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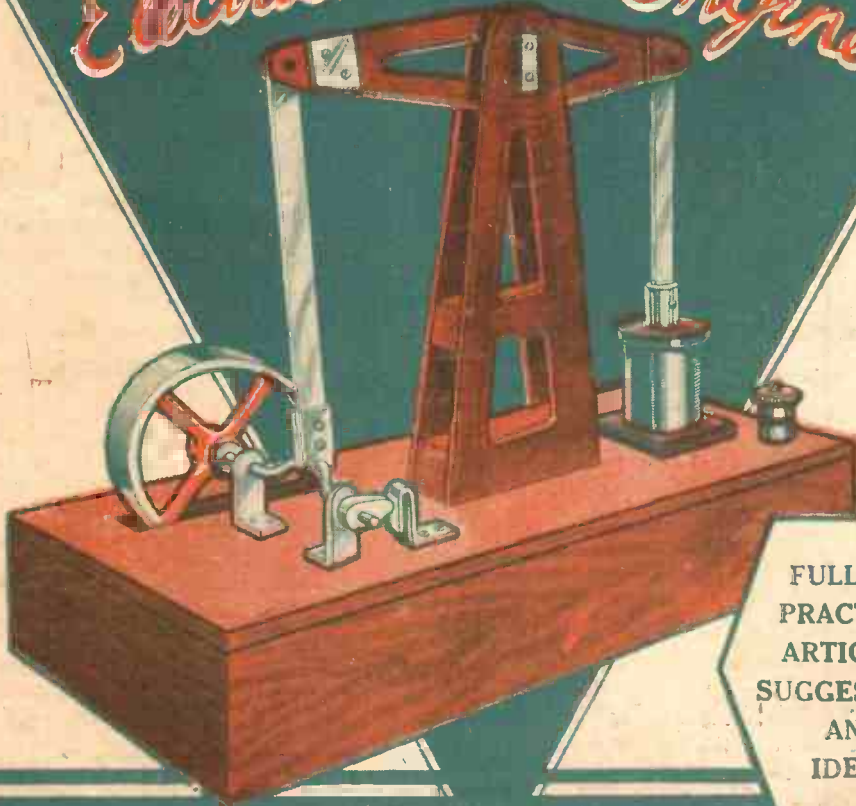
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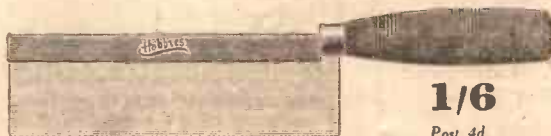
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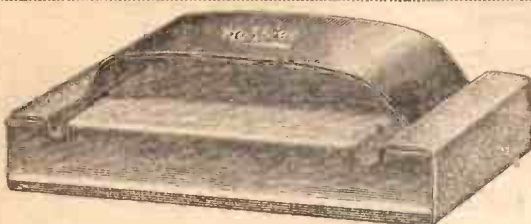
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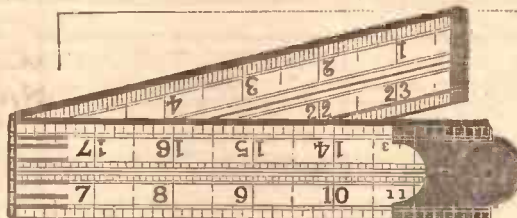
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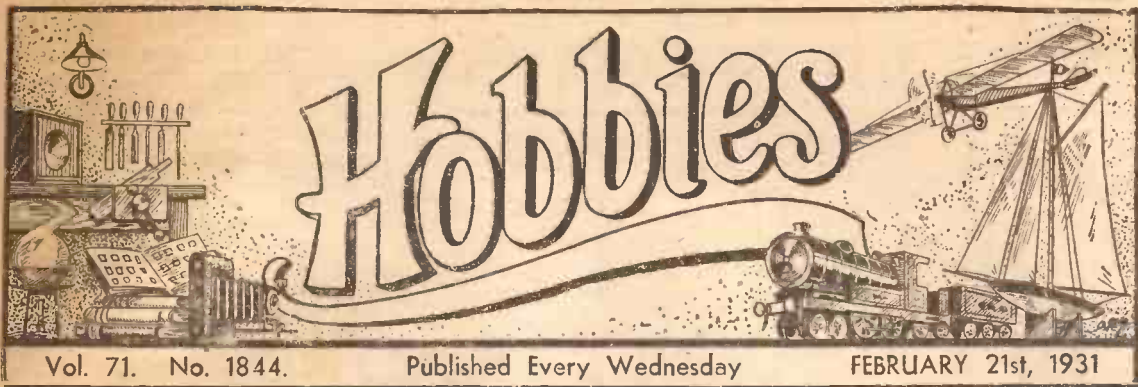
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## THIS WEEK'S CLEVER IDEAS

### A Miniature Microphone Button.

IT is not generally known that by means of a miniature microphone button obtainable from Economic Electric, Limited, 10, Fitzroy Square, London, W., it is possible materially to increase the efficiency of a wireless circuit and effect a reduction in battery current consumption. It can be used as an amplifier, as a loud speaker, and additionally, quite a number of mysterious effects can be produced. For example, one may talk through one's chest, amplify the ticking of a watch, talk through a glass, convey sounds from one room into another, etc., etc. The little button, which is fitted with carbon electrodes, costs 5s. and



A miniature microphone button.

works in any position.

### A New Gas-Lighter.

A NOVEL gas-lighter obtainable from the firm mentioned above is shown in the illustration in the centre of this page; a small switch is pressed and operates a plunger. This establishes connection through an electric battery to a spongy platinum igniter end which glows brilliantly and effects ignition. It costs 5s. 6d. complete with battery and burner.



A novel gas-lighter.

### The Moviescope.

A LITTLE attachment known as the moviescope, which will fit over any standard size 3-cell pocket lamp, is provided with a good quality lens mounted in a focusing tube, and a length of coloured film containing about forty different pictures is supplied with it. By putting the lens to the eye and switching on the light the pictures are seen enlarged several times their original size. The attachment only, complete with the film, costs 2s., but with lamp, bulb and battery, 4s., from the same address as mentioned in the first paragraph.



The moviescope.

### The Autocharge.

THE little piece of apparatus shown in the diagram here enables the user of a portable wireless receiver to charge his accumulator from his motor-car lighting set, either whilst driving or when the car is standing in the garage with the engine at rest. There are two plugs to fit in the car switchboard or inspection lamp sockets and two terminals to attach to the accumulator. The latter will charge without any attention or expense at the rate of 1 amp. per hour. The size of the device is only 6½ in. by 1¼ in., and may be obtained for either 6-volt or 12-volt sets. This costs 10s. 6d. complete from the firm already mentioned.



With this piece of apparatus the owner of a portable set can charge his batteries from the motor-car lighting set.

### A Pocket Outfit for the Camper.

THE little pocket set shown in the sketch below is made to slip into the pocket of a sporting jacket. The tin box contains a collapsible primus stove with detachable simple burner, wind-shield, methylated spirit c.n., spanner and cleaning needles. The paraffin tank will hold half a pint. This costs 7s. 6d. from Messrs.

Blanks, Ltd., 303, Grays Inn Road, London, W.C.

### "The Motor-Cyclist's Reference Year Book."

THIS handy compendium of everything the motor-cyclist needs to know about motor-cycles and motor-cycling is now ready, price 1s. from all newsagents, or by post for 1s. 2d. from the proprietors of this journal. It is the motor-cyclist's encyclopaedia.

### Shower Baths on L.N.E.R. Trains.

THE first hot and cold shower bath to be installed on a railway train has been fitted up experimentally in a first-class sleeping car on the night Scotch express from King's Cross.



A pocket stove for the camper.

# NOTES AND NOTIONS from our READERS

## Renovating Playing Cards.

WHY throw away your playing cards when they are dirty, and therefore unfit for card games.



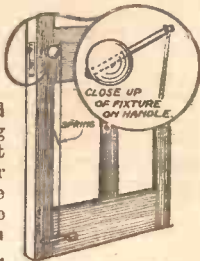
How to clean playing cards with spirits of camphor

They can be cleaned and made to look as good as new by the following method. Dip a piece of rag in spirits of camphor (obtainable at any chemist's), and gently rub over the surface of the cards. This will remove the dirt, and make them once more presentable for card games.

power. Obtain a small file, and break off a piece about lin. in length, and fix it between the pipe and a spanner as shown in the sketch. The pipe can now be turned with the spanner, as the piece of file stops the spanner from slipping.

## A Simple Door-Opening Device.

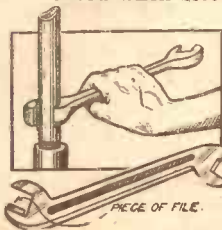
A SIMPLE device for opening a workshop or shed door when one's hands are full is shown in the sketch. A hole is drilled through the door handle or knob, and a piece of stout rod is passed through and riveted on the side nearest the edge of the door. At the other end of this rod is a hole or loop, through which is passed and fastened a long piece of stout wire. The other end of this wire is fastened to the middle of a treadle about 6in. long and 3in. wide, which is hinged to the door the same distance in as the handle, and about 3in. or 4in. from the bottom of the door. When this treadle is pressed, the handle is turned, and the door will open. It will be readily seen that the device can be adapted for use with a common "lift latch."



A simple door-opening device.

## Screwing Pipes into Tight-Fitting Holes.

DIFFICULTY is sometimes experienced when screwing two pipes together, by not having the necessary tool to grip the pipe to give the necessary twisting

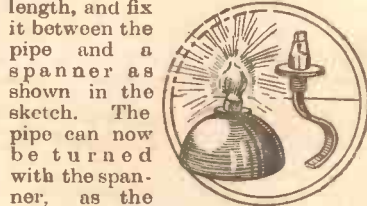


PIECE OF FILE.

Screwing pipes into tight-fitting holes.

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power. Obtain a small file, and break off a piece about lin. in length, and fix it between the pipe and a spanner as shown in the sketch. The pipe can now be turned with the spanner, as the piece of file stops the spanner from slipping.



An oil-can lamp.

## An Oil-Can Lamp.

HERE is a handy little lamp that can be made quite easily from an oil-can. Cut off the tube, leaving half an inch to allow a wick to be inserted as shown in the sketch. A lamp so made will give very good results.

## Flower Bowls from Gramophone Records.

WORN-OUT gramophone records can be made into novel flower bowls by the following simple process. Place the record into a bowl of hot water until it becomes soft and

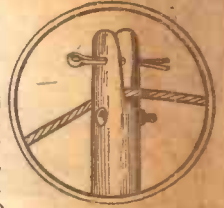


A flower bowl made from a gramophone record.

pliable. It can then be bent into any shape required.

## A Non-Slip Clothes Prop.

INSTEAD of having a simple V-shaped notch in the top of the prop for the line to fit into, it is an improvement to use a prop-head



A non-slip clothes prop

as shown in the diagram. A split pin is passed through the notch, thus acting as a lock and obviating the annoyance of the laundry falling in the dirt when the wind, acting on the garments attached to line, causes the line to lift.

## A Waterproof Boot-Cover for Cyclists.

DURING wet weather the cyclist often experiences the annoyance of wet feet. The attachment for a boot or shoe shown in the sketch is a good preventative against the wet.



A waterproof boot- or shoe-cover for cyclists.

It is made of waterproof canvas, and is attached to the boot or shoe by means of elastic bands. When fitted, it is completely watertight, and enables the wearer to ride a bicycle during wet weather, without suffering the discomfort of wet feet.

## Leather Stripping Guide.

ODD strips of leather can often be put to a useful purpose by converting them into laces for shoes, footballs, etc. It is difficult to cut narrow strips of leather straight and, to get over the difficulty, knock two nails into the bench so that they grip the sides of the leather strip. Then stick a sharp knife through the leather a distance from the edge equal to the width the lace is required to be, making sure that the knife sticks firmly into the bench. By pulling on the strip of leather the knife will cut a clean and even strip. For the next lace remove one of the nails and refix it close to the edge.

Making leather boot laces.



## The only Reference Year Book covering every phase of Motor-Cycling.

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WIRELESS NOTES.

# MAKING A GRAMOPHONE PICK-UP

By J. H. Reed

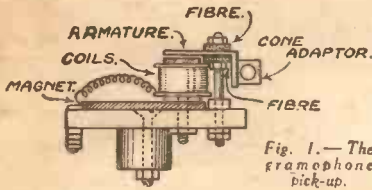


Fig. 1.—The gramophone pick-up.

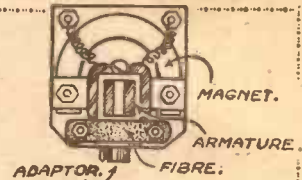


Fig. 3.—The magnet obtained from telephone receiver.

THE essential component necessary for the construction of the gramophone pick-up is an old telephone earpiece, with magnet and windings intact. The other materials required are a strip of metal, a small square of  $\frac{1}{4}$  in. ebonite, a length of 4 B.A. studding and nuts, a cone speaker attachment, a small piece of  $\frac{1}{8}$  in. vulcanized fibre, a 4 B.A. countersunk screw and nut, and two small terminals. It is not possible to give actual dimensions for every part, as the sizes of telephone magnets vary somewhat.

### The Magnet.

Dismantle the 'phone, being careful not to injure the windings, and mark out the shape of the magnet on the ebonite, allowing an overlap lengthwise of  $\frac{1}{8}$  in. (Fig. 3). Mark through the holes in the magnet whereby the pole-pieces and coils are attached and drill through the ebonite a  $\frac{1}{8}$  in. hole at each point. Also drill and countersink a further  $\frac{1}{8}$  in. hole in the centre of the block and screw in a 1 in. 4 B.A. screw. Drill two more holes to

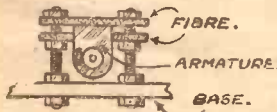


Fig. 4.—The armature supports.

### The Armature.

The next step is the armature (Fig. 2), and for this the meccano strip and cone speaker adaptor are required. Enlarge the hole near the end of the strip until it will take the adaptor and mark off where the adaptor will come. Now carefully bend over this piece at right-angles and solder in the cone fitting, afterwards cutting off any surplus.

For the armature support two further holes must be drilled in the ebonite. These should be  $\frac{1}{8}$  in. in diameter, 1 in. apart and  $\frac{1}{8}$  in. from the edges of the magnet bobbins, as in sketch. Cut two pieces of  $\frac{1}{8}$  in. vulcanized fibre  $1\frac{1}{2}$  in. by  $\frac{3}{8}$  in. and drill, using the two holes in the ebonite base as a template. Now insert a short length of 4 B.A. studding in each hole in the base and screw down, using a nut underneath and another on top in order to obtain as much stiffness as possible. Thread a further nut on each piece of studding and then slip on the pieces of fibre, leaving a slight gap between them. A further nut should now be added on each end of the fibres (Fig. 4). Insert the armature strip between the fibre strips, with the needle holder (cone adaptor) downwards, and push it back as far as it will go without fouling anywhere. Mark off on the armature strip the length of the magnet pole pieces, cut off the right length and file out the inside, leaving a hollow square with sides of the same width as the pole pieces. It is, of course, necessary to remove the armature to cut and file.

### Adjusting the Armature.

Reassemble, adjusting the lower fibre block so that its upper surface is a little higher (about  $1/32$  in.) than the tops of the magnet poles, and screw down the top nuts fairly tightly. Upward adjustment of the armature is obtained by slackening off the top nuts and tightening the lower ones, whilst downwards movement is made by slackening the under nut and tightening those on top.

A short length of round section wood of diameter sufficient to fit inside the tone arm is drilled lengthwise, slipped over the 4 B.A. screw already fixed to the base and secured by means of a washer and nut.

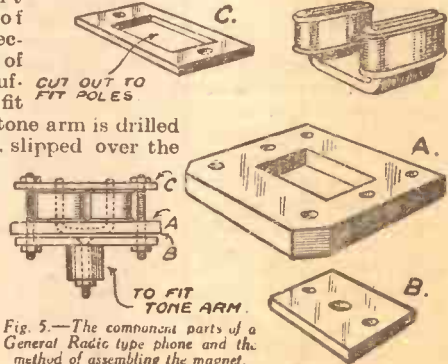


Fig. 5.—The component parts of a General Radioc type phone and the method of assembling the magnet.

### Testing the Pick-up.

The pick-up is now ready for testing and should be slipped into the gramophone tone-arm. If possible a pair of 'phones should be connected across the terminals, as a better idea of the output can be obtained than with an amplifier and loud speaker. If, however, 'phones are not available, it will, of course, be necessary to use the amplifier.

Adjust the height of the armature by the method previously described until the greatest volume with a minimum of chatter is obtained. Should there be a pronounced resonance on any note, try moving the armature backwards or forwards slightly. Should it, however, still persist, a fairly thick layer of rubber solution on the top surface of the armature strip will almost certainly effect a cure.

A light cover should be made to fit over the mechanism, either of light card or aluminium of the shaving soap container quality. The inside should be lightly packed with cotton-wool.

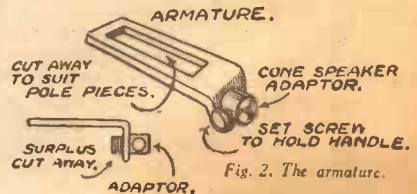


Fig. 2. The armature.

Instruments constructed in this manner have proved (Continued at foot of page 670.)

# A RUBBER-DRIVEN MOTOR FOR A MODEL SPEED BOAT

By W. S. Gifford

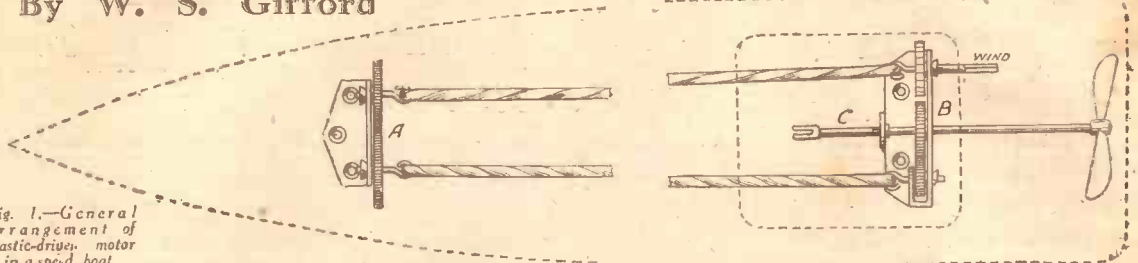


Fig. 1.—General arrangement of elastic-driven motor in a speed boat.

THE one drawback to the rubber motor as used in model aeroplanes is that it runs down in a very short time. This in part is due to the small amount of resistance offered to the propeller by the air, an objection that does not apply with so much force to a screw running in water, so that it is possible to use a rubber motor for driving a model boat, if in other respects it is designed so as to get the maximum duty out of the rubber.

### The Gearing System.

Fig. 1 shows how this may be done. The idea is to use two separate strands of rubber, geared together, so that they

may act as one, and thus operate as a single strand.

Fig. 1 shows these

strands broken in the centre for economy of space in the drawing. It will be noted that they are not quite parallel, which would not affect the working, but reduces the width of the gearing at the fore end of the boat. This gearing consists of two spur wheels of equal size running in bearings in an angle plate of sheet brass and carrying hooks to which the rubber strands are hitched (see A).



Fig. 3.—The winding key.



Fig. 2.—The ratchet wheel with pawl

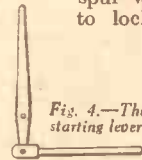


Fig. 4.—The starting lever.

shaft running in double bearings, provided with a spur wheel in mesh with one of smaller size to which one rubber strand is hitched (see B). Independently, a ratchet wheel with pawl (see Fig. 2) takes the end of the other strand, and has its pivot extended aft, and provided with a squared end for a cranked winding key as Fig. 3.

### The Starting Lever.

A starting lever as Fig. 4, operates a rod (shown also in Fig. 1 C) that can be driven into one of the four holes in the spur wheel on the screw shaft. Its object is

to lock the screw shaft whilst the strands are being wound up, the star-board strand being self-locking by means of the ratchet wheel and pawl.

### The Hull.

This part of the boat may be fashioned from wood and the gears screwed in place, holes in the gear plates for that purpose being made, as indicated in the figures.

Toothed wheels suitable for this motor may be purchased from firms specialising in model aeroplane accessories, or may be had from a friendly clockmaker.

Carefully made, with all gears running freely, this motor should render good service, and its cost for materials should be trifling.

### The Rear Gearing.

The gearing at the after end consists of the screw

## MAKING A GRAMOPHONE PICK-UP (continued from page 669).

quite satisfactory, although possibly not as good as expensive commercial makes. The total cost, however, need not exceed 2s. 6d., as the most expensive item, the 'phone, can usually be purchased for a shilling or so from any wireless shop.

### The Receiver.

When the telephone receiver available is of the general radio type, a different method of construction is required (see Fig. 5). In this case the magnet is of U shape and has no separate pole pieces, the bobbins being slipped over the ends of the permanent magnet, which is held in the case by means of wax. It is only necessary to gently heat the container to remove the "works."

### Mounting the Magnet.

To mount the magnet on the pick-up base cut a slot in the ebonite of a size that will just take the bend of

the magnet. A piece of  $\frac{1}{8}$  in. aluminium, from an old variable condenser end plate, is also slotted to fit over the magnet poles and cut to the width of the ebonite. Holes are drilled near the ends, corresponding holes are also drilled in the ebonite, and the three parts, ebonite, magnet, and aluminium cover piece, clamped together with 4 B.A. screws and nuts.

A strip of ebonite  $\frac{1}{2}$  in. wide to carry the tone-arm adaptor should be screwed on, using the same screws, as in sketch.

The armature and its support are constructed in the same manner as in the other type of pick-up, and adjustment is also carried out in the same way.

This type of instrument is slightly more difficult to construct than that first described, but has the advantage of lighter weight and appears, from tests, to be slightly more efficient.





# RAFFIA AND WOOL-WORK

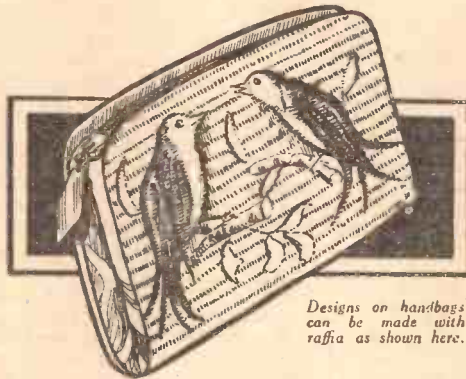
**A Practical and Inexpensive Hobby.**

**The Uses of Felt.**

Felt is used as much as canvas or crash nowadays. It is so heavy and firm; it wears for ever and cleans so well. Table runners and centres look very rich in felt, and providing the back is kept neat and free from ends, they need not be lined. For the more intricate and ambitious designs the raffia may be split, so that it can be worked in satin-stitch. By the way, raffia is more pliable and easy to work with if it is a little bit damp. If the bundles seem very dry, dip them in water and hang them up to dry an hour before you want them. This can be done over and over again without harming the raffia. Cushions are excellent in felt, and far more comfortable and inviting than those made of crash. If difficulty is experienced in getting a transfer to felt, the remedy is simple. Make your own design. An interesting way is to cut out flowers and leaves from cretonne. Arrange them on the felt and pin them firmly, then outline them with tailor's chalk. Cretonne colourings are usually beautiful, so your flowers and leaves will be a useful guide when you start the embroidery.

**E**MBROIDERING in raffia is one of the quickest and effective forms of decoration. The riot of colour is almost limitless, and bold designs spring

to life with remarkable rapidity under skilful fingers. Raffia-work is easy, and it also has the virtue of cheapness. The raffia straw is sold in bundles and is of varying thickness, according to the nature of the design. Usually a chenille needle is used. These bundles, which cost only a few pence, go a long way, and if you lay in a stock of assorted colours, you will find you have enough for quite a number of articles. Raffia canvas is usually used for the foundation, and the simpler designs for the beginner are generally in various cross-stitch patterns. It is impossible to go wrong with these: all you have to do is to count the threads of your canvas to keep your cross-stitches even. There are any amount of cross stitch transfers to choose from, and the two-colour scheme is the more effective for most of them. Thus, blue canvas might be worked in yellow and *vice versa*. Always work from left to right in cross-stitch, and then back from right to left, so that you keep your stitches uniform.



*Designs on handbags can be made with raffia as shown here.*

**An All-Over Design.**

Table mats of raffia are very effective. They are all the better for being thick and solid, so every thread of the canvas has its accompanying stitch. A striking design can be produced in squares worked in quarters, with contrasting colours in each quarter, while the wide border might be in the colour which is most predominant in the room in which they will be used. The mats are square, with oblong ones for the dishes. Always press raffia-work on the wrong side with an almost cold iron. Pad the ironing blanket, because, although you want it flat, the design should stand out. Felt linings are best for table mats. They prevent discoloration by heat, and they also cling slightly to polished surfaces, so that the mats do not slide about. Also felt does not fray, so the linings can be cut the exact size and oversewn neatly to the edges of the mats on the wrong side.

**Bags of all Descriptions.**

When making hand-bags, use coarse canvas and have it two-thirds as large again as you want the finished article. Choose your design and fasten it firmly on the canvas, which has been placed on a drawing board. Then outline it in quick drying ink. Embroider it in satin-stitch, after which fill in the background to the size and shape you require. This can be done in diamond pattern or in a plain style with long and short stitches, say five and eight threads of canvas alternately. The strap should be worked in the same way as the background. The border must be worked while the bag is flat. A loose lining would be nice in this bag, especially one of wash-leather. To



*A mat made with raffia.*

*(Continued at foot of page 672.)*



# THE GAME OF "SKYLL"

By E. Kerb

A novel and interesting game that is quite simple to make.

Fig. 1.—How the board should be marked out.

**H**ERE we suggest a novel game, which can be made quite easily and cheaply, and will amuse any number of persons, old or young. To play the game, stand the guide at any angle you wish behind the

### The Board.

Commence by marking out the cardboard as follows: 7 1/2 in. from one end, 1 1/2 in. from each side, and 2 in. from the other end, and draw an oblong. Now divide this up into 1 1/2 in. squares and circles, as shown in Fig. 1. Line up fairly thickly with black, leaving the squares white for the time being, the circles should be finished in various colours. When perfectly dry, the numbers may be painted on in black for the purpose of scoring. The vacant squares should be filled in in black.

Next glue the card to the baseboard, press out all air bubbles and put heavy articles on, to make it dry perfectly flat. The stripwood edge should now be fixed with screws to the baseboard, as shown in Fig. 1.

The guide is made by cutting two triangular pieces for the outside 1/2 in. thick as shown in Fig. 2, and one piece for the centre to the dotted line, measuring 3 1/2 in. on the vertical and 5 1/2 in. on the horizontal, 1/2 in. thick; nail these three pieces together firmly. The woodwork should be given a coat of dark stain and the board a coat of clear white varnish.

back line, place a penny or metal disc in the guide, and let it roll out on to the board. The skill is placing the guide to make the coin fall absolutely in the square or circle without touching the lines.

All you require to make the game is a baseboard 30 in. long by 18 in. wide, a piece of white cardboard the same size, two pieces of 1/2 in. by 1/2 in. stripwood 30 in. long, two pieces 17 in. long, and three odd pieces of wood for the guide, two pieces 1/2 in. thick and one piece 1/2 in. thick.

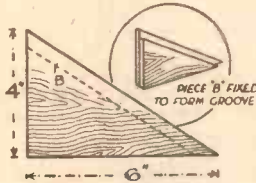


Fig. 2.—The guide for rolling the disc.

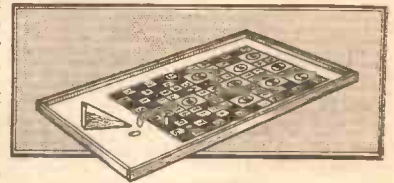


Fig. 3.—How the game is played.

## RAFFIA AND WOOL WORK (continued from page 671).

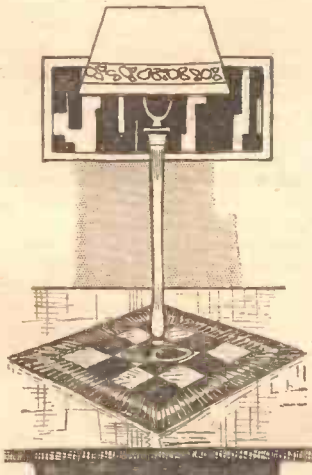


Table mats can be made as shown by using raffia

join the bag, stitch with the same raffia as for the border.

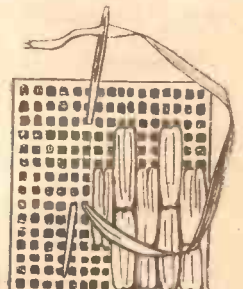
Zip fasteners can easily be incorporated by way of a change from the flap and press-fastener type. Evening bags look well in fine tapestry canvas. Split the raffia as finely as you can, so that the pattern will look like fine embroidery. Birds or butterflies would be very effective on a background of gold or silver. If birds are chosen, jewelled eyes add to their beauty. The gold or silver should be applied after the design has been worked.

foundation of the flowers is of stiff muslin; cut them in rounds about the size of a penny and pierce a hole in the centres. You need two rounds for each flower, and you can cover them with the wool in crochet or buttonhole-stitch. French knots are used for the centres. Attach all the flowers to wire stems and bind them all separately with green wool. The leaves are simply longer wires looped at the ends with enough wire left to go up the centre of the leaf. Twist tightly to the point and break off cleanly. Then buttonhole with green wool to the centre wire and this will form the veining. Group the flowers artistically and bind the stems together.

### Wool-Work Embroideries.

Wools are extremely easy to work and they give a raised effect that is very attractive. I saw some dark brown curtains worked with borders of orange and red flowers that looked very handsome.

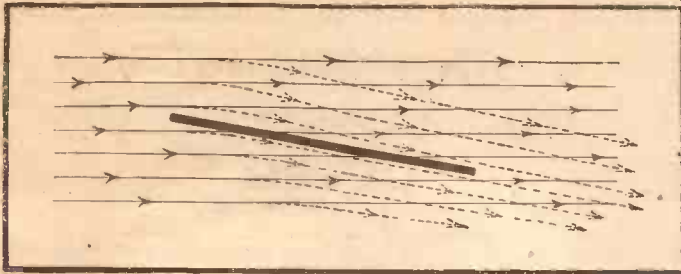
The flowers and leaves were worked in buttonhole-stitch with huge flower centres in contrasting colours. It was a bold design carried out in very thick wools. Garden cushions are useful decorated in wool-work, because they wash and wear for ever.



How the raffia work is done

### Wool Buttonhole Flowers.

Brilliant posies for the buttonhole are expensive, because they soil so quickly, so it is useful to know how to make them at home for about threepence. The



### Model Aeroplane Topics.

# WHY AN AEROPLANE FLIES

By S. J. Garratt

**H**OW many boys, if asked how an aeroplane derives its support when flying, could give a reasonably clear answer? It is hoped that all readers of **HOBBIES** will be able to do so after reading this article. In the case of airships and balloons, these simply float in the air because they weigh rather less than the weight of the air they displace; but an aeroplane, being very much heavier than air, derives its support in a different manner.

The aeroplane is, of course, acted upon by the force of gravity which unmistakably tries to bring the aeroplane to earth, and it would certainly do so if there were not another force acting in opposition to that due to gravity. The question is, "What is this force, and how is it derived?"

#### The Laws of Motion.

Before proceeding with the explanation we must recall two of Newton's laws of motion: firstly, that to every force there is an equal and opposite reaction, and secondly, that matter (which, of course, includes air) at rest will remain at rest until acted upon by a force.

Now turn to the diagram, which represents a flat surface (seen end-wise) inclined slightly to a stream of air moving past it. It is not important whether the air flows past the surface or the surface moves through the air, the effect is the same in each case. The full lines show the direction of the air stream without the flat surface, while the dotted lines show the new direction of the air stream when the surface (which represents an aeroplane wing) is placed in the position shown. The air, instead of going by in a straight path is deflected downwards, or, in other words, the wing has imparted a downward motion to the air. Now, according to Newton's law mentioned above, a force must be acting on the air to give it a downward motion, and again, according to Newton, this force must have an equal and opposite reaction; this reaction being opposite therefore acts upwards on the wing and supports the weight of the aeroplane. It will be seen from the diagram that the air passing over the top of the plane is also deflected downwards. In this case the air is pulled downwards by the plane, and the ever-present reaction, of course, pulls the plane upward.

At first it seems hard to believe that such large forces can be obtained through the agency of air, but it must be realized that an aeroplane wing deals with enormous quantities of air—it may be many tons per second—and, of course it requires just as great a force to move a ton of air as a ton of rock, say.

#### The Angle of Incidence.

By increasing the tilt—or angle of

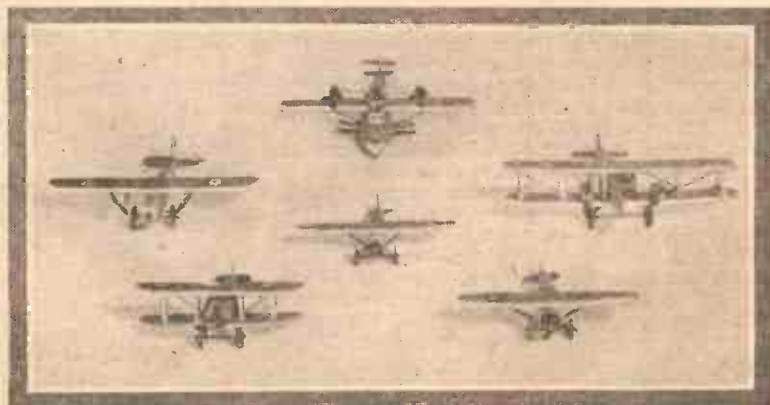
incidence, to use the proper term—the air is deflected more violently, or if the speed is increased, more air is dealt with, the result in both cases being to increase the lift beyond that necessary to support the aeroplane, which therefore climbs to a greater height. Similarly, a decrease in either the angle of incidence or the speed will cause the aeroplane to descend. If, however, the aeroplane falls below a certain speed (usually about forty miles per hour) the supporting force becomes so small that the aeroplane becomes uncontrollable (it is then said to be "stalled") and falls rapidly. If the aeroplane is high up, this will not be a very serious matter, for speed and control can be regained as the machine falls, but a stall near the ground means a serious crash unless the engine can get the machine up to flying speed again before reaching the ground.

#### The Force of the Propeller.

The forward motion necessary to cause the wings to deflect the air downward is, of course, derived from the engine and propeller. The propeller acts in a similar manner by pushing large quantities of air backwards, the reaction on the propeller blades providing the force which pushes the aeroplane along.

The angle of incidence of the wings is controlled by the pilot by means of the elevators on the tail; the wings are rigidly fixed to the fuselage of the aeroplane, but the whole aeroplane tilts to alter the angle of incidence, which usually varies between 0 and 15 degrees according to the conditions—i.e., climbing, diving, and varying speed. The directional control is carried out by the rudder, while the ailerons provide the means for keeping the machine level transversely.

A flat surface is shown on the diagram, but in practice the wings are always cambered or curved upwards near the front edge.



This photograph shows a flying boat, Puss monoplanes, a twin-engine monoplane, a fighter and a day bomber constructed of pieces of waste wood; these were made by Mr. J. C. Waller, one of our Hornsey Rise readers.

# AN INGENUOUS WIRE CONSTRUCTION OUTFIT

Easily Made in an Evening.

By L. Wallington

(Concluded from page 650, February 14th, issue.)

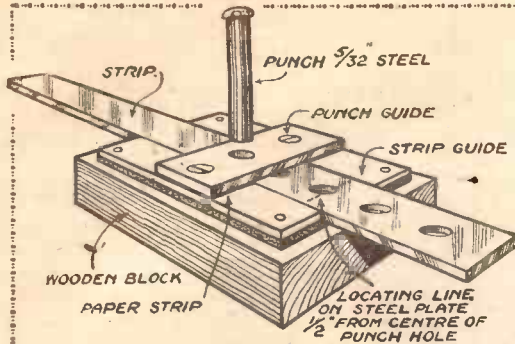


Fig. 3.—How the holes are punched.

### Flat Angle Pieces.

FOR bending these, another bending block can be made with a piece of hard wood and some stout nails, driving them well into the block as Fig. 1, leaving one of them loose, as it is on the outside of the wire shape and will hinder the bending if driven in tight. When bending the angles it is as well to keep your wire in a fairly long length, gripping it about an inch from the end with your pliers, turn it up square, then laying it upon the jig turn it round the pegs in the direction of the arrow, taking care not to kink the wire as you do so. Clip off the two rough ends and join with a ferrule. I have now given all the instructions necessary for you to commence bending and making all the building strips, and it will be quite a simple matter for the young inventor to design and bend any other shapes he may need as he goes along. In order that the strips and angle pieces may be erected to form your models, it will be necessary to make use of special brass washers; of course, the ordinary type can be used, but there is a danger of the wire strips splaying out when the screws are tightened up, and care would have to be taken to place the washer exactly upon each side, otherwise it would slip; so it is really worth while, to save time and irritation, to make the little die with which to punch out the neat, efficient washer designed for the set.

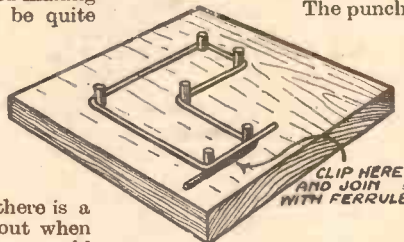


Fig. 1.—How the flat angle pieces are bent round the bending block.

### How Washers are Made.

In the first place, the washer is made as shown in Fig. 2, with two lipped sides, which actually clip upon the strip at any position quite securely, without any fear that it will slip when the model is built and working. When obtaining the brass for these washers do not get it too thick or soft; what is known as hard brass is just the thing, but it must be thin. To make the punch, Fig. 3, in its simplest form, you need a piece of thin steel, say, about 1/8 in. thick and 2 in. by 1 1/2 in. wide, and another piece of metal or hard wood to act as a guide for the punch. In order to form a slot through which to slide the brass strip you will have to separate the guide and the metal plate slightly more than the thickness of the material that you are using. Take a piece of the brass to be used and cut off two pieces 1/2 in. by 2 in., and lay them along either side of the base plate 1/8 in. apart. Upon these place a thick-

ness of paper, and again on the top lay the plate you are using as a guide. Clamp them firmly together and drill two holes large enough to allow a small wood screw to pass through, and then screw them all down upon a solid block of wood. The hole for the punch must now be drilled in the centre, and as the screws in the outfit are 5/32 in. Whitworth, this hole should be made with that size drill. Making sure that your brace is quite upright, take the drill completely through the plates and mounting block, afterwards opening the latter to allow the small pieces forced through by the punch to drop away.

### Punching the Holes.

The punch itself can be just a short length of ordinary steel 5/32 in. diameter, or if possible a piece of silver steel. As these washers are 1/4 in. by 1/8 in., it is a good plan to scribe a line across the block 1/4 in. from the centre of the punch hole, so that as you feed the strip through the die and bring the centre of a hole up to the line the strip will be in the correct position for a fresh hole to be punched lower down (see Fig. 3), thus keeping them all correctly spaced. After punching a

number of strips, snip them off neatly with a pair of snips; or if you possess a hand guillotine, so much the better, as this is the ideal machine for the job. Taking your pliers, it is quite easy now to turn up the lip on the edge of the brass washer (see Fig. 4), making sure that it is left wide enough to clip on your

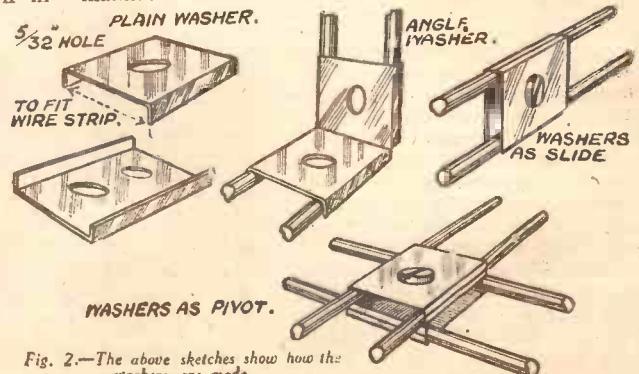


Fig. 2.—The above sketches show how the washers are made.

(Continued at foot of page 676.)

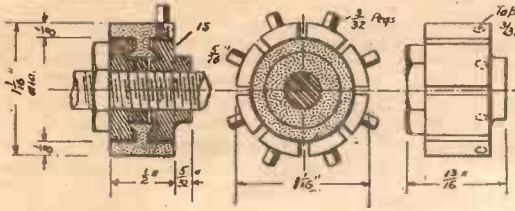


Fig. 1.—The commutator.

# A SMALL CHARGING DYNAMO

By H. Greenly (Concluded from page 644, Feb. 14th issue.)

## Winding the Armature.

THE successful winding of the armature depends on how evenly it is done. The amount of wire in each slot should be the same, not only to produce an even current, but to obtain an equally even mechanical balance. It is obvious that at a speed of 2,000 to 3,000 revs. per minute an unbalanced armature would soon shake the machine to pieces. The number of turns in each coil is about 60; there are two coils in each slot. The exact number must be found by experiment on the initial coil, and before winding, all roughnesses in the edges of the slots must be removed with a file. Further, it is just as well to line the slots with strips of paper to prevent the wire being rubbed bare by the metal. These strips of stiff cartridge paper may be glued in with shellac varnish. For the eight slots there are eight coils, but as each coil passes through two slots, only enough wire in each coil to fill half a slot is required. The drawing, Fig. 2, shows the whole set in diagrammatic form. Starting with the first coil, the beginning is made from the front end of No. 1 slot, round the far end back through No. 4, across the front, down No. 1, round the back end and up No. 4 again and so on until the amount of wire decided upon in the preliminary experiment is used up. The beginning end of the coil is left free to affix to one segment of the commutator, the finishing end being attached to the next segment. This is continued all round the armature, the next coil going down No. 2 slot and back through No. 5. The "end windings," i.e., the parts of the coils that pass over the ends of the drum, should be pressed down as flat as possible.

## Winding the Coils.

Fig. 3 shows one coil only. The others are similar and in sequence. There are several turns, the diagram only showing the starting and finishing ends. It will also be noticed from Fig. 2 that each segment of the commutator has two wire connections, the finishing end of one coil and the beginning of the next.

As the armature is fairly long, at high speed there will be a tendency for the centrifugal forces set up to make the coil windings fly out of the slots. A couple of grooves about  $\frac{3}{16}$  in. wide and  $\frac{1}{4}$  in. from edge may therefore be turned in the periphery of the armature drum so that, after the coils are wound on, they may be bound up with

about half a dozen turns of bare copper wire, soldered up at the ends. This is shown in the sketch, Fig. 4, with the grooves prepared before the armature is wound and after winding. Before putting the armature into service it should be steeped in shellac varnish and be baked at a temperature not exceeding about 140 degrees Fahrenheit in an oven.

## A New Design of Commutator.

The commutator illustrated in Fig. 1 is of an entirely new design, specially arranged for making up by an amateur engineer. A piece of good bronze rod is turned up to the section shown. It is then gripped in a  $\frac{1}{2}$  in. spindle between two washers of wood or waste insulating material and separated by sawcuts into eight equal sections. The two mica or bakelite insulating washers which have been already turned up to fit the section of the bronze commutator before it was split are then put on the shaft, the segments laid in, the little filling washer inserted in the centre, and the outer insulating washer put on and then the nut. On gripping up the commutator it may not present such a smooth or regular surface as it did before cutting into segments, but this can be corrected by skimming it up on the shaft. The slots may be filled with small sections of insulating material of a heat-resisting character. Ordinary fibre is no use for this. Either mica or the compounds of mica, which are marketed for this purpose, should be used. Open slots are quite alright for a time, but the tendency of metal dust from the brushes to get in them and cause short circuits makes a filled slot much to be preferred.

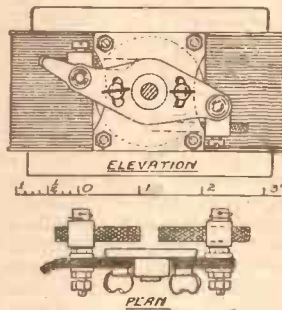
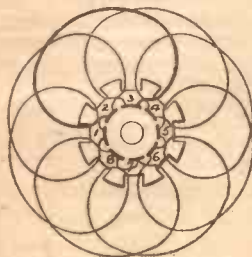


Fig. 8.—Brush gear arrangements.

The pegs in each section of the commutator are pieces of screwed brass wire, driven up to the end of the short threaded portions and cut off with an  $\frac{1}{16}$  in. or so projecting. They are only intended to form soldering points for the ends of the armature coils.

## Armature Coils.

The ends of the armature windings should be twisted together and not fixed up to the commutator until the brush gear is made up and fitted. The commutator can be then adjusted for position on the shaft at the last moment, so that the coils in the horizontal position



Figs. 2 & 3.—Diagram of armature windings and, above, a single coil shown separately.



Fig. 4.—Showing how the armature windings must be bound to prevent their spreading out when rotating at high speed.



Fig. 5.—Brass ends for winding yokes.

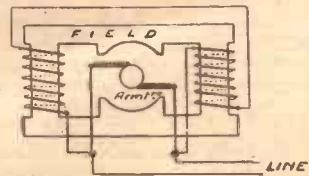


Fig. 7.—Directions for field winding.

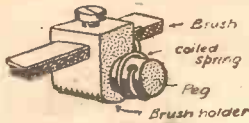


Fig. 10.—The contact spring.

are being short circuited, and thereby cut out of action, by the brush gear bridging the two adjacent segments to which those coils are connected.

**The Brush Gear.**

While the nominal position of the coil when the brushes are short circuiting is as stated above, in practice a slight advance is necessary to prevent unnecessary sparking. The brush gear must therefore be arranged to rock slightly and to obtain this adjustment the gear is put on a frame which embraces the shaft bearing boss. The extending arm of this frame (Fig. 8) is bushed with insulating washers, into which pegs carrying the spring brushes are fixed. One end of the frame is made longer than the other to form a handle for operating when adjustment is required. The clamping screws are used to grip the brushes in any position. The pegs should be extended through the bush on the outer side to form terminals by the addition of a second nut. On the inside they carry the brush-holding blocks, the pressure being arranged for by spiral springs, coiled up out of piano wire in the form shown in Fig. 10.

**The Field Windings.**

The field coils or yokes are arranged with brass ends (Fig. 5) which are soldered in position before the winding is done and before the magnet is built up (see Fig. 6.) The winding yokes which are of rectangular bar should have the corners removed to ease the winding-on of the wire and also be taped with a layer of Empire tape before the winding proceeds. The winding is best done in a lathe (or its equivalent), the wire being fed on carefully with an even tension. To give the magnets a good finish the last one or two turns may be done in a thicker gauge wire. All the wire should be double cotton-covered and the coil, when wound, should be steeped in insulating varnish and then baked quite dry. The outer casing of thick wire preserves the inner

windings from damage and imparts a good appearance to the model. When the windings are complete, the yokes may be driven on to the magnet limbs and riveted over. A block of wood, turned up for the purpose, or the armature itself with a protecting layer of paper may be inserted in the tunnel to ensure that the parts go together properly. The diagram (Fig. 7) shows the direction of winding and connecting up.

**The Connections.**

The dynamo should, for charging work especially, be connected up in shunt, as shown in the diagram, and while the field windings can be connected up directly to the brush terminals, it is much better to take all the leads to a switchboard and to arrange a variable resistance (Fig. 11) in series with the field magnet circuit. This will enable the operator to regulate the voltage of the current as delivered by the dynamo.

**Residual Magnetism.**

As there is no appreciable field magnetism until the machine is working, it may be asked: what starts the current? Once the field magnets have been magnetised a little of it remains and it is a building up of this magnetism that starts things working. The magnet should be strongly magnetised at the outset from a battery.

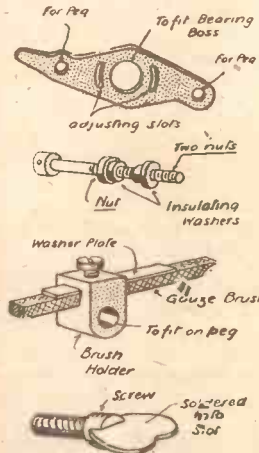


Fig. 9.—Brush gear details.

**Wire Sizes.**

For the armature, use No. 24 D.C.C. wire. From calculation, it would appear that 25 turns can be accommodated, about 4 yds., so about 2½ozs. should be purchased. For the fields, No. 30 D.C.C. wire will be ample, and about 3ozs. of wire will be required.

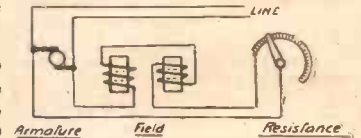


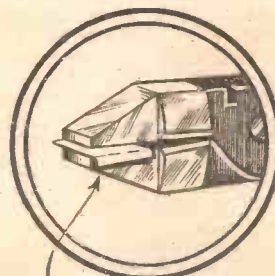
Fig. 11.—Regulating resistance in field circuit.

**AN INGENIOUS WIRE CONSTRUCTION OUTFIT—(continued from page 674.)**

wire strips, but not too tightly. The screws and nuts for the set can be obtained at any model shop, made up in packets of one dozen, as can any pulleys, gear wheels, etc., you may require. I have illustrated one or two methods for using the washers to act as pivoting points or slides; also, when cutting off the washers it will be found quite a good idea to cut some of them double (Fig. 2), as these are required to form bearings for spindles.

**Model Making.**

The model crane shown in last week's issue, will give a great deal of amusement, as small loads can be



TAP EDGE OF WASHER AGAINST JAW OF PLIERS.  
Fig. 4.—The edge of the washer should be held in the pliers and turned up as shown.

easily transported across a wide room. Taking a piece of wood for the base, the vertical and inclined strips are secured with wood screws, with cross pieces for strength, double washers being used for spindle bearings. To give greater rigidity to the model, braced girders can be used to replace the single strips; whilst with a little ingenuity the whole model can be improved upon and strengthened according to the outfit you have at hand. It is a good plan to obtain a guide book from a model stores of any of the constructional sets upon the market, and so give yourself numberless designs upon which to base your ideas and experiments.

**IMPORTANT NOTICE!** All correspondence intended for the Editor or Advertisement Manager MUST be addressed to "Hobbies," Messrs. George Newnes, Ltd., 8-11, Southampton Street, Strand, W.C.2

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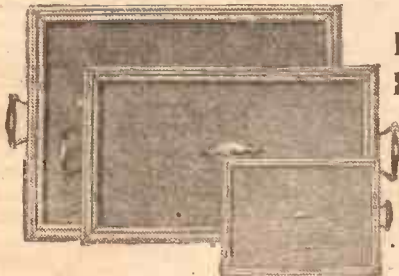


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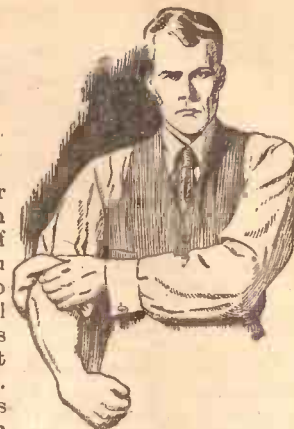
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# HOW COIR MATS ARE MADE

An Interesting Hobby Requiring Few Tools or Materials.

By "Home Mechanic"

Fig. 4—How new yarns are added.



Fig. 1.—A piece of rope showing the yarns.

**M**AT making has always been a favourite hobby with people of all ages. It is easy to do and very profitable. Mats are always useful and in demand.

It is surprising how few people have tried to make coir mats. These strong and serviceable mats for the front door or scullery are very easy to make, and only a sail needle and palm is necessary for tools. You need no frame or canvas, the mat being entirely made by hand with the coir or manilla sennet.

Old coir or manilla rope can be obtained very cheaply at any marine store. From this you make sennet by one or both of the methods detailed here. When sufficient sennet has been made you sew it up into the shape you require your mat to be.

### Two Methods of Making Sennet.

The two methods described enable the reader to make sennet quickly and easily.

The first is by plaiting five yarns together in one continuous strip.

Cut a piece of rope into 2ft. lengths and separate the three strands by untwisting them. Now take one of these strands and carefully twist out the yarns from it. Do not let the yarns fray out. Take five yarns and tie one end of each together, as in Fig. 2. Look at Fig. 3 and follow the movements closely. Study this well, because this sennet is only a repetition all the time. Once you have become accustomed to the movement you will be able to gather speed and make the sennet quickly and neatly.

### Adding New Yarns.

It is better to make the yarns of uneven length at the start, and then you can add the new yarns evenly throughout the making of the sennet. When adding a new yarn, leave an inch or two for cutting off when you have the remainder well plaited in. See Fig. 4

for the method of adding yarns. The second type is also easy to make and, perhaps, quicker. The rope should be cut into 4½ in. lengths and the strands teased out into yarns. When you have a good number of yarns ready, pick up three of them and place in the manner shown in Fig. 5. Now follow carefully the movements.

Bring A over B and under C, then over D. Now bring B over C and under D. Take a fresh yarn, place on C and under D. Twist top half of new yarn with C and bring it over D, and under bottom half of new yarn. You will then have two ends pointing to your right, as in Fig. 6. E-F is a new yarn. G H are the two ends sticking out from your sennet. Give E-G a twist together and bring down over H and under F. You will now notice that H has become G and F becomes H. Every new yarn you add becomes E-F. You carry on in this way until you have enough sennet to make your mat. To finish off this sennet all you do is to knot G and H together.

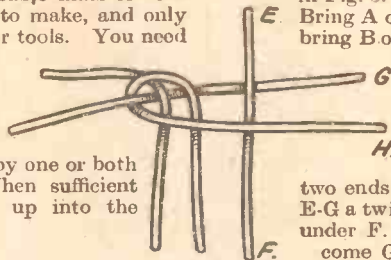


Fig. 6.—The piece marked E-F is a new yarn.

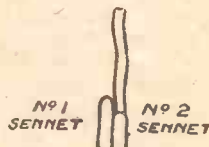


Fig. 7.—Sennet sewn together for mat making.



Fig. 2.—Five yarns tied together.

### Mat Making.

And now we come to the mat making. So far, manual methods only have been described and no tools have been required.

A sail needle and palm, together with some sail twine, are now required to sew the sennet up into a mat.

If a front-door mat is desired, Nos. 1 and 2 sennets should have been made. Take one end of each and sew together for 6 in., as in Fig. 7. Now bend them back and sew again. Do this about four times and then carry both sennets right round, sewing them all together as you go along. The mat will then begin to take shape and size. You can make the shape you desire by sewing the sennets on the end or sides. Oval or round mats can be made if you start in the way you want the mat to shape.

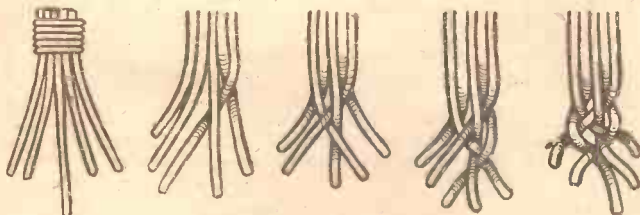


Fig. 3.—Sennet can be made by following the movements shown above.

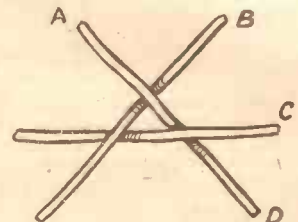
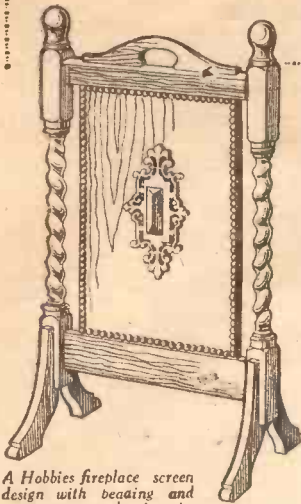


Fig. 5.—Another method of making sennet.



# DECORATING WOODWORK



A Hobbies fireplace screen design with beading and ornament used in its decoration.

Woodworkers should know of the ornamental moulding and wide range of carved ornaments with which they can so easily decorate every class of work. This article tells you how they are used and applied.

**M**ODERN woodwork is probably not so ornate or ornamented as it was during the last century. The wonderful carvings and decorated work handed down to us have given place to more simple, and perhaps more dignified, examples of woodwork. Carvings and ornaments are still used very largely, but only as a plain

decoration. In spite of this, carving itself has very largely declined as a pastime, and this is probably due to the fact that the woodworker can now obtain so cheaply all the ornamental carvings he requires. Modern machinery has been applied to woodwork and designing, and in consequence even the amateur craftsman can now buy his accessories at an absurdly cheap price, and so add artistic finishes to his work. Fancy beading of all kinds is obtainable in strips of any length. Small moulding is supplied shaped to be suitable for any class of work, whilst there is an almost endless range of turned wooden ornaments which add just that touch of distinction of which every worker is proud.

We illustrate an assortment of moulding and beading specially supplied for the amateur by Hobbies Ltd., and full particulars of prices, sizes, etc., are given in their 1931 General Catalogue. The plain ball

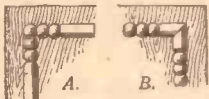


Fig. 1.—Two ways of cutting the beading for a corner joint.

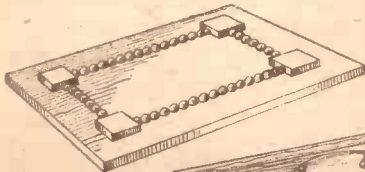


Fig. 2.—If the beading does not measure to the corner properly, put in little blocks and glue the beading close to it.

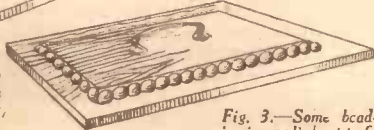


Fig. 3.—Some beading is supplied cut to fit into corner angles. It is illustrated in position here on a box lid.

is obtainable half round and quarter round, both in a number of sizes. The "ball and sausage" has an equally wide range of usefulness, whilst the twist beading is added to certain work in keeping with its style. These turnings can be used to decorate all kinds of work, and a glance at some of the fretwork articles readily suggests the range of their decoration. A single instance is given herewith in the firescreen, where it can be seen glued round the outer edge.

The turnings are easily cut, because they are made

from soft wood, whilst being white they can be stained down to match almost any shade of work being undertaken. If the moulding is fitted between two other parts it can be cut straight

to the lengths required, but if it has to form a panel on its own a right-angle must be made by cutting at a suitable point. Two examples are given at Fig. 1, where (A) the strip is simply sawn and turned

round, and (B) where it is cut across at an angle of 45 degrees to form a continuous pattern. Another plan is given at Fig. 2, where little blocks are put in at the corners and the beading glued up to them. This is often helpful if the beading must be in a certain position, but does not fit in with an even number of balls or patterns. The manner in which quarter-round beading is used is shown at Fig. 3. It comes in to help build up a base, or in the angle of a lid as shown. Also at corners which would otherwise be ugly or open (see Fig. 4).

Flat waved or carved moulding is suitable for decorating all kinds of work, and an excellent example is given in the speaker front shown in Hobbies 1931 Catalogue. It can very often be used to cover up nails or screws or joints which would otherwise look unsightly. In the form of panels it can be applied to all kinds of work, the idea being illustrated at Fig. 5. This class of moulding is also used for drop ornamental work under a lid or top (see Fig. 6). It usually requires mitring to get it at a correct right-angle, and the best way to do this is to use a Hobbies cutting table, or any proper mitring block. This table is specially made for cutting angles and is provided with fixed fences at 30 degrees, 45 degrees, and 60 degrees, so that one cannot go wrong. The moulding is held against the proper fence, and the saw held in the metal guide. This makes the cutting simple and accurate, and this table should certainly be on every woodworker's bench. The saw cut is exactly 45 degrees—otherwise a good right-angle cannot be obtained.

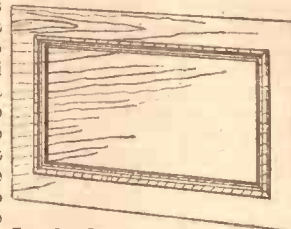
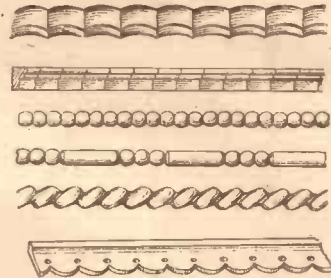


Fig. 5.—Small flat moulding is used to form panels or frames like this.



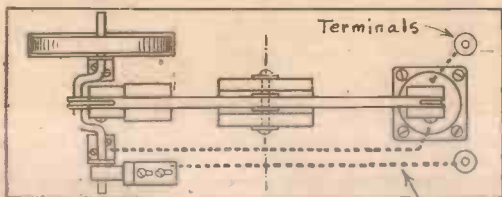
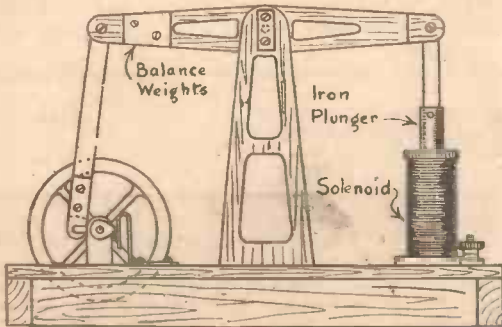
Fig. 6.—Another method in which the drop moulding is used in decoration.

Fig. 4 (below).—Another example of quarter beading in a corner.

THE model described here has been specially designed for HOBBIES and needs only a very modest equipment of tools. It is easily constructed, has quite an imposing appearance and when working it is quiet, clean and free from smoke or smell.

#### The Principle on Which the Model Works.

The large beam at the top (see Fig. 1) rocks to and fro about its central support; one end of the beam is connected to a crank and flywheel, while the other end carries an iron plunger which works up and down inside the "solenoid" or bobbin wound with insulated wire. On the crankshaft is a cam which rubs up against a light spring and acts as an automatic switch, through which the current flows from an accumulator when the cam touches the spring, but stops when the contact is broken. When the iron plunger has passed its highest point and is just beginning to descend, the cam touches the spring and switches on the current. The current flows round the solenoid, which then acts exactly like a magnet, attracting the iron plunger very strongly; the plunger therefore descends, pulling down the beam, which, of course, goes up at the other end and pulls the crank and flywheel round. When the plunger has reached its lowest point, the cam leaves the spring and switches off the current. The solenoid ceases to act as a magnet when the current is off, so the plunger is able to rise, which it does owing to the momentum of the flywheel, but directly it gets to the top the current is again switched on and pulls it down again; this action is repeated at every revolution, so keeping the model in motion. The best and most convenient form of battery to use is an accumulator.



Electrical Connections shown in thick dotted lines

Fig. 1.—Plan and elevation of our model electric beam engine.

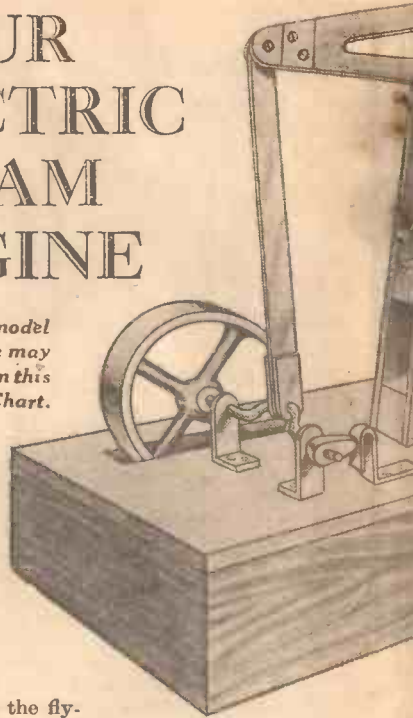
#### The Baseboard and Crankshaft.

This takes the form of a shallow box; the top is of fretwood 10½ in. by 4½ in., the sides being 1 in. high by ½ in. thick. The space underneath gives clearance for the flywheel.

The bearings are quite a simple job; they are shown on the design sheet, which explains itself. Make two of these in brass from the material supplied.

## OUR ELECTRIC BEAM ENGINE

*This fine working model electric beam engine may be built in wood from this week's Gift Design Chart. It is simple to make, as full-size patterns are printed on the gift sheet. It represents a piece of work of which any fellow can be proud.*



#### The Flywheel.

Cut the shape of the flywheel in wood, finished off very smoothly and varnished; you may also make a mould from this in plaster of Paris, and cast a wheel in lead. Drill the central hole to fit the shaft, also a little hole radially through the boss to take a grub screw, which can be an ordinary round head wood screw with the point filed off to a flat end.

As designed the wheel is of three-ply wood; add more weight to the rim by fixing a rim of lead on to the side of the wood rim by small screws; the lead ring could be cut out or cast. A wood boss should be glued to the centre and fixed to the shaft by a single wood screw with the point filed off.

#### The Contact Cam.

The head of the screw is the point of the cam. The point of the cam should be arranged diametrically opposite to the crank shaft, as shown on Fig. 1.

The next item is the connecting rod. The idea of the double bearing arrangement at the lower end is to obtain a wider bearing, at the same time allowing the rod to be threaded over the end of the shaft. The two side pieces are threaded over the end of the shaft, before being fitted to the connecting rod; the three pieces may then be fitted together in position either by soldering, riveting or by two small bolts. In the latter case the connecting rod may be taken off the shaft again, if necessary, by undoing the bolts, but if the pieces are attached permanently it will not be possible to take the complete rod off the crank.

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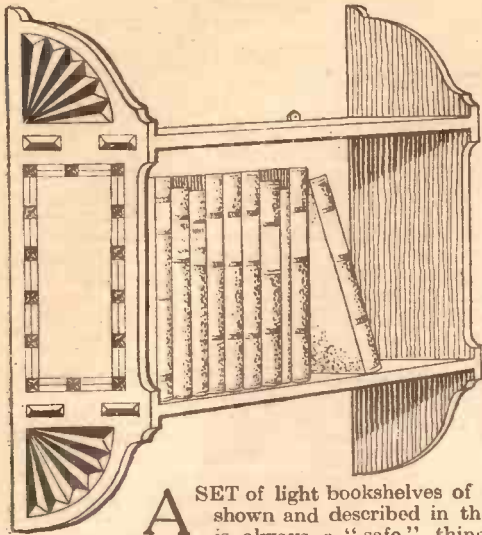
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# CHIP CARVING for the AMATEUR



A SET of light bookshelves of the kind shown and described in this article is always a "safe" thing for the

amateur to make. He may rest assured that they will be put to use on completion, as a place could be found for them in any room in the house, and in these days of cheap literature there are generally many books awaiting shelves. The work is simple enough for anyone to tackle, as the shelves are only tenoned through the sides, and full instructions are given for the carving, which will be found very easy to execute.

### Suitable Wood.

Ordinary fretwood  $\frac{1}{2}$  in. thick should be used, light oak or satin walnut being the most suitable. Four pieces are required, two for the sides and two for the shelves, the former being 1 ft. 8  $\frac{1}{2}$  in. long by 5  $\frac{1}{2}$  in. wide, and the latter

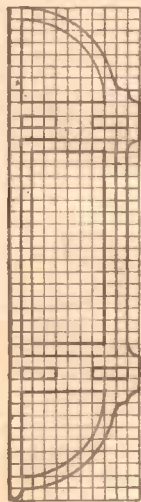


Fig. 2.—A side ruled into  $\frac{1}{2}$  in. squares to make it easy to copy on to the wood.

2 ft. long by 5  $\frac{1}{2}$  in. wide. The method of construction and the dimensions which should be observed are shown at Fig. 1. The sides are shaped as shown at Fig. 2, where lines have been ruled to divide the illustration into  $\frac{1}{2}$  in. squares to enable the pattern to be easily redrawn full-size. This may be done by drawing a similar number of lines full-size on a piece of paper, or on one of the pieces of wood which is to be used for the sides, and copying the outline from Fig. 2. The positions of the four mortises through which the shelves are tenoned, and which are  $\frac{1}{4}$  in. wide, should also be marked. The sides may be shaped and the mortises cut with a fretsaw. The shelves are quite straight,

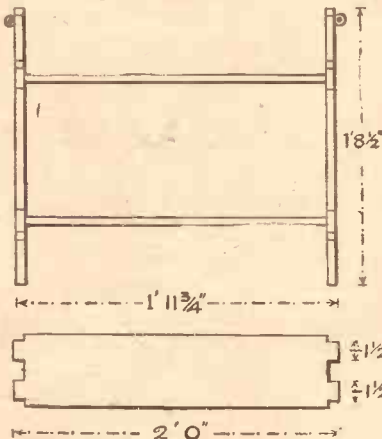


Fig. 1.—A plan view of the shelves and sides with particulars how to cut a shelf to fit.

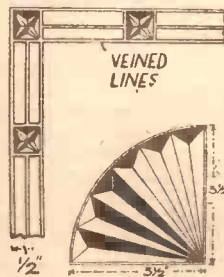


Fig. 3.—An enlarged view of the carving, making it quite easy to set out and cut.

Chip carving is a fascinating pastime requiring only a few tools and very little practice before it can be used successfully in all kinds of ways.

and double tenons are cut at the ends to fit the mortises in the sides. Care must be taken in marking and cutting the mortises and tenons to obtain good fits. The mortises should be cut first and the tenons fitted into them, and it is better to have the latter too large than too small, as they may be easily pared down to fit. The tenons should be  $\frac{1}{4}$  in. long, and on completion their ends could be chamfered to form a neat finish.

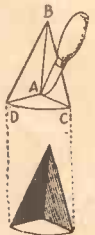


Fig. 5.—How the pockets are carved.

### Simple Carving.

The carving is confined to the sides, and consists of quarter-circle pieces at the ends, and panelled strips between. The outlines of the carving may be obtained from Fig. 2, and the actual method of setting out from Figs. 3 and 4. A pair of compasses and a rule are required, and the lines should be plainly marked in dark pencil. The principal lines should be veined, this being done with a veining tool, or with an ordinary chip-carving knife, with which an upright cut is first made and then two sloping cuts one on each side of the upright to form a very small V-shaped groove. The carving consists of cutting a number

of triangular pockets as shown at Fig. 5. The work is started from the centre A, from which upright cuts are made to the corners B, C and D. The knife should be pressed in to a depth of  $\frac{1}{4}$  in. at the centre, but rises to the surface at the corners, and the finished pocket is formed by chipping out the wood from the lines B—C, C—D, D—B, to the centre A. An effort should be made to finish the pockets clean with the knife.

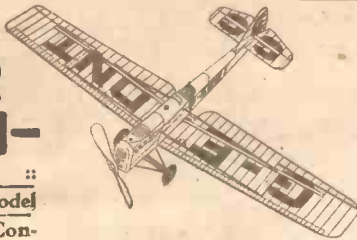
On completion the shelves are glued into the sides, and two wall hangers (No. 6134) are screwed to the back edge of the sides for hanging. The whole is finished with a suitable stain and then polished or left with a dull gloss.



Fig. 4.—A detail of the completed carving in the sides. Note the projecting shelf tenons.

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# ATTRACTIVE FRAMES FOR PASSE-PARTOUT PICTURES

By W. J. Ellsom

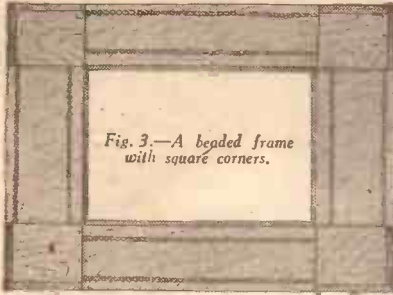


Fig. 3.—A beaded frame with square corners.

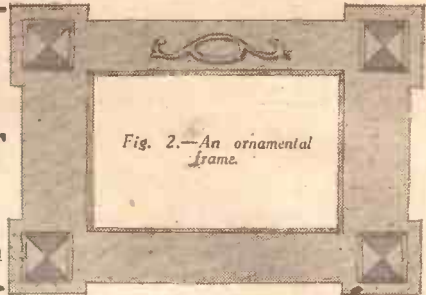


Fig. 2.—An ornamental frame.

THE frames shown in Figs. 1 to 4 are intended as outer frames for pictures framed by the passe-partout method. Definite sizes cannot be laid down, as everything depends on the dimensions of the pictures, but the width of the sides of the frames should be from 2½ in. to 4 in.

In the illustrations they are shown cut in one piece, but, for economy, they can easily be cut in four, and mitred or otherwise joined at the corners. Fig. 5 shows alternative methods that can be used for joining.

Five ply, ¼ in. thick, should be used, or, better still, oak or mahogany-faced plywood which, besides being more attractive, is stronger.

A rectangle is cut out, the size of the picture, and the edges bevelled; this can be done with a chisel and file. If this bevelled edge is stained black, it helps to show up the picture.

The picture is inserted in the opening and secured by strips of linen tape glued across the back (see Fig. 6). This, of course, is done when the frames are finished.

### The Frames.

Fig. 1 has the outline cut to the shape shown, and at each corner is glued a circular overlay.

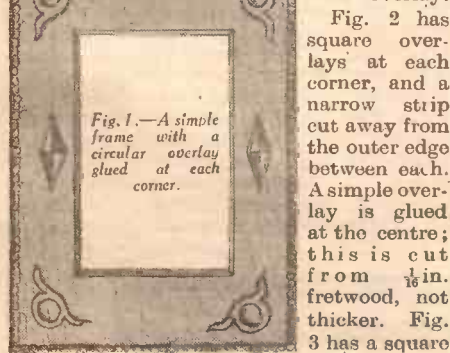


Fig. 1.—A simple frame with a circular overlay glued at each corner.

Fig. 2 has square overlays at each corner, and a narrow strip cut away from the outer edge between each. A simple overlay is glued at the centre; this is cut from ¼ in. fretwood, not thicker. Fig. 3 has a square

of ¼ in. oak, or mahogany, glued at each corner, the outer sides of each being bevelled. Strips of ¼ in. or ½ in. half-round moulding are glued and nailed between each.

Fig. 4 has a strip of ¼ in. or ½ in. half-round

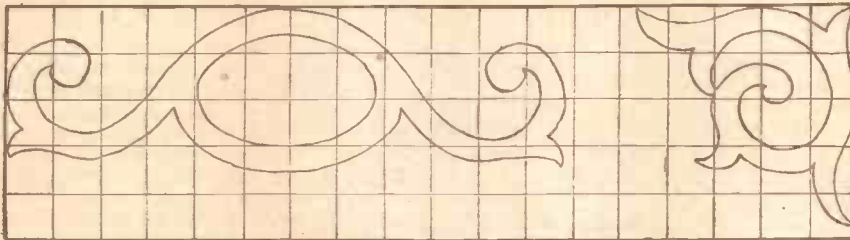


Fig. 7.—How to draw the designs.

moulding, glued round the outer edge; diamond overlays top and bottom, and corner ornaments, cut from ¼ in. fretwood, as indicated.

These frames, if of oak, should be stained and varnished. Designs, drawn on ¼ in. squares, are shown at Fig. 7 for suitable overlays, to be cut from ¼ in. fretwood and glued in place.

Pictures framed in this manner are not only attractive and fit for any drawing-room, but light in weight and easily packed.

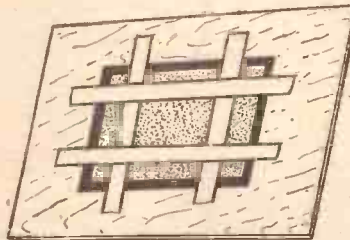


Fig. 6.—How the back is secured with tape.

### Paper Edging.

A wide range of coloured papers for passe-partout edging is obtainable from most picture-frame dealers and those who supply artist's materials, in the form of rolls of gummed paper. These are quite inexpensive and in themselves provide a simple and ready means of framing photographs and pictures. A piece of glass is obtained

of the same size as the picture and the latter is interposed between the glass and a piece of cardboard. A

suitable length of passe-partout paper edging is then glued over the glass and the cardboard, providing a neat edging and securely holding the assembly together. The colour of the edging should always be chosen to suit the particular nature of the picture.



Fig. 5.—Alternative joints for the frames.

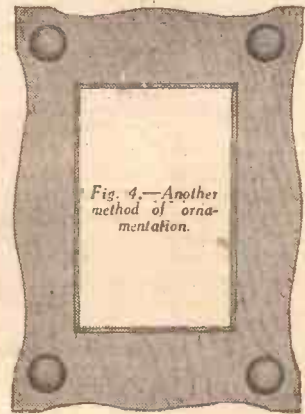


Fig. 4.—Another method of ornamentation.

# AN EASILY-MADE WIRE-WOUND BREECHLOADER

By W. S. Rogers

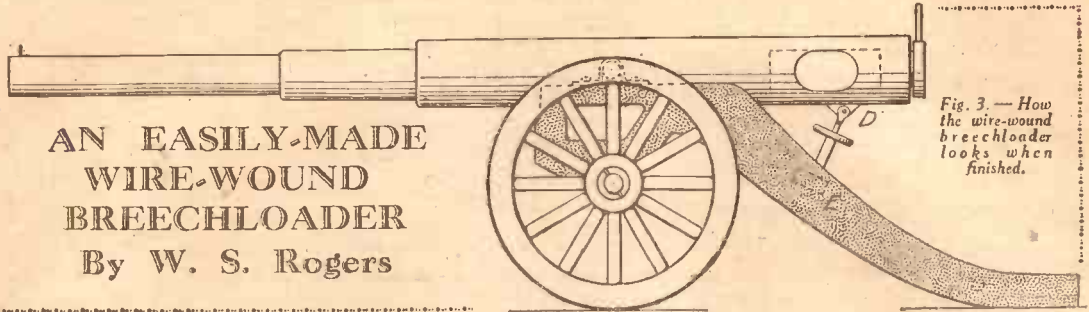


Fig. 3. — How the wire-wound breechloader looks when finished.

IN days gone by model cannons were popular with boys but fell into disrepute when the manufacturers failed to advance with the times, which means that they produced no satisfactory breechloaders that could be fired with powder.

There are still occasions when a big bang is needed, as for starting races and for administering a shock to the timid, on the fifth of November.

A very serviceable piece of ordnance may be built up from brass tubing in the manner to be described, though it does not pretend to reproduce any existing

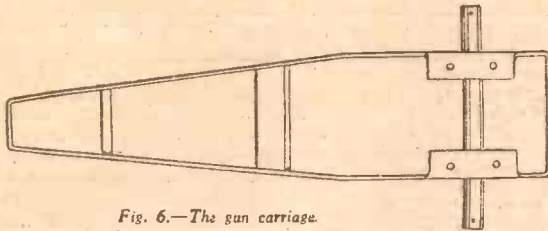


Fig. 6.—The gun carriage.

pattern. To ensure the necessary strength it should be wire-wound.

### The Barrel.

Fig. 1 shows a sectional view of the gun. Stout brass tubing should be used, and the components must be securely sweated together. Three sizes of tube will be necessary, as will be seen in the illustration. Having decided on the bore, select a tube of the required length and from another tube of internal diameter that will just fit over it cut the two sleeves A.B. Solder them in place and in the space between them, wind firmly and closely fine steel wire, the same as is used for banjo strings, filling the whole space, but not beyond the diameter of the sleeves. Then from tube of still larger diameter cut the sleeve C, pass it over A and B, and sweat all together. If skilfully done, you will have a very strong barrel, quite safe with the powder charge it is intended for.

### The Breech.

The breech mechanism is very simple. A breech block must be made as shown in section in Fig. 2. This may be built of tube, but is better if turned from solid rod. It will be noted that it has a small vent at its back end—also that its internal diameter is rather smaller than that of the gun barrel.



Fig. 1.—How the barrel is assembled.

### The Breech Block.

An opening must be cut in the breech of the gun on the right side, in size just to admit the breech block. This can be done by careful drilling and finishing with the file.

A smaller opening must be made on the opposite side, as seen in Fig. 3, to facilitate removing the breech block, and a screw plug with sprocket must be fitted in the tail of the barrel, the purpose of which is to jam home the breech block (see Fig. 4).

It only remains to sweat on two trunnions as shown in Fig. 5, and to add a sight near the muzzle of the gun, to complete the barrel and its mechanism, though a small lug, as shown at D, Fig. 3, must be sweated to the lower side of the breech, if it be desired to add the screw elevating gear.

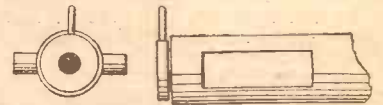
### The Gun Carriage.

This may be fashioned from sheet brass. In side view it is shown in Fig. 3, and in plan view, in Fig. 6.

The points to be noted are that its front end must be cut away sufficiently to allow of the gun barrel lying horizontally, two lateral extensions must be turned over at right angles to provide a bed for the trunnions, which latter would be secured by brass straps, and a cross piece must be fitted at E to afford purchase to the elevating gear. An axle also, of stout rod, must be run through as shown.

The wheels may be cast from type metal from a wooden pattern, or they may be cut from stout three-ply with the fretsaw, at the option of the craftsman.

They should be secured with washers and pins.



Figs. 4 and 5.—How the trunnions are sweated on, and, right—the screw plug with sprocket fitted to the tail of the barrel.

### Loading and Firing the Gun.

In firing this gun the procedure is as follows: the breech block serves as a cartridge case. The vent is closed with the finger and the charge of powder introduced at the open end, followed by a wad of paper, card or felt, which is best cut with a punch. The block is then introduced into the breech and jammed with the screw plug, when the gun is ready for firing. This may be done with a red-hot skewer, or better still, with one of the pistol-pattern gas lighters which throw a stream of sparks.



Fig. 2.—The breech block.





# Making the most of Your Model Theatre

**H**ALF the fun of having a model theatre is the joy of the artist and craftsman who has the satisfaction of knowing that he has made his model theatre and all its properties himself. This satisfaction will grow as the owner develops his use of the theatre, and makes all kinds of additional properties, characters and scenery. Adapting and writing plays for the little theatre will prove an absorbing pastime too.

Figures which lend themselves to quaint dialogue or cross-talk plays should be tried first. They may be made by cutting out suitable figures from illustrations and pasting them on thin cardboard, cut to the outline. A small strip of wood should be glued to the back of the figure at the base, so that it will stand up without any other support. The wire should be either pasted on the back of the figure with a strip of stout paper, or forced tightly into a small hole drilled in the wooden base with a fretwork drill. These will be all that the beginner will need in addition to the interior and outdoor scenes given on Hobbies design sheet. Simple plays for two or more figures are easily written by anyone with a sense of humour, and they form the best type of drawing-room entertainment to begin with.

**Dialogue and Characters.**  
In this way, experience is soon gained in manipulating the figures, and there are two ways in which experience makes all the difference. First, some practice is necessary in order to be able to think both of the dialogue and of the movement of the characters, but, like many other things, with a little use this soon becomes "second nature." Then you will have to learn how to hide your figures behind the scenery so that they do not have to be taken off the stage completely when they have finished their scene, for their next entrance will be much quicker if the characters are ready, waiting in the wings for their cue.

When you are ready to attempt something more ambitious, we suggest that two copies of a well-illustrated children's story be procured. "The Forty Thieves," "Red Riding Hood," "Dick Whittington," or "Alice in Wonderland," will be found very suitable. First, from the story make up your own "script." This should follow the simple outline of the tale as it is told for the children, with the addition of your own jokes, or songs

if they are desired. The "script" should be divided up into scenes, and have the dialogue written in black ink, and the directions for moving the figures in red ink.

## "Dick Whittington."

Now go through the script, and make a list of the characters and properties you require, and make up the figures from the illustrations, which, of course, should be coloured. In those plays which have one main character, e.g., "Dick Whittington," it will be easier to play if you have three models of your hero or heroine, one facing left, one facing right, and the other facing the audience.

If you follow these simple directions, after one or two rehearsals in private, you will be able to give your friends many an enjoyable half hour's entertainment, or even make it possible for them to see several pantomimes in one evening.

Members of amateur dramatic societies will find that their model theatre is of great value if it is used for planning scenery and stage effects. One of the great faults of amateur dramatic societies is that they cling fondly to scenery which has long ago become wearisome to the eyes of their faithful supporters. Yet simple scenery is quite effective, and both easy and inexpensive to make if all the details are worked out carefully beforehand.

This is where the model theatre scores over a drawing. It illustrates the idea in three dimensions. Further, the scene may not only be examined "in the round," but also lighted under more or less stage conditions. In this way the effectiveness of a scene may be determined at a glance; any faults may be corrected at once, and those slight improvements made which make all the difference.

## Model Scenery.

In building up model scenery, you will find that palace and temple scenes can be made imposing and attractive by using pillars made of tubes of paper. If you cut a rectangular opening in the card you use for the "back-cloth" or "wings," and divide it up into panes by passing pieces of black cotton across it and fastening them with thin strips of paper behind, a realistic window will be the result.

(Continued at foot of page 689.)

Readers may obtain a design sheet, size 24in. x 30in., of stage fittings, etc., for the model theatre design given free with our issue for January 10th, 1931, by sending 3d. in stamps to The Publisher, Messrs. George Newnes, Ltd., 8-11, Southampton Street, Strand, W.C.2.



"Dick Whittington."



One of the "Forty Thieves."



"Alice in Wonderland."



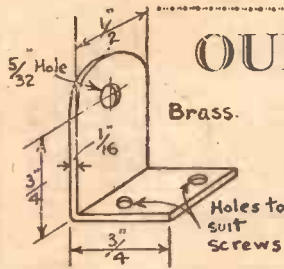


Fig. 6.—The bearing.

# OUR ELECTRIC BEAM ENGINE

(Continued from page 681.)

Fig. 8; this will prevent the solenoid from becoming unwound. These three holes should be on the opposite side of the square end to the small hole for the inner end of the solenoid.

### The Solenoid.

Now make two small holes in the base, pass the wires through, and screw down the solenoid, squared end downwards, so that its centre comes immediately below the free end of the beam. Connect one of the wires direct to a terminal (scrape the enamel from the end of the wire where it comes under the terminal, otherwise there will be no electrical contact and the model will not then work) and run the other wire under the baseboard, bring it up through a small hole and connect it to the crank-bearing on the cam side by screwing the bearing down on top of the wire. The black enamel must be scraped off the wire before contact can be made, and the underside of the bearing must also be clean and bright.

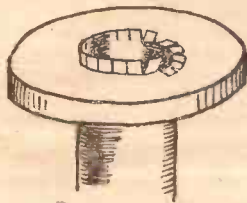


Fig. 4.—How to spread the core of the bobbin.

### The Iron Plunger.

The iron plunger is quite simple and is shown in Fig. 7. The only point worthy of mention is that it must move perfectly freely inside the solenoid; there should be just a little clearance all round, say 1/64 in., or even less. It does not matter about it touching the brass tube, but it must fall freely by its own weight. Cut the slot with a hacksaw or a thin file, countersink both ends of the hole slightly and rivet the ends of the pin to fix it.

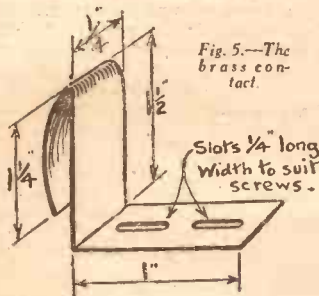


Fig. 5.—The brass contact.

## MORE ELECTRICAL MODELS COMING SHORTLY

The connecting rod should move quite freely at its joint with the plunger, also at the top, and

the exact length should be found by trial, so that when the plunger is at its lowest point, it clears the baseboard by 1/8 in. When these parts are fitted up, fit the lead balanceweights, previously mentioned, to the crank end of the beam; the amount of lead should be found by trial so that the beam is well balanced.

The last job is to make the contact spring of thin, springy brass (Fig. 5). Screw this down on to the base so that it just touches the cam at every revolution; the slotted holes are to allow the spring to be pushed up closer to the cam until the best result is obtained. This adjustment should be made while the model is running.

Now run a wire under the baseboard connecting the contact spring to a second terminal arranged opposite

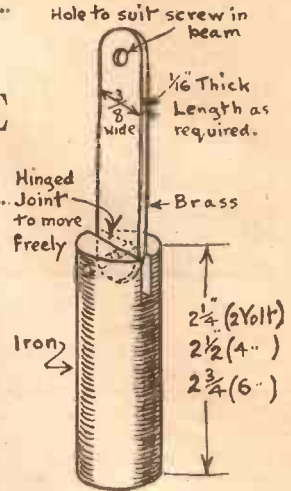


Fig. 7.—The plunger.

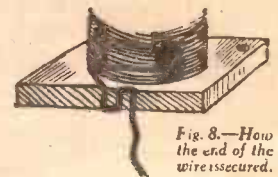


Fig. 8.—How the end of the wire is secured.

to the one already fixed and everything is finished. Be very careful *always* to scrape the end of the wire to show bare copper before making any connection whatever, and see that all connections are quite clean.

If the model does not work satisfactorily at first, the following points should receive attention:—

Contact spring may be either too stiff or too weak.

Contact cam may require its position altered on the shaft so as to give earlier or later contact.

File down point of cam to give a flatter end and longer period of contact.

You can increase the speed by using an accumulator of higher voltage.

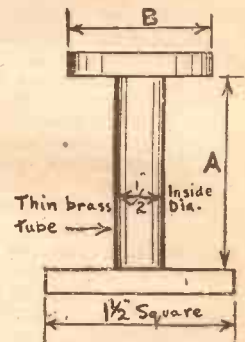


Fig. 3.—The bobbin

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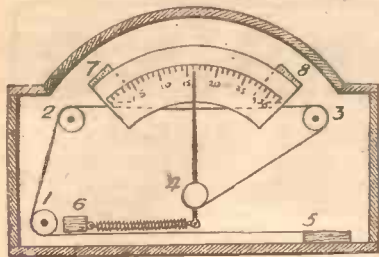


Fig. 1.—The case for the Hygroscope.

THE hygroscope is a simple instrument for indicating changes in the amount of moisture in the air, and to that extent it serves to give us an idea of what kind of weather to expect.

It cannot compete with the hygrometer or barometer, the indications of which are quantitative, but all the same, like the old-time weather indicators in which two figures advance from or retreat into their cottage, it is "a usefu' thing to have about the hoose," as the Scotsman said.

A neat and effective instrument may be made by following the instructions given below.

#### The Case.

This may be designed to suit the craftsman's fancy. That illustrated perhaps would commend itself to most tastes. Size is not important. A length of six inches would be ample, and a depth from front to back inside of 1½ in. (see Fig. 1).

The whole of the mechanism is attached to the back of the case, so that the front may be hinged on.

Four small rollers are needed. They may be cut from ¼ in. dowelling, and drilled centrally. Those numbered 1, 2 and 3 should be fixed to the back of the case in the positions shown, by slipping them over wire pins driven into the wood. They should rotate freely upon these pins (see Fig. 2).

The roller 4 has a pointer of stiff wire driven through its diameter near its front end, and the pin on which it works is shorter than the others, so as to stop short of

## A SIMPLE HOME-MADE HYGROSCOPE

By W. S. Rogers



Fig. 3.—The front of the case.

the pointer. The short lower end of the pointer is flattened with the hammer and drilled with a small hole.

#### The Hygrosopic Element.

This is a ½ in. wide strip of tracing linen, which every draughtsman knows expands in a damp atmosphere. This is dried by a moderate heat and glued to the block 5, then carried round the rollers 1, 2 and 3 and glued to the roller 4 when the pointer is at the extreme left-hand position on the scale. The helical spring of hard brass wire is then attached to the base of the pointer and its other end to an eye on the block 6.

The hygroscope is now assembled so far as its working parts are concerned.

A graduated dial should be made from stiff card; its curves being struck from the centre of the index roller, and divided into small steps of equal length, which may be numbered, say, at every five divisions. This dial should be glued to

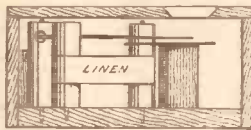


Fig. 2.—The rollers.

the two blocks 7 and 8.

The front of the case must have an accurate opening as shown, in which the neat-handed workman will put a bevel. Behind the opening a piece of glass may be clipped.

As it is important that there should be a free circulation of air within the case, opportunity is given for a piece of fretwork, a design for which is suggested in Fig. 3.

As the range of movement of the pointer is a matter for experiment, it is well to wait for a damp day before deciding upon the length of the scale.

## A FINE MODEL LOCOMOTIVE

THIS model locomotive, made by Messrs. Bassett-Lowke, Ltd., is of the famous locomotive "Enterprise." It is made in standard 0-gauge and will negotiate a 2-ft. radius curve. It has a brass boiler, whistle, double-acting piston-valve cylinders, stainless steel valves and rods, a real steam dome, steel frame, a flame guard, six-wheel tender, steel underframe, anti friction axle boxes, and in a non-stop run of fifty minutes it covered 1½ miles with one filling of water and spirit. It retails at 50/-, and is supplied in L.M.S. red and L.N.E.R. green or black, hand painted.



### MAKING THE MOST OF YOUR MODEL THEATRE (continued from page 687).

Outdoor scenes are perhaps easier to do, and here, wooden rods covered with sealing wax roughened while it is still warm to suggest bark will serve as the trunks of trees. Bare twigs glued into wooden bases will help out winter scenes, and the twigs of evergreen can

be used in the same way for shrubs. Fine moss thickly dusted here and there with red, yellow, blue and white powder will make a realistic and charming garden border. All the scenery and properties should be firmly secured or weighted at the base.

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Those who are fond of woodwork will welcome these splendid tool sets. Most Outfits contain cheap inferior tools which are of no practical use. These, however, are splendid value, because every tool is well made, strong and a real serviceable article. Each set contains a useful range of tools to meet everyday woodworking requirements.

London: 65 New Oxford St., W.C.; 147 Bishopsgate, E.C.; 83 Newington Butts, S.E.11. Glasgow: 326 Argyle St. Manchester: 10a Piccadilly. Birmingham: 9a High St. Leeds: 10 Queen Victoria St. Southampton: 25 Bernard St. Brighton: 68 London Road. Sheffield: 214 West St., or by post from Hobbies, Ltd., Dereham, Norfolk. Canadian Depot: 844 Yonge St., Toronto, Ontario.

## A DIRECT VISION FINDER FOR A CAMERA By S. J. Garratt

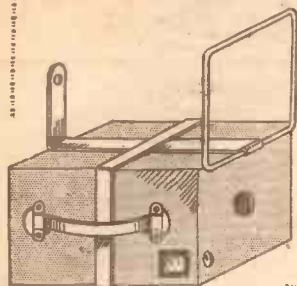


Fig. 2.—  
The vision-finder attached to the camera.

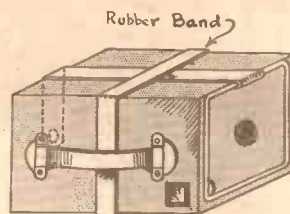


Fig. 1.—When the vision-finder is not in use it fits against each side as shown.

**M**ANY small "snaps" made by amateur photographers suffer from the fact that they are generally taken from too low a viewpoint. The ordinary type of view-finder must be examined from the top, so the camera is held only about half the height of eye level, and a somewhat unnatural perspective results. This is not always evident unless pointed out, but if comparisons are made, the pictures taken from eye level will usually be found to give more pleasing results, particularly when you photograph your friends standing up. Another advantage is that photographs can be conveniently taken over the top of a wall or other obstacle without climbing up to look into the ordinary view-finder.

A simple form of direct vision-finder for a box camera is shown in the illustrations. The rectangular frame at the front is made from a piece of stiff brass wire, about 18 gauge, soldered to a strip of flat brass about  $\frac{1}{4}$  in. by 1.32 in., the proportions being found as follows.

The length of the central part between the frame and the sight is, of course, just a trifle longer than the camera. Ascertain the distance between the lens and the film or plate; then, to get the size of the rectangular frame, multiply the size of the negative by the overall length of the finder and divide by the distance

between the lens and the film. For instance, suppose the camera takes pictures  $3\frac{1}{4}$  in. by  $2\frac{1}{4}$  in. and the distance from lens to film is 4 in., while the overall length is 5 in. The length of the frame will then be  $3\frac{1}{4}$  in. by  $5 = 16\frac{1}{4}$  in.  $\div 4 = 4\frac{1}{4}$ ; similarly the width will be  $2\frac{1}{4}$  in. by  $5 = 11\frac{1}{4}$  in.  $\div 4 = 2\frac{3}{8}$  in. You can work out the size for any camera in a similar manner. Of course, if you can arrange the rectangular right over the lens and the sight right over the film, the frame will be the same size as the negative.

The flat strip of brass is bent up at right angles at the back end and the sighting hole drilled exactly opposite the centre of the rectangular frame; this hole should be  $\frac{3}{16}$  in. diameter. A rubber band holds the finder to the camera, allowing it to be turned up for use as shown in Fig. 1, or (by turning the finder over bodily) to be folded away for use as Fig. 2. If an endless rubber band is used, the leather handle should be unscrewed at one end to allow the band to pass beneath and, of course, screwed on again after.

By placing the eye right up against the sight hole and looking through, the frame will be seen to outline the part of the view which will be included in the negative. Care should, of course, be taken to see that the finder is arranged parallel to the camera.

## HINTS ON KEEPING AN AQUARIUM.

**M**ANY young folk start an aquarium with but little idea of how to make the best of this interesting hobby, and the consequence is that their pet fish become sickly and die. There are many who regularly overcrowd an aquarium, and this, of course, is bad for the health of the inmates. Always avoid overcrowding; allow at the least six cubic inches of water for each fish.

To give the reader some idea of the necessary roots, plants and snails which should be found a place in all aquariums, the following will probably be a useful guide. For an aquarium measuring, say, 2 ft. by 1 ft. by 10 in. or 12 in. you will require six roots of Vallisneria, one lily root, and a small quantity of anacharis weed. Then for an aquarium of this size you would require about six snails, which will cost about one penny each. The aquarium of above dimensions will be a most suitable size for the beginner. It is no use having one too small; neither should you go in for a very large one. Avoid those bell-shaped globes, for they are not altogether suitable for the purpose, as they admit too much light.

It is always advisable to have some shade for your fish, and for this purpose you should procure a few

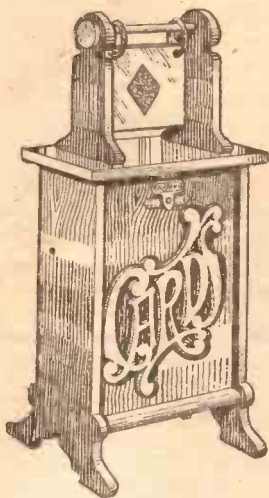
pebbles or stones. White rocks of various heights can be purchased, costing from 3d. to 9d. each; double white rocks,  $4\frac{1}{2}$  in. high, cost 1s. each.

Place a layer of clean silver sand at the bottom of the aquarium. Aerate the water each day by ladling out a quantity and then returning it from a height. When your fish begin to swim close to the surface all the time, and seem indisposed to go to the bottom, change the water.

Of the kinds of fish most suitable for the beginner to commence with, goldfish are, perhaps, the best. Japanese fantails are very pretty, but expensive. You can catch your fish from the nearest river or pond if you prefer. Those kinds which do well in an aquarium include small roach, dace, tench, and bream. Smallish specimens, from two to three inches long, do better than bigger fish. Prussian carp are other favourite aquarium fish.

It is a mistake to allow an aquarium to stand in the hot sun. Place it in a cool, shady part of the room, and it will be all to the good where the inmates of the tank are concerned. Do not over-feed your fish. Scraps of undevoured food lying on the bottom of the tank tend to foul the water. Feed the fish on ants' eggs, natural fish food, and small worms from the garden.

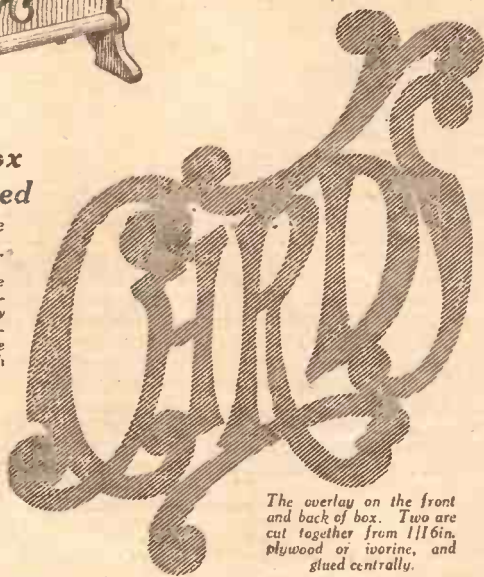
# A CARD BOX AND—



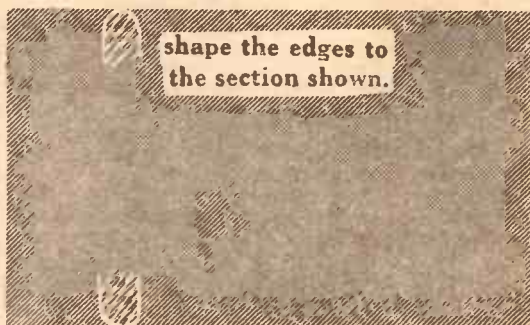
**The Box completed from the patterns.**

Made from the printed patterns in any common fretwood by the handyman with a fretsaw.

This useful little box is easily made from the full-size patterns printed here. The top is hinged for the cards to be slipped inside, whilst celluloid indicators are fixed to the rail above to show trumps. Just the thing to make from odd pieces of fretwood. Mahogany, oak or satin walnut 3/16in. thick is required for all parts except the overlay of the word "Cards." Paste the patterns down and cut to shape. Fix the thin overlays "Cards" to the back and front pieces, then glue the bottom, back and front (B) between the upright sides where shown by the dotted lines. Note that the two long edges have to be rounded off with sandpaper. The back and front are set back slightly from the edge of the sides. Get all top edges level and square. Make up the lid by gluing the uprights in place (tenon A) after the length of 1/4in. spindle has been glued between. Cover the ends of the spindle with the little discs (C), and hinge the whole lid with 1/4in. hinges as shown in the small detail. The lid lies flat on top of the box itself and is held at the front by the fancy catch. One piece of this is fixed under

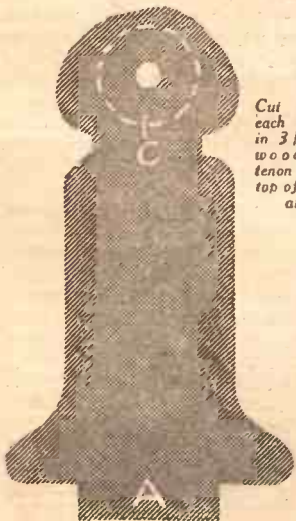
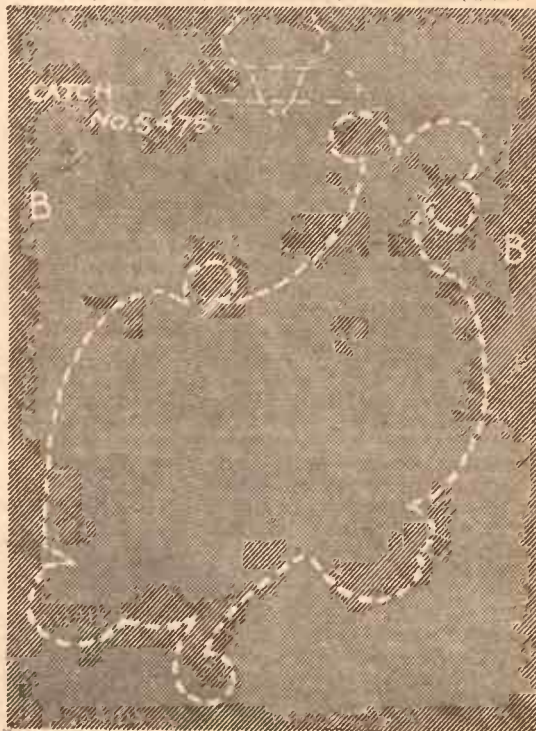


The overlay on the front and back of box. Two are cut together from 1/16in. plywood or ivorine, and glued centrally.



shape the edges to the section shown.

The part above is the bottom, cut from 3/16in. wood, with rounded edges. Cut two of pattern below from 3/16in. wood for front and back of box.



Cut one of each of these in 3/16in. wood and tenon into the top of the box at A.

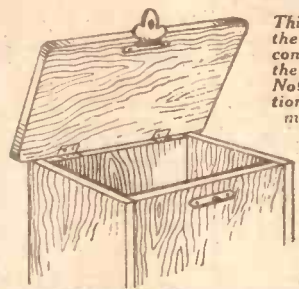


# —TRUMP INDICATOR

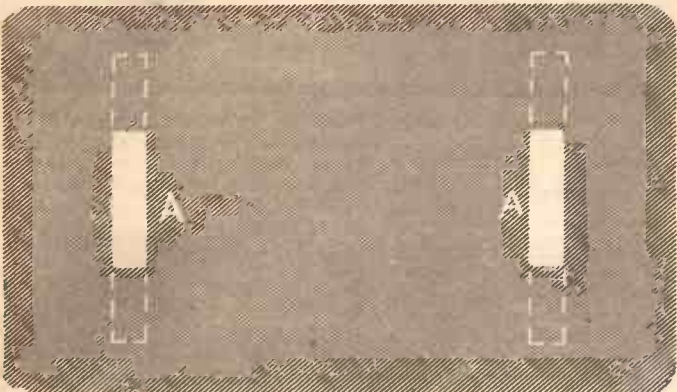
the lid, and the other part to the front of the box (see detail). Finish the whole article with Lightning Polish or clear varnish before the metal fittings are added.

**THE PARTS REQUIRED.**  
 All the patterns can be cut from a D panel of mahogany, price 5d. The trump indicator (No. 5240) is supplied with fixing rings, and the catch (No. 5475) is embossed brass ready to fix. Both are obtainable, with a pair of hinges and a piece of ivory for the overlay, complete for 1/9 post free. Ask at any Hobbies Branch or post your order to Hobbies Ltd., Dereham, Norfolk.

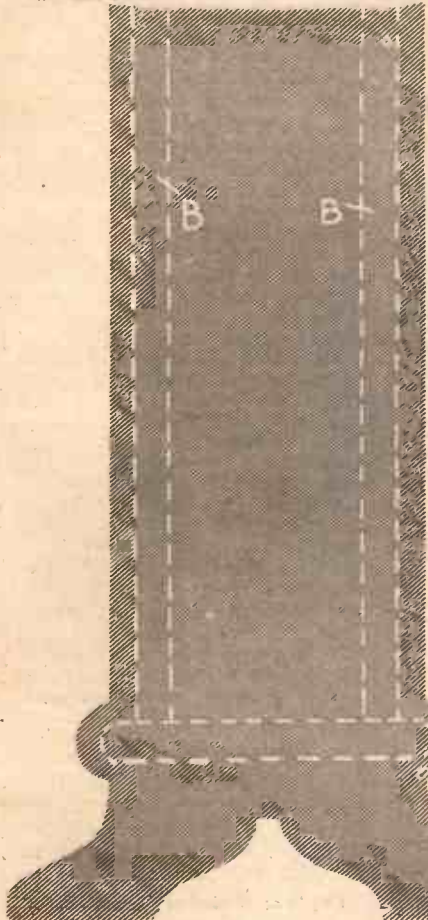
This is the handsome embossed ornament and catch to fix under the lid as described. Order No. 5475.



This is a detail of the way the box is constructed, and how the lid is hinged. Note also the position of the catch mentioned above.



The part above is the top of the box. Cut one from 3/16in. wood and take out the mortises A for the trump indicator.

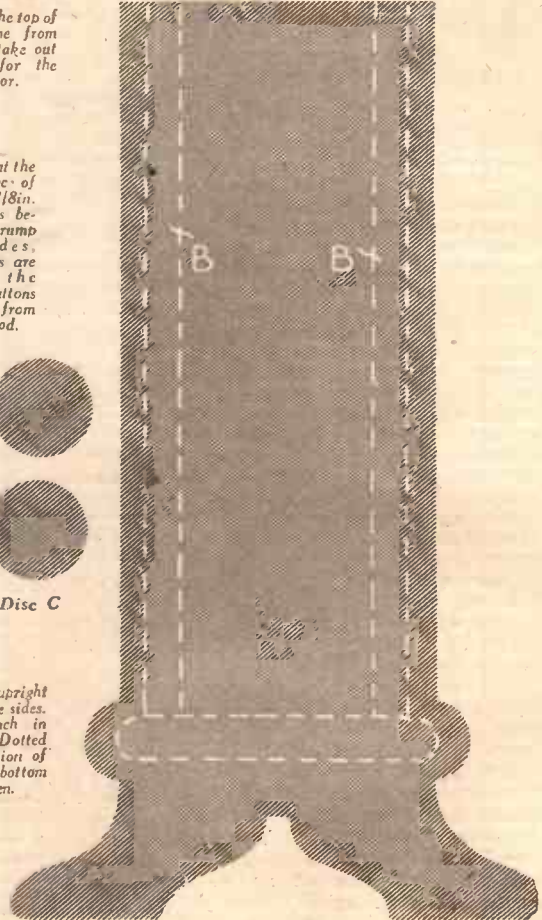


The spindle at the side is a piece of 1/4in. rod 2-3/8in. long. It fits between the trump indicator sides, and the ends are covered by the little round buttons which are cut from 3/16in. wood.



Disc C

The two large upright patterns are the sides. Cut one of each in 3/16in. wood. Dotted lines show position of box sides and bottom fixed between.





Mark all envelopes containing stamp queries with the word "Stamps" in the top left-hand corner.

**S**TAMPS commemorating the anniversaries of notable events lose much of their significance in a country that makes too much of a habit of such issues. The United States Postal Department permits itself the luxury of four commemorative stamps per annum; some of the events and persons pitched upon for the honour have little renown beyond the boundaries of the States, and the issues evoke little enthusiasm in other countries. It may, however, be said of the Pulaski stamp, which has just been issued, that its appearance is unusually attractive. In size it conforms to the modest dimensions of the ordinary current postage stamps; the denomination is only 2 cents. In a plain oval frame, below which is the name—General Pulaski—appears the portrait of a youngish man with long hair brushed well back; a dear little butterfly moustache, which ill befits the character of the man as it is handed down to us, sits upon his upper lip; and the luxurious fur collar of a cavalry cloak envelops his neck. Above and behind the portrait appear the flags of the United States and Poland, and, on either side, the significant dates, 1748-1779, do not note the limited span of the hero's life.



General Pulaski, the Polish patriot, who assisted the American colonists in their War of Independence.

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Venezuelan stamp showing a portrait of Miranda, the pioneer of revolt in South America.

The crowded page of history contains so many names that only the most famous can expect to echo round the world for ever. You may therefore be excused, gentle reader, if Pulaski conjures up no vivid picture in your mind. And yet

**TWO GREAT PATRIOTS**

By P. L. Pemberton.

there was a time when his name was prominent in the news, for he was a redoubtable foe of the British in the American War of Independence, and eventually met his death through a British bullet.

**Casimir Pulaski.**

Casimir Pulaski was a Pole who devoted his life to the cause of freedom. In his own troubled country he became commander-in-chief of the national forces in their struggle for independence from the yoke of Russia. The hope was a forlorn one, and when the rebellion was crushed, Pulaski's estates were seized and a price set upon his head. He escaped and found his way to France, where he met Benjamin



Simon Bolivar on stamp of Bolivia, a country which was named after him.

Franklin, who soon aroused his interest in the similar struggle then being waged by our American colonies for independence. The year 1777 found him in America, attached to the staff of General Washington. At the battle of Brandywine he distinguished himself so greatly that he was commissioned a brigadier-general, and placed in charge of all the cavalry forces. He took part in the battle of Germantown, and was especially prominent during the critical winter of 1777-78. He organised the famous "Polish Legion," which consisted of three companies of horse and three of infantry. Ordered to South Carolina, in 1779, he successfully held the city of Charlestown during the siege, until reinforcements arrived, but a few months later he was mortally wounded while leading a charge at Savannah. A monument was erected at Savannah, and another at Washington, to mark American appreciation of the generous assistance he gave to their cause and—now, one hundred and fifty years after his death, the fame of Pulaski is spread throughout the world through the medium of a postage stamp.



Portrait of Bolivar on stamp of the Colombian State of Bolivar.



Bolivar's head on Venezuelan stamp.

Competition closes February 28th.

**CASH £850 PRIZES**

THIS splendid puzzle is a worthy successor to the three previous Teasers and will provide lots of fun and entertainment or the whole family. The puzzle is to steer your car past Buses, Trams, Vans, and Lorries to your own home. Get your Teaser to-day and win one of the numerous prizes offered for the solution of this perplexing puzzle.

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On sale at all Newsagents and Bookstalls, or by post 7d. from George Nunn, Ltd., 8-11, Southampton Street, Strand, London, W.C.2.

**Simon Bolivar, The Liberator.**

The story of Pulaski reminds me that last year was the centenary of the death of a much more celebrated patriot, Simon Bolivar, and that special stamps may be issued.

(To be concluded next week.—Ed.)





Let Your Editor Help You. Address your letters and queries to The Editor, "Hobbies," Geo. Newnes, Ltd., 8-11, Southampton Street, Strand, London, W.C.2. All letters and queries must bear the full name and address of the sender.

### Our Free Gift Model Autogiro.

OUR free gift model Autogiro, presented with HOBBIES dated January 31st and February 7th, created an enormous demand. Those readers who were unable to secure copies may be glad to know that we have printed a few extra copies which are obtainable for 3d. post free from Geo. Newnes, Ltd., Back Number Dept., Exeter Street, London, W.C.2. This supply will not hold for very long!

### Our Model Chevrolet Competition.

AS I write these notes we have just received the last deliveries from the Post Office of our Model Chevrolet competition. They have poured in from all parts of the country, and a large staff is now busy unpacking the entries ready for the judging. Although we have received, literally, thousands of entries, I want to assure my readers that we shall carefully examine every entry, and we shall do it without delay. The result will be definitely published in our issue dated March 7th.

### Can You Write an Article?

A FEW weeks ago I appealed to my readers to put into article form any special model or method of doing a particular job. Quite a number of interesting articles were sent in, and each of those readers will receive a guinea after publication of their articles. I hope readers will continue to send me contributions of this nature. This is a fine chance for those with literary inclinations to get their foot upon the first rung of the journalistic ladder. But please note that the matter must be original. I do not want you to write articles on hackneyed subjects. I have no doubt that many of you can get your schoolmasters or your handcraft masters to help you if you are in difficulty regarding the preparation of the manuscript.

### Send Your Suggestions.

I THINK every reader of HOBBIES will agree that it is the only practical paper which caters for such

a wide diversity of subjects. It not only tells you "how," but also "why." If there is any subject in which you are keenly interested, please let me know and I will arrange to have an article on that subject if it proves to be in general demand. I have already arranged for articles on the microscope, the talkies, brazing, taking cinematograph films, cycling, camping, and model boats. I should appreciate it very much if you would show HOBBIES to your schoolmaster and



let me know what he thinks about it. He may have some valuable advice to offer as to how the paper may be made of even wider interest.

### Next Week's Design Chart.

A SMALL stool in Jacobean style forms the subject of the design sheet given with next week's issue. A stool is useful in every home, and the one we have designed is sturdily constructed and makes a presentable piece of furniture.

### QUERIES AND REPLIES.

History of the World's Land Speed Record. A. S. (Nuneaton) wants to know when the world's land speed record first started. The

first record was created in 1898 by Chasseloup-Laubat on a Jeantaud, the speed being 39.24 m.p.h. It was broken in 1899 by Jenatton on a Jenatton at a speed of 41.42 m.p.h., Chasseloup-Laubat on a Jeantaud at 43.69 m.p.h.; Jenatton on a Jenatton at 49.42 m.p.h., Chasseloup-Laubat at 58.25 m.p.h., Jenatton on a Jenatton at 65.82 m.p.h. After a lapse of three years it was broken by Serpollet on a Serpollet at 75.06 m.p.h., Vanderbilt on a Mors at 76.08 m.p.h., Fournier on a Mors at 76.60 m.p.h., Augieres on a Mors at 77.13 m.p.h. In 1903 by A. Duray on a Gobron-Brillie at 84.21 m.p.h., Ford on a Ford at 91.37 m.p.h.; 1904 by Vanderbilt on a Mercedes at 92.30 m.p.h., Rigolly on a Gobron-Brillie at 93.20 m.p.h., Baron de Caters on a Mercedes at 97.26 m.p.h., Rigolly on a Gobron-Brillie at 103.56 m.p.h., Baras on a Darraq at 104.53 m.p.h.; 1905 by Hemery on a Darraq at 109.65 m.p.h. These distances were over 1 kilometer. The following were over the 1 mile distance: Bowden on a Mercedes at 109.75 m.p.h.; in 1906 by Marriott on a Stanley at 121.57 m.p.h.; 1909 by Hemery on a Benz at 125.9 m.p.h.; 1910 by Oldfield on a Benz at 131.72 m.p.h.; 1911 by Burman on a Benz at 144.73 m.p.h.; 1919 by de Palma on a Packard at 149.87 m.p.h.; 1920 by Milton on a Duesenberg at 156.04 m.p.h. The following were over the 1 kilo.—1922 by Guinness on a Sunbeam at 129.17 m.p.h.; 1924 by Thomas on a Leyland-Thomas at 128.73 m.p.h., R. Thomas on a Delage at 143.31 m.p.h., Eldridge on a Fiat at 145.90 m.p.h.; 1925 by Campbell on a Sunbeam at 150.86 m.p.h.; 1926 by Segrave on a Sunbeam at 125.33 m.p.h., Thomas on a Higham at 169.23 m.p.h., Thomas on a Higham at 171.09 m.p.h.; 1927 by Campbell on a Napier-Campbell at 174.88 m.p.h. The following were over the 1 mile.—Segrave on a Sunbeam at 203.79 m.p.h.; 1928 by Campbell on a Napier-Campbell at 206.95 m.p.h., Keech on a White-Triplex at 207.55 m.p.h.; 1929 by Segrave on an Irving Special at 231.44 m.p.h. The latter was over the 1 kilo. 1931 by Malcolm Campbell at 245.736 m.p.h.

### Model Airship Envelopes.

Model airship envelopes, W. A. (Dublin), are obtainable from Messrs. Wm. Appleby & Co., 217-219, Jesmond Road, Newcastle-on-Tyne.

### Painting Canvas Canoe.

Both sides of the canvas material of the canoe should be painted, C. V. (Dundee). The frame must be painted before stretching the skin. Ordinary paint is used, but see that the white-lead is good and not half whiting. Use plenty of boiled oil for the last coat.

### How Many Kinds of Animals?

An unusual query comes to hand from L. S. (Manchester), who wants to know how many different kinds of animal life exist. In 1830, when Darwin was beginning the investigations which led to the "Origin of Species," there were 73,588 different forms of animal life known to natural history. This total included 49,100 species of insects, 11,000 of molluscs, 3,600 of birds, and 3,500 of fishes. Fifty years later, just before Darwin died, the total had increased to 311,653; the birds and fishes had grown to 11,000 each, molluscs to 33,000, and insects to 220,150. There were then known 8,070 different species of spiders alone. Since 1880 the number of new species discovered each year has averaged 12,000, and there are now catalogued and described about 600,000 different forms of animal life.

### Solder and Flux for Wireless Connections.

Solder of the blowpipe type should be used, and, for preference, resin as a flux. In no case should spirits of salts be used. This is in reply to H. G. (Harrogate).

### A Query about Locusts.

The locust's existence, A. L. (Belfast) is four years, but it only really lives a month. It exists underground for two or three years; then it spends another year boring a tunnel to the surface. When it reaches the light of day it develops amazingly, but in five weeks its life is over.

Advertisements are accepted for these columns at the rate of 1d per word, prepaid.

## SALE AND EXCHANGE

Address communications to the Advertisement Manager, "Hobbies," Southampton Strand, London E.C.4.

**CINEMATOGRAPH FILMS.** Machines, Accessories. Lists Free. Sample Film, 1s.—Filmeries, 57, Lancaster Road, Leytonstone.

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**10,000** ½ horsepower petrol motor, part machined castings, 9s. 9d. Catalogue 3d.—H. Madison (Motors), Wade Street, Littleover, Derby.

**"HINTS FOR HOME DECORATORS."**—Best book obtainable. Full instructions on Painting, Paperhanging, Staining, Graining, Varnishing, Enamelling, Signwriting, Polishing, Colour Washing, etc., and scores of tips, hints and recipes for decorating the home throughout, 144 pages, price 1s. post free.—Texaco Co. (Dept. 32), Blackpool.

**50 PRINTED MEMOS** or Billheads, post free, 1s. Write for list.—Ling, Printer, Haverhill.

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### STAMPS.

**SIX TRIANGULAR STAMPS.** 6d. Large List free.—Felix Sykes, New Barnet.

**FREE.**—Collectors early and medium will like my approvals. 50 different to genuine applicants for approvals sending postage.—Bowden, Wychar, Bedale, Yorks.

**STAMPS FREE!** Twenty Unused Co. onials, "Neurope."—G. H. Barnett, Limington, Somerset.

**STAMPS.**—Set 4 Persia Air Mail, 6d. List free.—Gould, 75, Shirley Road, Acocks Green, Birmingham.

**2/6 AND 5s.** K. G. Great Britain, 6d. post free to applicants for selected British Colonial Stamps and 1d. each.—E. W. Small, 32, Downhills Park Road, London, N.17.

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When replying to advertisements please mention "Hobbies."

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gives useful hints on the Bugle, Drum and Fife, also Parade Formations, Use of Parade Cane, Staff, etc. Free and post free.

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IN THE

# GENERAL

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Weekly Parts*

**NEWNES'  
HOME  
MECHANIC**

FOR EVERYONE WHO TAKES  
A PRACTICAL INTEREST IN  
HIS HOME

.....Contents of Part 21.....

*Ready Friday Next.*

CONSTRUCTION CHART TO MAKE SOME  
ATTRACTIVE CARDBOARD MODELS,

also  
Things to Make for the Kitchen.  
A Hood for the Gas Cooker.

Clothes Airing.

Airing Cupboard.

Plate Rack, Egg Stand.

Clothes Horse.

Electric Burglar Alarm.

An Ornamental Fire Screen.

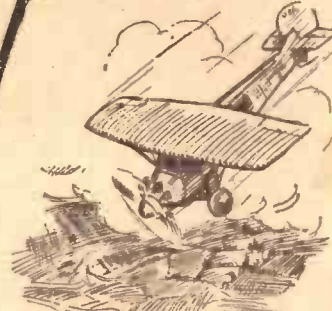
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is  
Thrill/  
Day!**



All boys like a thrill — even the old boys. Thursday is Thrill Day because that is the day on which Every Boy's Paper — THE SCOUT — is published.

Adventures on land and in the air, on the sea and under the sea are in the pages of THE SCOUT, the paper that gives the best stories, articles and competitions.

Ask your news-agent for a copy to-day, then get it regularly every Thursday.

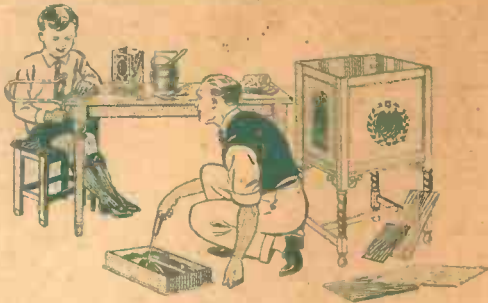


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**THE  
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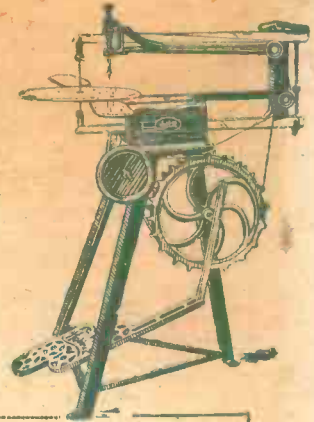
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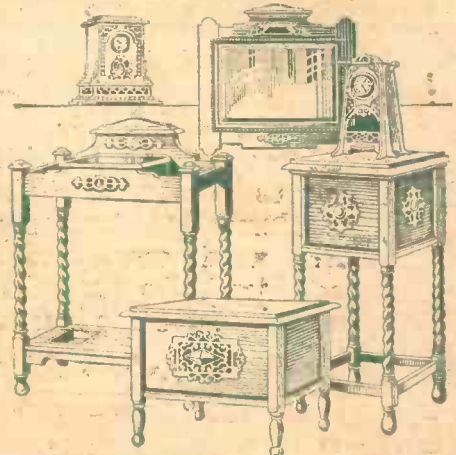
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