing at all, and the answer proved difficult to find. He said he was 'going up in a lift' (or going down?)

Making paper hats

The game here is for each member of the party to make a paper hat, the best one to receive a prize. This game requires a little previous preparation, and you should have ready two sheets of newspaper, three pins, a piece of fine string, and perhaps a length of crepe paper or

ribbon for the trimming. Each player needs such a set of equipment. Allow about fifteen minutes for the modelling.

Pipe Cleaner Figures

This is a similar game to hat making, but using pipe cleaners. These are obtainable from tobacconists for a few pence per bundle. The object of the game is to make models of animals, men, or what you will, easily accomplished by twisting the pliable wires. Each player should be given two cleaners, a short length of thin string, and some trimming.

For the next few games you will require the co-operation of a friend who must be carefully instructed before proceeding so that there is no danger of a hitch.

Black magic

The assistant leaves the room while the remainder of the party selects an object in the room visible to all. It may be a clock, a tie, a particular piece of furniture; but something all can see. When the object has been arranged the assistant is recalled.

The master of ceremonies — who might be yourself — asks the assistant if he knows what has been chosen, pointing to an object and saying 'Is it this?', and another with 'Is it that?', repeating this until eventually he replies correctly. The secret of this game is not in the way the question is asked. Immediately before pointing to the selected article the M.C. points to something *black*, for example, a black shoe, a piece of coal or soot in the chimney, and the assistant has been previously forewarned.

Towns

This is a similar game to Black Magic, but in place of an object the name of a town is chosen, and obviously we must have a different code for the assistant. Before saying the name of the selected

town the M.C. quotes a name which includes some part of the body, such as *Manchester, Birkenhead, Bournemouth, Liverpool*, and perhaps you can think of many others. As a rule it takes quite a few repetitions before anyone spots the coding, and of course they can be invited to test their theories.

A very similar game can be played by using flower names instead of towns, and once again we use a code name before saying the name of the selected flower. Here it is advisable to use a name containing an animal, as for example *snapper, dragon, foxglove, or harebell*. Now let's try an entirely different kind of game.

Pickpocket

Ask about half a dozen boys to sit on the floor in the centre of the room, and turn out their pockets. Each item is counted separately, and believe me, there are often many amusing items. You can perhaps find a prize for the one having the largest or smallest number of articles in his pockets.

Song Titles

For this game you will require a supply of pencils and paper for the competitors and the game may be modified quite easily to suit the party. The idea is for each competitor to write down as many song titles as possible containing the name of a flower, e.g. 'A garden of roses'; or perhaps a colour, e.g. 'Blue Skies', or you might have the more topical word *Rock*. This might include anything from 'Rock-around-the-clock' to 'Rock-a-bye-baby,' and the winner is the one with the highest score.

Guess who

An entirely different game can be prepared on the basis of a picture quiz, and for this you will require several pictures of well-known people cut out from newspapers or magazines. You may have television stars, film stars, athletes or politicians, but it is best to have them taken from recent publications so that competitors have a reasonable chance of guessing the answers. Do not show the whole of the picture but merely some distinctive features, such as part of the mouth, the nose, or eyes.

Our front page picture

The happy band of carol singers on our front page were photographed on Ilford film. The lighting effect was produced by a flashbulb in an 'open type' holder, held by the girl on the left.

PHOTOGRAPHY AFTER DARK

WINTER is not a closed season for the amateur photographer. Its many moods — frost, fog, snow, rain, etc — can make interesting pictures, and with the recent great advancements made in camera lenses and film speeds, these can be attained more easily than ever before by the beginner.

By C. Robinson

Here, however, I would like to write about a subject, which can be most fascinating, for the darker months of the year, and one which is not so dependent on weather conditions as the previously mentioned winter themes, namely — 'Photography after Dark'.

The streets, squares, parks, etc. of our large towns and cities, the historic buildings and monuments which are floodlit on festive occasions, the railway termini, large bus depots, are but some of the places where, after nightfall, some interesting pictures can be taken without much difficulty.

Where people and life in general are to be included in the scene the combination of the wide aperture lens and ultra high speed film is essential, but many of the subjects mentioned previously can be taken with the moderate aperture ($f11$) lens of the ordinary box camera as they



'Night Express' trains standing in stations are ideal subjects. (Gevaert 33 film 10 secs. F8 Unitol Dev.)

are what are termed 'static' subjects, and can be given the more lengthy exposure made necessary by the small aperture lens. I would, however, advise the use of high speed panchromatic film for all work of

this kind, whatever type of camera you may be using. This cuts down the exposure time to the bare minimum, which is always a useful thing to do for many reasons. But what is more important, it takes advantage of the long tonal scale, which is one of the main features of this type of film, to accommodate such high contrast scenes to be found where bright lights and dark shadows go together. The highlights will not be 'burnt' out, nor will the shadows be devoid of detail, as is so often the unavoidable result when a slower, more contrasty film is used.

This inherent quality of the high speed films can, of course, be easily destroyed by over-development, which should be avoided at all cost. The exposure required for such scenes cannot be given specifically, nor can they usually be measured with a meter. It is best to experiment, at first giving, say, three different exposures for the same picture and keeping accurate notes of these, which will in the future serve as a reliable guide.

As high speed film also has a remarkable latitude in relation to exposure I would advise giving each of your trial exposures three to four times as long as each other, as there will be little appreciable difference by merely doubling it. As exposures are lengthy you may



'Awaiting the Midnight Tide' at Hull. (HP3 film 10 sec. F8 Unitol)

● Continued on page 203

TRELLIS WORK IN CONCRETE

A CONCRETE trellis is long lasting, can be tailored to fit exactly in the space available in a garden, and needs little or no maintenance. Making it is a job that can be done a bit

the concrete to a depth of 2 in., then place a wire reinforcement in position. (Fig. 2). This is a 9 in. square of fencing or similar wire. The rest of the concrete is then poured level with the top of the

spare the time. Withdraw the core carefully, then unscrew the sides of the mould and ease them away from the concrete.

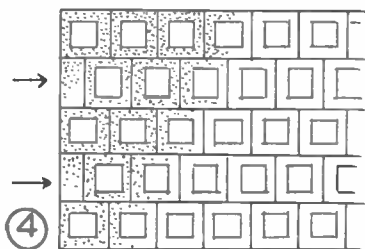
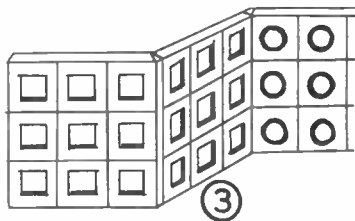
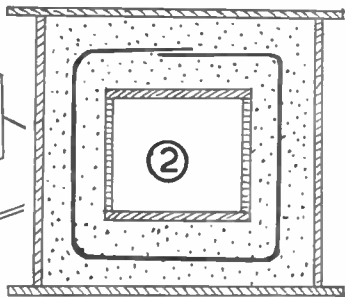
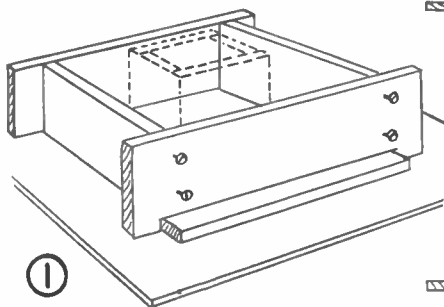
Two or more moulds will, of course, speed up the work, but they must be identical. The castings should be handled with care at this stage, and it is preferable to make several and leave them to "harden off" before erecting.

The units are cemented together like bricks, and they must stand on a firm foundation. This should be 6 in. wide and 9 in. deep, filled with a 1:2:4 mixture of cement, sand and aggregate.

A trellis of this kind need not run in a straight line, but can be curved or angled. This is preferable where the trellis is not supported at the end by a wall, as it gives added strength without having to use buttresses. If an angled or zig-zag pattern is used, the length of each section should not be less than the height of the trellis, for the sake of appearance. (Fig. 3).

Another variation is to build in bonded courses. This gives a different effect and a strong structure, but it necessitates making end blocks 12 in. high, 6 in. wide and 4 in. thick, to fill in the gap at the end of every second course (Fig. 4).

The same mixture of concrete should be used for pointing as that used for making the blocks. The finished trellis can be left in its natural state, or painted with cement paint or plastic emulsion. (A.L.)



at a time, and it is not expensive.

The trellis is built up from square units which are cast individually, then cemented together. One foot square is probably the best size for each unit, but this can be altered if desired.

The mould is made from 4 in. wide by $\frac{3}{4}$ in. thick wood. Two of the sides are 12 in. long, and two are 14 in. long. They are screwed together as shown in Fig. 1, the heads of the screws being left projecting for easy dismantling. The mould is then laid on a piece of hardboard between two wooden strips which are nailed to the hardboard to prevent movement.

The core is a 6 in. square box without top or bottom, and it should be 2 in. higher than the rest of the mould for easy withdrawal when the cement has set. If a round hole (Fig. 3) is wanted in the trellis, a 6 in. diameter tin, with any projecting lips cut off, can be used.

The surfaces of the mould may be lightly smeared with grease to prevent the cement from sticking.

The core is placed in position and weighted down with a stone or brick. A 2 and 1 sand and cement mixture should be used, or a ready-mixed concrete. Pour

mould, i.e. to a depth of 4 in.

Cover the mould with wet sacking and leave for 2 days, or longer if you can

● Continued from page 202

PHOTOGRAPHY AFTER DARK

feel that you are overdoing things a bit. But remember that giving 40 seconds for a night scene instead of 20 is only the equivalent of giving, say, 1/50th of a second instead of 1/100th in daytime, and I am sure that acceptable prints could be made from either if such an error was made. During such times as the shutter is open, people who are passing will not be recorded on the film. But should they linger for a moment or two (and you do not want them to be part of the scene) cover the camera lens by placing the palm of your hand in front of it without actually touching the camera. Take similar action when car headlights move into view, until they have passed out of the picture. Remember, of course, to add to your total exposure any such

time that the lens is covered.

It is, of course, impossible to hold the camera in the hand for such lengthy exposures. The ideal support for it is a sturdy tripod which can be set up in any chosen view point to make the exposure. Should you be caught without your tripod, and wish to take a picture, take a look round for an alternative means of support. Window sills, walls, railings, traffic bollards, etc. can all be very useful for this purpose.

The accompanying illustrations will serve as examples of such scenes. The technical details given can be used as a guide on which to base your trial exposures, but as street lighting varies from town to town and even street to street, one cannot be more specific.

Designs Designing

SO many of our crafts and hobbies demand a practical knowledge of designing that an outline of the

If you try to visualize these lines for a moment, or sketch out with a pencil, you will realize that a few wavy lines may

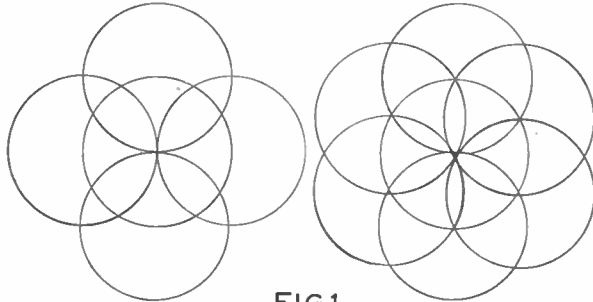


FIG 1

By
S. H.
Longbottom
(PART 1)

basic principles is certain to be helpful. This will not only enable you to create your own individual designs to meet particular requirements, but also give you greater scope and pleasure with your hobby. We will show how you can invent all manner of designs, sketches, motifs or ornamentation, enlarging or reducing them as desired, with a minimum of tools and endeavour.

First, we must emphasize that all designs are made from a few basic lines, alone or in combination. These are the straight, curved, wavy or zig-zag lines, the circle, semi-circle, and the S line. And all geometric patterns result from different manipulations of these few lines, either by using a pair of compasses, ruler, or a curve.

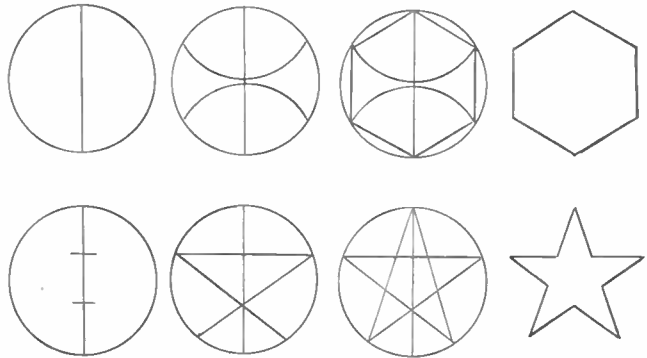


FIG 2

diameter in various ways.

In Fig. 2 we show the effect of combining circles and triangles within the limits of a circle to produce different motifs. You will see that if the diameter is divided into thirds or quarters, we ultimately produce a five- or six-pointed star. We can proceed with this method, making accurately shaped stars of all kinds, and which we can ultimately convert into patterns. For example, each of the points can be transformed into the petals of a flower or leaf shape, but you are first recommended to consider the principles involved in making these basic shapes, noting the progress in Fig. 3.

We can then proceed to the modifica-

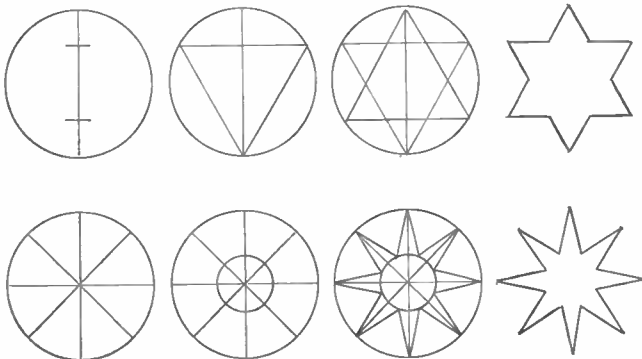


FIG 3

tion of a simple square, and in Fig. 4 it will be seen that all manner of designs can be created by diagonal line treatment plus quarter or semi-circles of different radii. Such designs are emi-

The flexible curve is a modification of the French curve but, as its name implies, it is plastic, and can be manipulated to form any desired curve. This is not an expensive tool to buy, but you

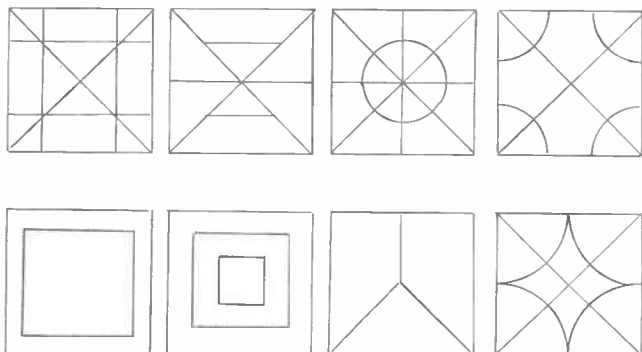


FIG 4

nently suitable for both border and overall treatment, but again we must emphasize that any shapes we construct in this fashion are primarily skeletons for patterns requiring more detailed treatment.

So we continue to experiment with the basic shapes of squares or circles, and it requires but little imagination to show how these are quickly transformed from a square to a box or house, the triangle to a cone or mountain, the oblong to a cylinder or the circle to, say, an apple. And it is a good plan to observe the objects lying around you, mentally placing them in their respective categories of basic shapes. It will then be realized that these different basic shapes require distinctive decorative treatment.

Fig. 5 shows how we again use the circle as a basis for leaf patterns, two quarter circles making the outline. Ultimate treatment of the leaf is decided by the flower we wish to portray, but you should regard this as a simple example of modified treatment from a basic shape.

All the designs we show here have been made with simple instruments — a ruler and compass—but before we proceed further it may be better to discuss other useful tools which aid the designer. Apart from those already mentioned, a French curve or a flexible curve is almost essential. The former takes many shapes, but may be described as a kind of set square on which the ruling sides, internal and external, consist of varying degrees of curves. There are many different curves available, some are sold in sets, while others are obtained separately, and these are extremely useful for making accurate connections where a curve is desired, but where the compass cannot be used.

can always improvise one quite easily. Obtain a 1 ft. length of finely bored rubber tubing, insert a length of stiff flexible wire, and the 'ruler' so made will bend to any required curve. Flexible spring curtain wire will also make a curve of this type. So the question of tools should not really be a difficulty.

By experimenting with the basic shapes shown in the diagrams, you will be able to transform them into all manner of patterns, and it is suggested that you reconstruct these before proceeding further.

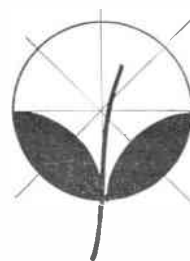
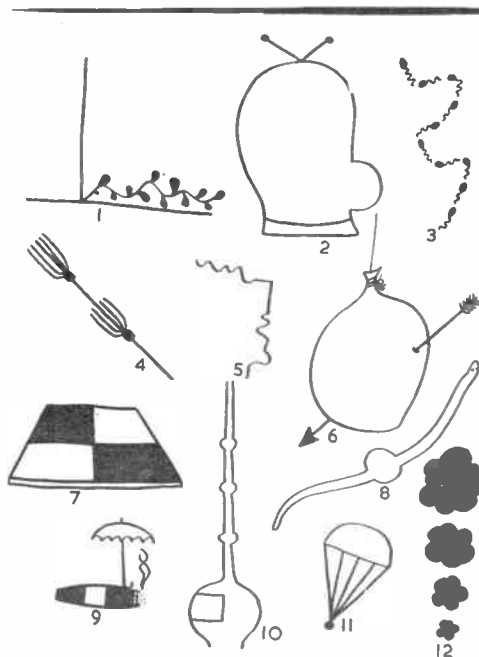


FIG 5

In our next article on this subject we will show how skeleton shapes are clothed, and how to visualize the basic shapes of objects, thus helping to make drawings, patterns or designs.



ARE YOU A DROODLE BUG?

Do these pictures confuse you? Look at the twelve doodle drawings carefully, and try to guess what they are. If you are stumped, turn to page 210 and see what they are supposed to represent.

(A.E.W.)

FIXING FAIRY LIGHTS

DECORATIVE lights need checking before being placed on the Christmas tree, especially if they have been in use for some years. Precautions are also necessary before fixing small brightly-coloured bulbs of the kind used in strings to give an air of festivity. One method is to hang a bunch of holly or other evergreen in the hall, or a room, and place the fairy lights among the foliage. This can look attractive, and is safely out of the way.

bulbs light, they can be replaced in their holders. They will not burn at full brilliance from the battery, because of its low voltage.

When any defective bulbs, which fail the battery test, have been replaced by new ones, the string should light. If not, check connections as described later. With an old string, it is much easier to test bulbs individually in this way, rather than keep changing and replacing bulbs at random, until the string lights.

twelve 20V. bulbs are connected in this way, this makes a total of 240V. Such a string may be used with 200/250V. mains, either direct current or alternating current.

If one bulb is defective, or the holder connections are not sound, the whole string will fail to light, and there will often be nothing to show where the fault lies. When this happens to a new string, or one which has previously been tested and found to be in order, a new

By 'Modeller'

With the usual string of bulbs, all are connected in series. This is one of the disadvantages of the system, as it means that if a single bulb fails, the whole string is extinguished. Or, if a string is being brought into use, and does not light, any of the quite numerous bulbs could be responsible.

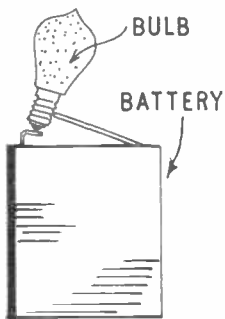


Fig. 1—How to test individual bulbs

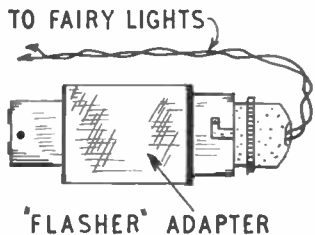


Fig. 3—Flasher for string of lights

Bulb testing

Before arranging an old string of bulbs on a tree, it is wise to test it, or the bulbs. Individual bulbs can be tested with a dry battery (at least 4½ V. will be required), as shown in Fig. 1. If the

Series circuit

The way in which the usual string of bulbs is made up will be clear from Fig. 2. Each bulb is of low voltage, but enough bulbs are wired in series to permit running from 200/250V. For example, if

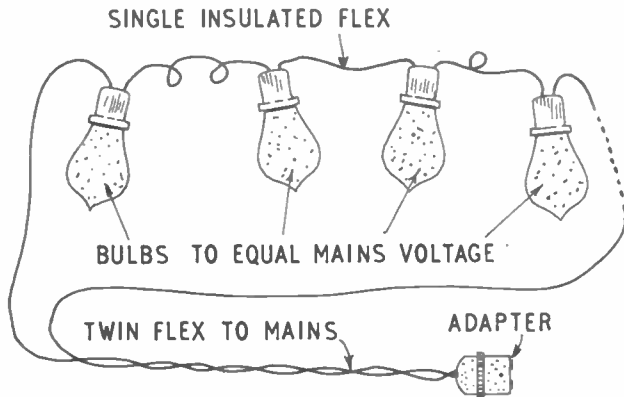


Fig. 2—Bulbs wired in series to equal mains voltage

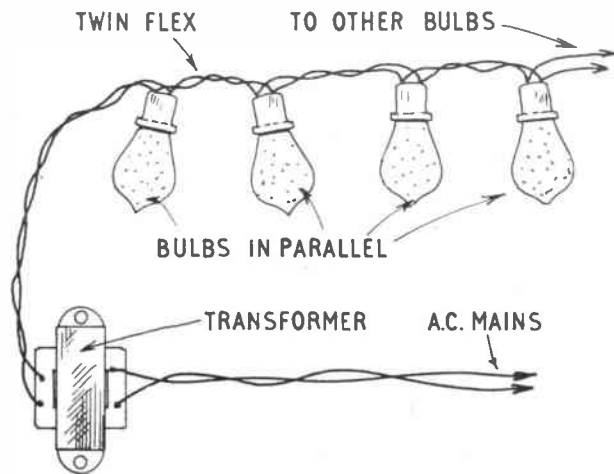


Fig. 4—Running bulbs in parallel from a transformer

bulb (known to be in working condition) should be tried in each holder in turn. When this new bulb is fitted in place of a defective bulb, the whole string will again light, if it is otherwise intact.

As a single bulb failure can put the whole string out of action, it is wise to keep two or three replacements available. It is not a good plan to short out any defective lamp — this will allow the string of bulbs to light, but will over-run the remaining bulbs, so that others may soon fail. On the other hand, it is quite in order to use a string with a total somewhat higher than the actual mains voltage, such as twelve 20V. bulbs on 200/210V. mains.

All bulbs must be screwed in tightly, and connections to the holders should be sound. Unnecessary kinks should be avoided in the flex. If the leads are lengthened, use good quality twin flex, and ensure there are no bare joints.

Drawing current

Current for the bulbs may be taken from a ceiling rose or lamp holder, by inserting an adapter like that in Fig. 2. If the usual household lamp is not required, the adapter is simply inserted in its place. This is often convenient, as wiring can be kept up out of the way. The usual lamp switch will then control the string of fairy lights.

If the household lamp is also required, it may be inserted in a 2-way adapter. The adapter from the fairy lights can then be plugged into the second socket of the 2-way adapter. If the 2-way adapter is a type with switch, it will be possible to run the fairy lights alone, or the household lamp alone, or both together, according to the way the adapter is used.

When a separate switch is required for the string of fairy lights, a torpedo or lead-through switch is convenient. Some switches of this kind also form a very handy junction point, so that an additional length of twin flex can be joined

on. If so, the switch comes between the twin flex from the fairy lights and the new length of flex.

It is also in order to draw current from a 13A. wall plug. For this method, take the twin flex leads to the two small pins ('L' and 'N'). With 13A. fused plugs, a fuse will be present in the 'L' side of the circuit. This gives additional protection, especially if the usual 13A. fuse is replaced by a 3A. type. If the wall socket has a switch, the lights may be controlled by this. If there is no switch here, it will be necessary to remove the plug, or insert a switch as described. When the string is going to be out of use for any length of time, unplug it from the mains, for maximum safety.

Flashing lights

A very simple type of flashing device, which works by the heating-up of a bi-metal strip, may be obtained. The adapter from the fairy lights is inserted in it, as in Fig. 3, and the 'flasher' adapter is then inserted in the lamp holder from which current is drawn. The whole string of bulbs will then be turned on and off automatically as long as required.

It is effective to arrange one string of lights with a flasher, and to have a second string burning permanently. When two or more strings are used, each is separate from the other, and draws current from its own adapter or socket outlet.

If such a flasher is to be used with a string powered from a wall socket, a lampholder will be needed. Insert a 3A. fuse in the 13A. plug, and take a length of twin flex from it, as described. Fit the lampholder to the end of this twin flex. The flasher can then be plugged into the lampholder.

Parallel running

Running bulbs in parallel from a mains transformer is sometimes convenient. With this method, it is not necessary to use the full number of bulbs. The actual number can, in fact, be from one upwards. In addition, if any bulb fails, the others will continue to burn. The failure of a single bulb is thus unimportant, and if a defective bulb is present it can be located immediately.

When bulbs are run in parallel, both contacts on each holder are wired to a length of twin flex, as in Fig. 4. This circuit is connected to the secondary of the transformer. The transformer primary is wired to the A.C. mains. D.C. (direct current) mains must not be used.

Heater transformers, or those intended for driving models, or for accumulator charging, may be brought into use. The secondary voltage rating of the transformer should not be higher than the voltage of a single bulb. Any number of bulbs may be used, provided the total current consumption does not exceed the rating of the transformer. For example, if the bulbs are .15A. types, and the transformer is rated for a maximum of 3A., up to twenty bulbs could be used, if desired.

With small fairy lights, it is quite usual to indicate only the voltage and wattage. If so, the current taken by the bulb can be found by dividing the wattage by the voltage. For example, suppose 3W. 20V. bulbs are to be wired in parallel. From the calculation described, it will be seen that one bulb will require .15A. From this, the maximum number of bulbs which may be run from any particular transformer can easily be worked out.

Make this Christmas leg-pull gift

IT'S getting near Christmas, so now's the time to make that 'do-it-yourself' present you are going to give to your

friend (if he or she is the kind of person to appreciate a practical joke, of course). It is a 'do-it-yourself' present in more than one sense, for you have to make it yourself.

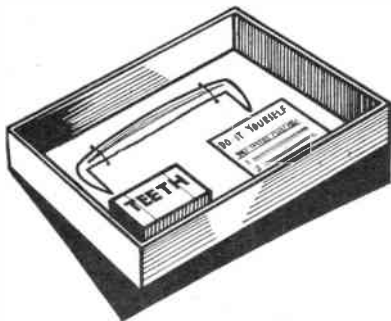
The materials needed are a comb, a cardboard box, a piece of card, the same size as the bottom of the box, and a matchbox.

First of all, break all the teeth from the comb except the two big ones at the ends. Put the teeth into the matchbox, which is disguised with coloured paper and labelled 'Teeth.' Then lace the frame of the comb and the box of teeth to the piece of card, with cotton.

Type out a few simple instructions on a piece of paper to include in the kit, such as:

1. One by one, melt the ends of the teeth and mould on to frame provided.
2. Allow plastic to set with comb lying flat.

Label the lid of the box, and let's hope your friend appreciates the joke! (D.M.)



Next week's free design will be for making three novelty items — ideal for the beginner in fretwork, and interesting projects for the more experienced worker.

MAKE SURE OF YOUR COPY

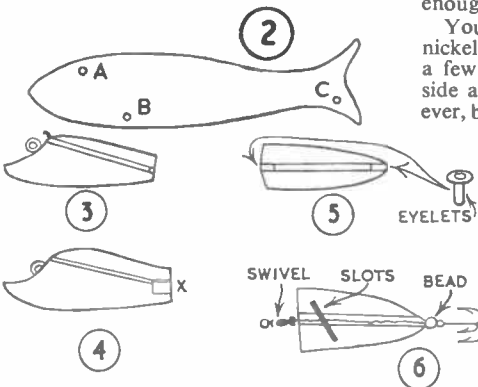
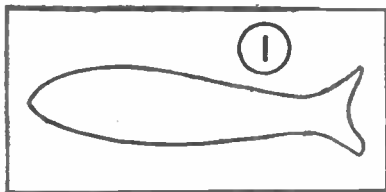
WITH ROD & LINE

THERE'S an angler in America who a few years ago set about making up his own lures for pike fishing. He made one in particular which proved to be a real fish-getter. The success of this most simple lure was so phenomenal that he made up quite a number and sent them all over the States to be tried out by well-known anglers and guides.

LURES FOR BIG PIKE By 'Kingfisher'

Still proving their worth wherever they were used, this angler soon became inundated with orders so he got himself a small fly-press with which to blank out and form the parts. His wife helped him to produce these spinners and in no time at all he was selling a matter of 50,000 in a year, building himself a nice business.

It would amaze you to see the catalogue of one famous tackle firm in America.



Some of the lures are so simple that anyone could make them at home. Our own tackle makers are very slow to branch out into what, for want of a better term, I would call novelties, but when these novelties prove to be good then they should be on the market for anglers.

In some of the quiet country places I visit I see quite a number of useful ideas and it surprises me that the inventors of these things do not try to get them marketed. For instance in my recent travels I saw the simplest lure one could possibly imagine and it is so simple to make that I propose to give you the details here.

It had been made out of a piece of tin plate but I propose to suggest rather better material. For the design you can take the pictures of a small fish, say about 2½ in. to 3 in. in length. The material you require is a piece of sheet brass no more than 1/16 in. in thickness. From this you cut out a fish, and you can do this by pasting your picture or drawing on to the brass and cutting round it (Fig. 1.)

The next job is to drill three holes in the fish as shown in Fig. 2. The one in the head (A) should be large enough to take a split-ring to which the reel line is attached. The one marked B should be large enough to take the wire you will use for your hook whilst the one in the tail marked C needs only to be large enough to take a strand of cotton.

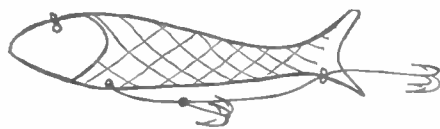
You can have the model of the fish nickel plated if you wish and then paint a few red stripes diagonally along one side and blue ones on the other. However, before that is done but after plating, the lure is weighted. This is done by dipping the bottom edge of the fish into molten solder. After a few dips, sufficient has been built up to provide ample weight for casting and also to serve as a keel and prevent the lure from spinning.

The maker of this lure assured me that he did very well with it by just casting

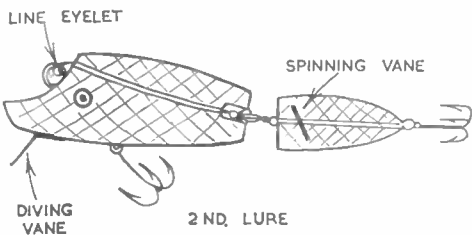
out and reeling in. The fish made no movement at all beyond coming straight through the water. The fine hole in the tail fin was used for binding the treble hook at the tail close to the body and the cotton breaks when the lure is taken by a fish.

The second lure is a much more elaborate affair and one which — I hardly dare say it — I produced myself after thinking about plugs and spinners. It suddenly struck me that a lure which combined both a plug and a spinner might be very useful as a novelty to offer the pike when everything else in your tackle box fails to attract them. The handyman can make his own throughout but I used a two-piece plug from my box of lures.

I first separated the two pieces and removed the eyelets. Starting with the front section a hole was drilled from the



1ST. LURE



2ND. LURE

top of the head and coming out at the centre of the rear end as shown in Fig. 3.

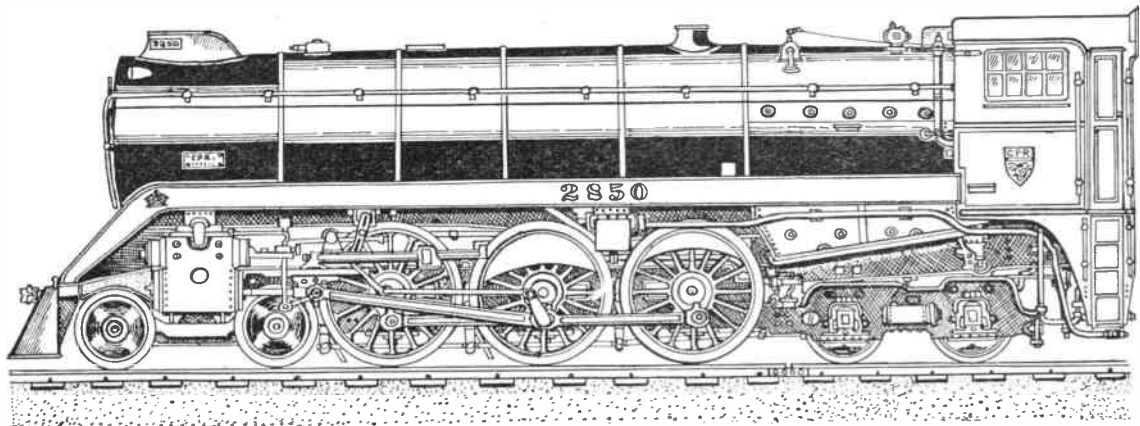
Then, using a drill about 1/8 in. diameter, a hole was drilled at the other end, using the smaller hole as a centre mark for the drill. This hole, shown at X in Fig. 4, was drilled in to a depth of about 1/4 in. The purpose of this hole is to take part of the centre swivel and by using it the two pieces of the plug can be brought close together.

The next job is to drill a hole straight through the centre of the rear portion of the plug and this should be about 1/8 in. in diameter so that you can either fit a piece of brass tubing the full length of the hole or insert eyelets at each end to act as bearing surfaces on which this part can spin (Fig. 5).

The next operation is to cut a couple of vanes which will provide the spinning action and these can be either metal or perspex. You will need to cut two slots in the plug to take the vanes and these should be of a size which provides a slack fit for the vanes so that you can apply a good coat of cement. This is the only

● Continued on page 209

THE C.P.R. 'HUDSON' CLASS



OUR subject depicts the popular 4-6-4 'Hudson' class engine of the Canadian Pacific Railway. When these locomotives first made their appearance they were built to specifications and designs from the drawing office of Mr H. B. Bowen, Chief of Motive Power and Rolling Stock, C.P.R., Montreal, the object being to produce a locomotive which would be capable of continual high speed, long distance service without relief or the need of an assistant engine over the steepest grades.

In this connection the design has proved thoroughly satisfactory, and forty of the type were outshopped in 1927-28, followed by another twenty in 1929-30. They are all numbered in the 2800 series, and in regular passenger service these locomotives have been used on high speed runs approximating a thousand miles between Toronto and

Fort William, and in Western Canada.

Engine No. 2850 shown in the drawing successfully completed the very creditable task of hauling the Royal twelve-car train conveying King George VI and Queen Elizabeth 3,100 miles across Canada during the Royal tour of 1939. The engine was afterwards displayed at the New York World Fair in the same year. The tour passed without incident to mar the locomotive's record, and never before or since has such a train accomplished such a lengthy run on the North American Continent without change of engine.

The design follows closely the streamlined construction first developed in the lightweight high speed 'Jubilee' engines, the exterior being airmoothed with no projecting headlight, smokestack or domes to any great extent, whilst the sloping lines of the front plates merge into the horizontal lines of

the running boards and boiler. The following are the general details: engine class — H.I.D., cylinders 22 in. diameter by 30 in. stroke, coupled wheels diameter 75 in., boiler water pressure 275 lb. p.s.i., tractive power, 45,250 lb. (with booster 57,250 lb.). Total engine weight in working order 364,000 lb. (with booster 353,500 lb.). Tender — weight loaded, 12,000 imperial gallons and 21 tons coal = 293,500 lb. Heating surfaces, tubes and flues 3,465 sq. ft., firebox and arch tubes 326 sq. ft., total 3,791 sq. ft., superheater 1,542 sq. ft., combined total 5,333 sq. ft. Grate area 80.8 sq. ft. Coupled wheelbase 13 ft. 2 in. Total engine wheelbase 39 ft. 6 in. Length engine and tender over couplers 90 ft. 10 in.

The Royal Hudson engine 2850 embodies stainless steel fittings, and is finished in royal blue and silver livery. (A.J.R.)

● Continued from page 208

LURES FOR BIG PIKE

means you will have of fixing the vanes in position and if they are a really tight fit in the slots the adhesive will be rubbed off as you push them in. Fig. 6 shows the position of the slots. The angle you can make to suit your own fancy but I suggest that they are not too steep as there is no need for a really fast spin.

Your next job is to make up the wire flight and connect the whole lot together. To do this take a piece of Alasticum wire and double it. Put on your treble hook and then twist the wire tightly. Make sure that your wire is long enough to go through the rear portion of the

plug and with enough spare to take a bead at the hook end and to twist on to the swivel at the opposite end. Fig. 6 shows the rear portion complete.

You now require another piece of wire and this too should be double. Put the other eye of the swivel on to this wire and then twist tightly and push the wire through the hole in the front portion so that the swivel comes up into the larger hole at the rear. This wire should be long enough to go through the line eyelet in the front of the plug where it is threaded under and twisted two or three times. The whole plug is then ready for use.

Now for the advantages of such a lure. In a 'thick' water the pike does not get much opportunity to see a lure, whether it be a plug or a spinner. If you let a spinner sink to the bottom it appears to the fish for what it really is — a piece of metal with no life in it. This lure when fished out will give all the action of a plug but with the advantage that when sinking, the rear portion will spin.

In running water the plug, being buoyant, will not sink to the bottom if held stationary and the current will make the rear portion spin, giving the appearance of a small fish 'fanning' to maintain its position in the stream but with no forward movement and it will be within the vision of the pike for as long as you wish. Try one out.

Model Boats in Cardboard

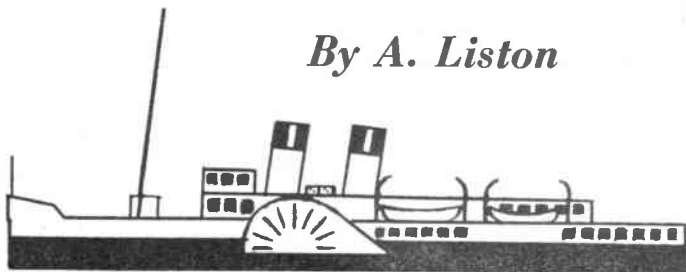
By A. Liston

MODEL ships constructed from paper, cardboard, and odds and ends, can look surprisingly effective, and are easy to make.

The method described here can be used for many kinds of ships, but it is best to start with a simple model with a flush deck. The example shown here is a paddle steamer, the paddle boxes on each side breaking the plain lines of the hull.

First, two pieces of thick cardboard, 12 in. long and 2 in. wide, are cut to identical shape, pointed at the bow and rounded at the stern. Next, four blocks of wood, 1 in. high, are glued in position between the cardboard shapes, and flush with their outer edges. The one at the bows is wedge-shaped, and the pair in the centre are 5 in. back from the bow.

The sides of the hull are made of paper. Ordinary brown wrapping paper is suitable for this. Each side is made from a strip 14 in. long and 2 in. wide. A $\frac{1}{2}$ in. border at each side is cut into flanges as shown at B. The strip is gummed in place top and bottom, starting at the bows. Allow a little overlap at the stern and cut off the remainder.



The upper deck is a rectangular box, $6\frac{1}{2}$ in. by 1 in., with $\frac{1}{2}$ in. sides and flanges. It is therefore cut from a piece of thin cardboard $8\frac{1}{2}$ in. by 3 in., cut and folded as shown at C. It is glued in place by its flanges 3 in. from the bows.

The bridge is a 1 in. square box, cut from a 3 in. square of card as shown at D. It is glued to the upper deck by its front and sides and by its flange at the rear.

The funnels are $1\frac{1}{2}$ in. wide strips of paper wound round a $\frac{1}{2}$ in. diameter rod — a fountain pen barrel will do — and glued into cylinders E. They are glued in place 1 in. apart, the front one close against the bridge. Trim one side of the bottom, so that the funnels lean back slightly.

The mast table, which supports the mast, is made from a $\frac{1}{2}$ in. strip of card $2\frac{1}{2}$ in. long, folded as shown at F and glued in place. The 5 in. long mast is

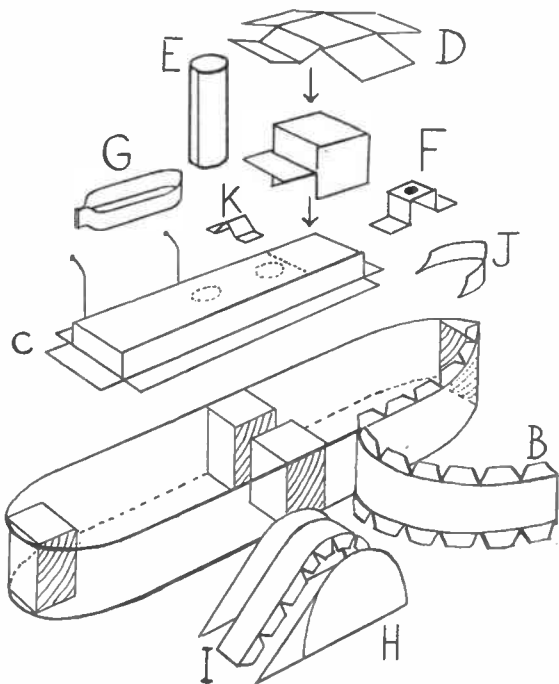
made from paper rolled round a knitting needle and gummed. A hole is made in the mast table and the deck beneath it, and the mast passed through it and glued in position.

Each lifeboat is made from a strip of card, 2 in. by $\frac{1}{2}$ in., folded and glued as seen at G. They are placed on each side of the upper deck.

Each paddle box is made from two 2 in. diameter semi-circles, with the rear side extended by $\frac{3}{4}$ in. (H). A $\frac{1}{2}$ in. wide strip with $\frac{1}{4}$ in. wide tabs on each side, I, is bent round and glued to two semi-circles to form a complete paddle box. These are glued to the now hidden block at each side of the hull between the funnels.

A V-shaped strip of card J is glued in place in the bows, another between the funnels K becomes the engine-room skylight, and bent pins glued to the upper deck form davits.

The finish can be in poster or oil paint. The hull should be black and white, decks grey or fawn, upperworks white, and funnels red or yellow with black tops. Use a very small brush for window and paddle-box details, and use the end of a match-stick dipped in paint for portholes.



HOW DID YOU DROODLE ?

(See page 205)

1. Clinging Vine on a Day Off.
2. Space Helmet for a Boy who chews bubble Gum.
3. Tadpoles doing the Conga.
4. Tandem for Witches.
5. Bent Wire Worm.
6. Brave Balloon.
7. Chess Board for Novices.
8. Worm who bit off More than it could Chew.
9. Rain Proof Cigar.
10. Diver with Hiccups.
11. Cowardly Fly Landing.
12. Swear Word in Cherokee.

Single seat and two seat CANOES

COMPLETE AND READY
FOR THE WATER — OR
IN KIT FORM TO MAKE
YOURSELF



THE PBK 10 SINGLE SEATER

These popular craft are designed by that well-known authority, P. W. Blandford. With canvas skins, they are propelled by double-bladed paddles and are thoroughly at home on lake, river or canal — or even on the sea in experienced hands. They are offered as complete canoes, or as specially prepared kits, which include full building instructions. Easy terms are available, subject to the completion of a simple form of Agreement.

PBK 10

Single seat — 11 ft. long
28 in. beam — load 300 lb.

COMPLETE CANOE (without paddles)
CASH PRICE £24.5.0 (part p. & p. £2 extra),
or EASY PAYMENTS £6 DOWN (plus £2
part p. & p.) & 6 monthly payments of £3.4.8.

COMPLETE KIT (except paint and
varnish and without paddles)
CASH PRICE £15.10.0 (part p & p. 15/- extra)
or EASY PAYMENTS £4 DOWN (plus 15/-
part p. & p.) and 6 monthly payments of £2.0.9.

DOUBLE-BLADED PADDLES, 47/6 Complete (part p. & p. 2/6 extra)

PBK 20

Two seater — 15 ft. long
32 in. beam — load 700 lb.

COMPLETE CANOE (without paddles)
CASH PRICE £32.10.0 (part p. & p. £2.10.0
extra), or EASY PAYMENTS £8 DOWN
(plus £2.10.0 part p. & p.) & 6 monthly pay-
ments of £4.6.9.

COMPLETE KIT (except paint and
varnish and without paddles)
CASH PRICE £22.5.0 (part p. & p. 20/- extra)
or EASY PAYMENTS £5.10.0 DOWN
(plus 20/- part p. & p.) & 6 monthly payments
of £2.19.4.

(DEPT. 993)

DEREHAM



NORFOLK

CHEMISTRY

AT HOME

An adhesive which resists hot water is often needed for small crockery repairs. Gelatine solution will act as an adhesive, but hot water readily removes it from joined surfaces. By incorporating a little potassium dichromate the adhesive becomes insoluble when it has been exposed to light.

MORE USEFUL RECIPES FOR HOME USE

By L. A. Fantozzi

It is best made in small quantities, for it sets to a gel when cold and there is the inconvenience of warming it up when required. Naturally, it also has to be kept in the dark. Put 2.84 grams of gelatine in a beaker or small clean tin. Add 14 c.c. of cold water and leave to stand overnight. Then warm up the mass in a boiling water bath. When the gelatine has run down to a liquid add 0.26 gram of potassium dichromate and stir until it has dissolved. Apply the warm adhesive to the work and bind together. Leave the article in strong light for three or four days.

Copper etcher

Diluted nitric acid is useful for this. It may also be used for brass etching. To make up the etcher stir 1 volume of concentrated nitric acid into 2 volumes of cold water in a glass vessel. Keep it in a glass-stoppered bottle, for it rots cork. It should be borne in mind that nitric acid is corrosive to skin and stains it yellow. Should you inadvertently get any on your hands, flush well with water and dab on a paste of sodium bicarbonate and water.

Glass-marking pencils

For the temporary marking of glass or crockery a special pencil may be bought from laboratory furnishers. Should you like to make your own, it is quite simple. In a water bath melt together 2 grams of stearic acid, 1.5 grams of fat, and 1 gram of beeswax. Stir in 3 grams of dry powder pigment. This

mixture can be conveniently made into a pencil by cleaning out the pith from an elder twig, pressing one end into a dab of modelling clay on a board, and pouring in the melted mass. Allow to cool for a few hours before sharpening the pencil. If you have difficulty in making a mark, either warm the article or rub its surface vigorously with a dry cloth.

For a pigment you can use red lead for a red pencil, lead chromate for a yellow, and Prussian Blue for a blue.

Bath cleaner

Porcelain enamelled baths which have a refractory scum mark may be rubbed with trichlorethylene. If this has little or no effect, the scum is due to hard water. Treat this with dilute hydrochloric acid. Technical grade hydrochloric acid should be bought and diluted by stirring one volume into 4 volumes of cold water. Hydrochloric acid is injurious if it comes in contact with the skin. Should this happen, treat it as for nitric acid (see "Copper etcher"). Tie a pad of cotton on a stick, well damp it with the acid, and apply to the scum. Rinse down well with water and dry off. If any scum remains, follow up with trichlorethylene.

Lemonade crystals

This ever popular item is easily made by thoroughly mixing 2 pounds of white sugar with 1 ounce of tartaric acid. Put the mixture into a large bottle and add $\frac{1}{4}$ fluid ounce of lemon essence. Shake up thoroughly once more and leave overnight. Shake again, and the essence should then be evenly dispersed. The quantity to use naturally depends on one's palate, but on average a dessert-spoonful to a tumbler of water may be used.

Peppermint cordial

This pleasant "winter warmer" can be made up in concentrated form by dissolving 4 ounces of white sugar in 1 pint of hot water, pouring into a bottle when cool, and shaking with 12 drops of oil of peppermint. Dilute to taste as required.

White ink

If you should need a little white ink, an emergency measure is to mix a little powdered starch or whiting with ordinary gum mucilage.

Stamp pad ink remover

Smears of coloured stamp pad ink on skin or clothing are tenacious and unsightly. A simple remedy is methylated spirit. Swab or soak the stain, remove surplus spirit and repeat the treatment if the stain has not entirely disappeared.

Fireproofing solution

Paper, wood, and cotton may be kindle-proofed with solutions of various metallic salts. As the readily available borax is one of these it is most convenient to use this. Dissolve it in the proportion of 1 ounce of borax to $\frac{1}{2}$ pint of warm water. Dip or brush the article and allow to dry. In the case of cotton it should be borne in mind that washing will remove the borax. Hence the fabric must be reproofed after each washing.

Low melting point casting alloy

Sometimes the problem arises of how to take a cast in metal of a wood relief or of a papier-mâché moulding. Ordinary alloys of higher melting point will naturally damage the object. There is a useful alloy for the purpose which will melt even below the boiling point of water. It consists of 8 parts by weight of lead, 3 parts of tin, and 8 parts of bismuth. Melt the lead at as low a heat as possible, add the tin, and when it has disappeared put in the bismuth. Cast the alloy into small ingots in moulds made by pressing a pencil stub into firmly packed earth. The alloy may be melted as needed by the heat of a water bath.

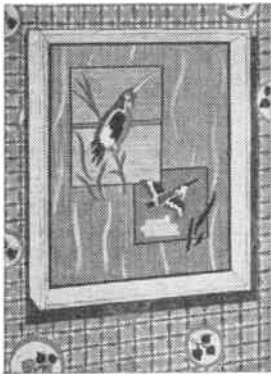
Photographic tray cleaner

Trays which have resistant stains on them may be cleaned with a special solution. This is in principle a solution of chromic acid produced by acting on potassium dichromate with sulphuric acid.

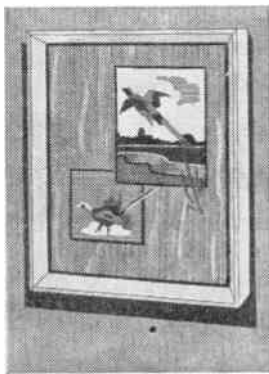
First dilute 10 c.c. of strong sulphuric acid by stirring it slowly into 80 c.c. of cold water in a beaker surrounded by cold water. Remove the beaker from the surrounding cold water. Dissolve in the diluted acid 12 grams of potassium dichromate by warming the whole. Allow it to cool and make it up to 100 c.c. with water. Keep the solution in a glass-stoppered bottle. Both the original sulphuric acid and the final solution are corrosive to the skin, and any on the fingers should be treated as for nitric acid (see "Copper etcher").

To use the cleaner pour some into the tray and allow it to act until the stains disappear. Pour the solution back into the bottle and rinse the tray until the water runs off uncoloured. The solution may be used again and again and only needs renewing when its action on stains becomes markedly slow.

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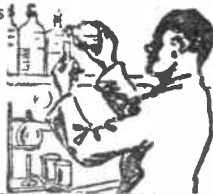
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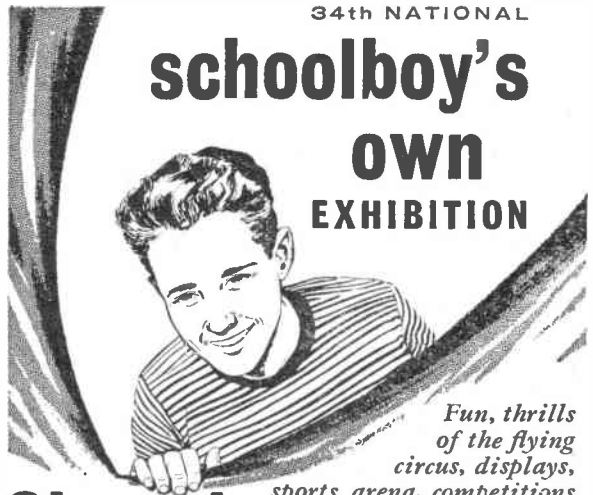
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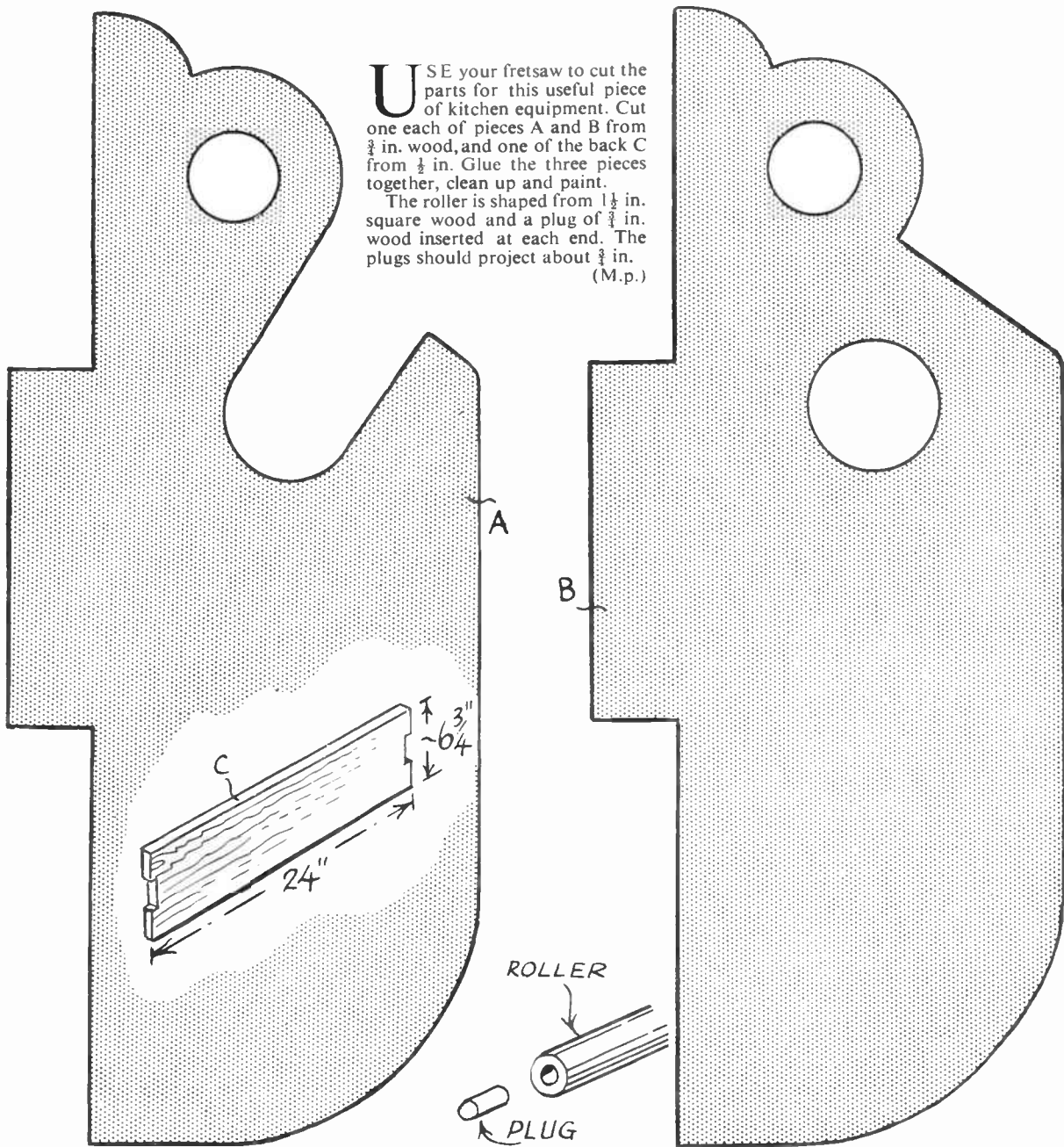
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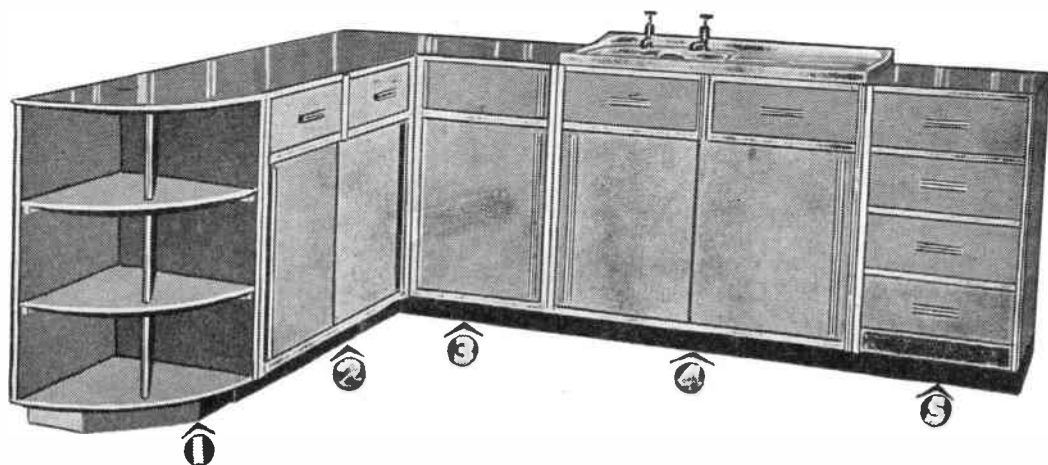
The roller is shaped from $1\frac{1}{2}$ in. square wood and a plug of $\frac{3}{4}$ in. wood inserted at each end. The plugs should project about $\frac{3}{4}$ in.

(M.p.)



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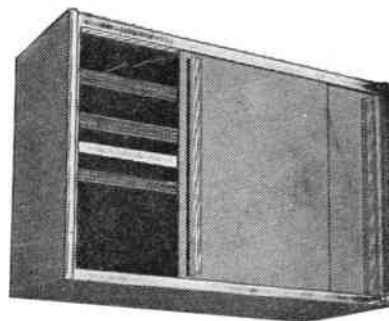
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