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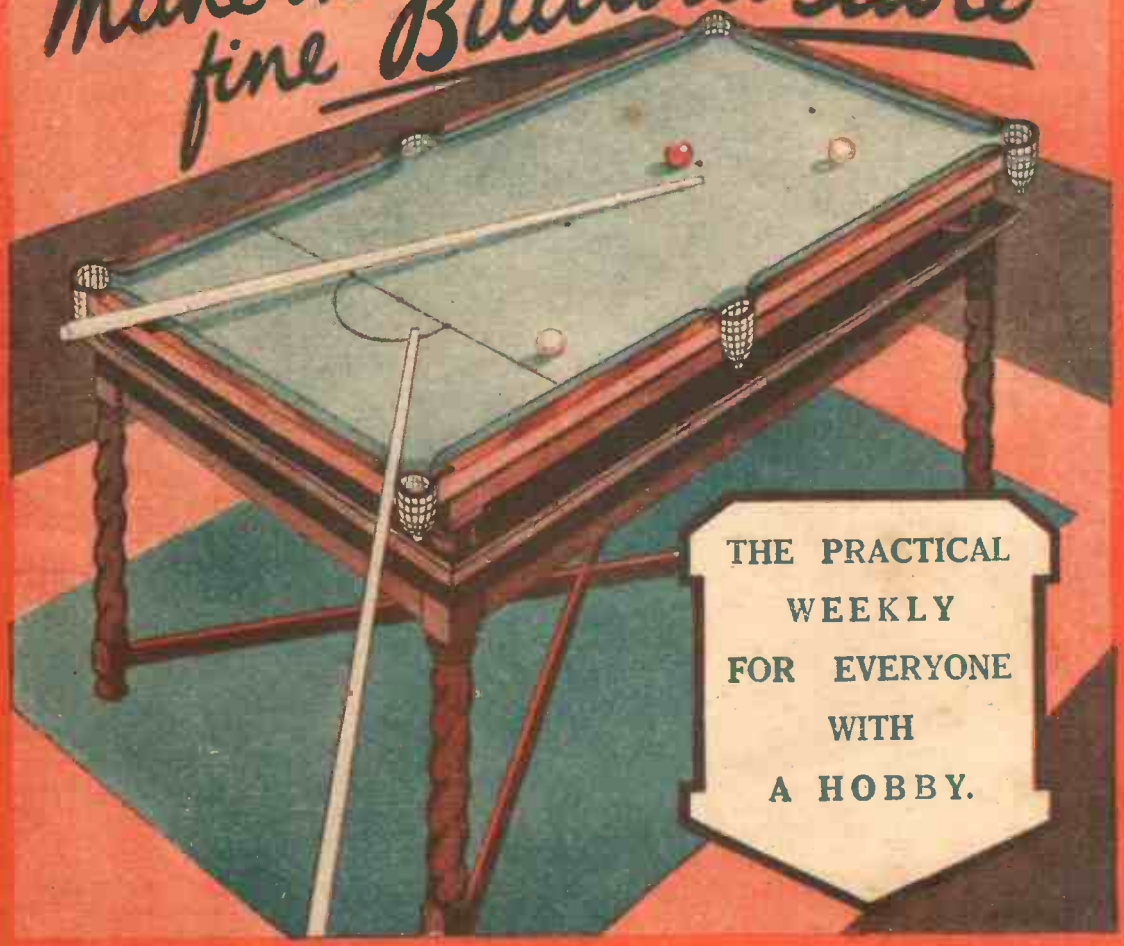
HOME CRAFTS
WOOD WORKING
MODEL MAKING
AMATEUR MECHANICS
ETC. ETC.

Hobbies

2D

February 14th, 1931.
No. 1843.
Published every Wednesday.

Make this fine Billiard Table



THE PRACTICAL WEEKLY FOR EVERYONE WITH A HOBBY.

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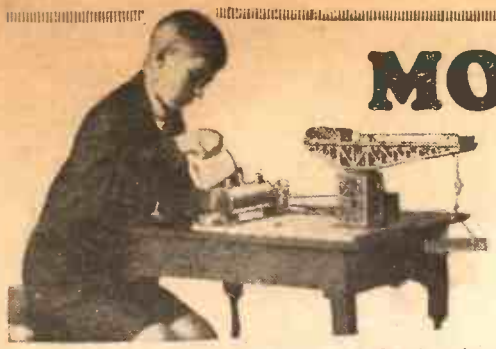
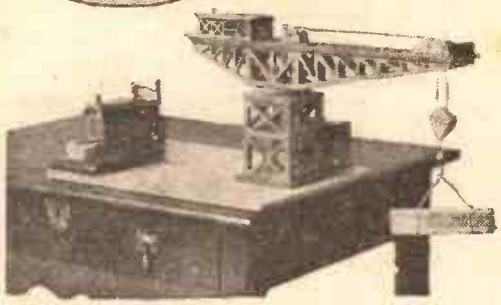


MODEL MAKING
is really great fun

The joy of making a model is only equalled by seeing it connected up to a power unit and working away with great realism. The models illustrated here are made from designs containing patterns of all necessary parts and how to put them together. It is fascinating work, and anybody with a fretwork outfit can take it up. A parcel of the necessary wood is supplied for each with all parts cut and planed to the size required. The making is therefore quite straightforward and the completed models connected to a "Demon!" engine are a lasting and profitable joy.

Hobbies



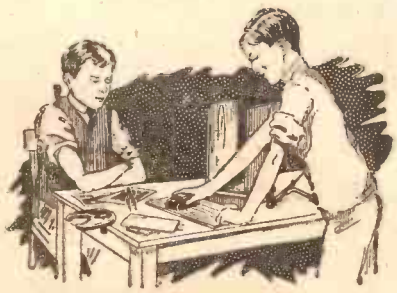
Model Revolving Crane.

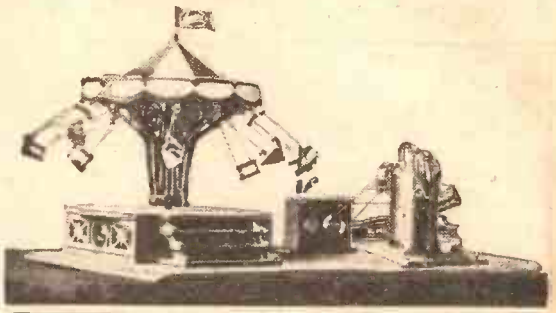
Design No. 1627. Price 4d., Post Free 4½d.

FRETWOOD.—For making this model we supply a parcel of selected Beech, together with sufficient rod for spindles, chimney, etc., 3/-; post free 3/9.

FITTINGS.—A complete set of Metal Fittings (No. F1), embracing all gear wheels, pinions, and axles needed for constructing this model, 3/-; post free 3/6.

Specially planned for use with Hobbies British Fretwork Tools.





The Model Chairoplane.

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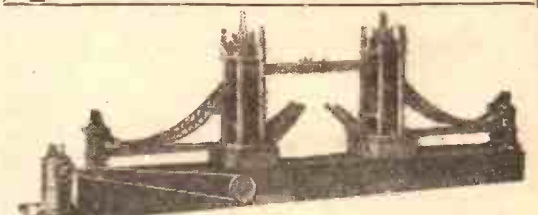

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Design No. 159 Special. Price 9d., Post Free 10d.

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EVERY POUND MUST BE WON.

THE NEXT FLOOD By SIR MAX PEMBERTON

A striking contribution to the most absorbing topic of the times—the turn in the industrial tide.

OUTLAWING PEACE Will America release her supply of helium? The export of this valuable gas is prohibited by law, thus preventing other countries developing the airship which is regarded as the world carrier of peace and commercial goodwill.

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Hobbies

Vol. 71. No. 1843. Published Every Wednesday February 14th, 1931

THIS WEEK'S CLEVER IDEAS

A New Hobby.

A NEW hobby recently introduced to the market is known as Silva-Rivit Sheet Metal Work. It is put up in the form of a box containing a hand-drill and three bits, a rose sink, centre-punch, a ¾lb. ball pene hammer, a cramp, with sinks for setting the rivets, ornamental feet, assorted Silva rivets, one 16-gauge 4in. diameter polished brass disc, and several templates from which the reader can construct his own designs. By means of this outfit the owner may make beautifully ornamented metal articles, such as teapot stands, ash-trays, etc. He may also use the outfit for the decoration of wood and leather, for making house name-plates, and dozens of other applications will readily suggest themselves. Holes are first drilled into the material and then countersunk with the rose-bit. The small rivets are then placed in the holes and set over, the result being an attractive embossed designs. It will readily be seen that the owner of such a set has limitless scope for the creation of his own designs. These sets are marketed by The Silva-Rivit Tool Co., 4, Gray's Inn Road, London, W.C.1.

An example of Silva-Rivit work.

A Midget Portable Gramophone.

MEASURING only 8in. by 7¼in. by 3¼in. high, and covered with imitation leather cloth, the little portable gramophone here illustrated, marketed by E. J. Heraud, Number One, Edmonton, London, N.18, costs 7s. 6d. It has a good quality motor with interchangeable spring, a very mellow sound-box, and plays records up to 8in. in diameter.

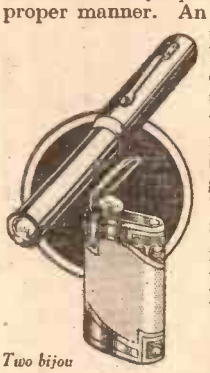
This tiny portable gramophone measures 8in. × 7¼in. × 3¼in., and plays 8in. records.

Vest Pocket Torches.

THE illustration above shows a nickel-plated pocket torch, shaped like a fountain-pen, which clips to the pocket. The other torch is claimed to be the smallest in the world. It has a reflector top that opens when you switch it on and it lights automatically. It slips quite easily into the waistcoat pocket. The fountain-pen torch costs 2s. 6d., and the other 1s. 6d. Both bear the hall-mark of the Ever Ready Co.

A Glider Fired with a Gun.

A CATAPULT glider has been a popular novelty during the past few months. The catapult, however, does not always project the glider into the air in the proper manner. An improvement has been introduced in the form of a gun. This gun has an elastic band stretched over the barrel on which is poised the glider itself. Upon releasing the trigger the glider is shot forward and its angle of flight is made a certainty owing to the guiding effect imparted by the "barrel." It is obtainable from most toy stores and also from A. W. Gamage, Ltd., Holborn, London, E.C.1.



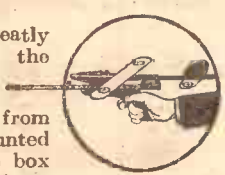
Two bijou electric pocket torches.

Rail Lights Which go on Automatically in Tunnels.

AS an experiment the London and North Eastern Railway are running for extended trials a coach in the King's Cross—Hull service in which the lights are automatically controlled.

The apparatus is a newly devised attachment to the standard train lighting and consists of a light-sensitive selenium bridge enclosed in a small window in the guard's van at the end of the carriage. This attachment works a relay operating the main electric lighting switch. It is so adjusted that when the light conditions outside render reading difficult the lights are immediately switched on. The reverse procedure takes place when the external light becomes strong enough. It will be seen therefore that the new apparatus functions not only on the approach of natural darkness but also when the train passes through tunnels, below dark station roofs and under long bridges.

This "Radiovisor" relay is neatly housed in a cast-iron box in the guard's compartment near a small window containing the selenium cell and is protected from excessive vibration by being mounted in a sponge rubber lining. The box also incorporates a hand switch to throw the device out of action when the carriage is not in service. Small red tell-tale lights are fitted to indicate to the guard that the apparatus is functioning perfectly.

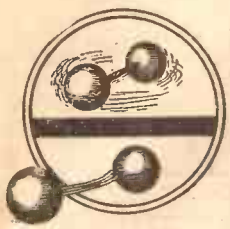


A toy glider propelled by a "gun."

NOTES AND NOTIONS from our READERS

Spinning Balls.

OBTAIN two wooden balls each about 1½in. in diameter, and fix two U-shaped staples into them. Connect the balls together with elastic, as shown in the sketch, and twist the elastic. When it is sufficiently wound, place the two balls on the ground and they will gyrate for a considerable time. The balls can be painted, if so desired.



The spinning balls.

A Novel Sugar Basin.

THIS novel sugar basin is very simple to make. All that is required is a coco-nut shell, a cotton reel, and a round piece of wood for the bottom. Cut the coco-nut about one-third from the top, and sandpaper it. Then remove the top of the cotton reel, bevel it about ¼in., and glue it to the bottom of the shell. The round piece of wood for the bottom is then fitted on as shown in the sketch.

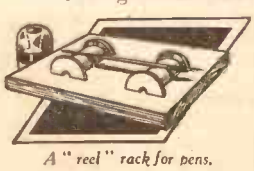
A simple sugar basin made from a coco-nut shell.

A "Reel" Rack for Pens.

A COTTON reel, a piece of wood 8in. long and 3in. wide, a fine saw, and a little glue is all that is needed to make this useful pen and pencil rack. Cut the cotton reel in half and glue the halves about 1½in. from either end of the piece of wood, and you have a fine rack as shown in the sketch.

A Handy Container for Nails.

MOST handymen find difficulty in looking after their nails and screws. Here is a useful container that can be made from two halves of a coco-nut shell, fitted into a wooden frame as shown in the sketch. The frame is made of plywood, and two holes are bored in the top large enough to allow the shells to fit in.



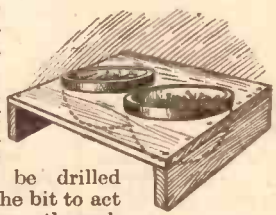
A "reel" rack for pens.

THAT DODGE OF *YOURS!*

Why not pass it on to us? We pay Five Shillings for every item published on this page. Mark your envelope "Notes and Notions."

A Gas-Heated Soldering Iron.

IT is sometimes tiresome when working on a large job to have to wait while the soldering iron is being heated. Much waste of time can be eliminated if a gas-heated iron is used. This is made by fixing, by means of a clip of thin strip iron and two nuts and bolts, a heater made from an old incandescent gas light to the handle of a hatchet-shaped soldering iron. A hole should be drilled through the bit to act as a flue, through which the flame can pass, and so improve the heating capacity.



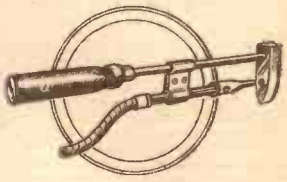
Handy containers for nails and screws can be made from coco-nut shells.

A Handy Night-light Reflector.

THIS night-light or candlestick reflector can be made from a round tin can. The can is cut in the manner shown in the sketch, and a ring of the spare metal can be used as a candle holder, when soldered to the bottom of the tin. If the tin is polished it will act as a good reflector. A handle can be added to the tin if desired.

To Restore Worn Emery Cloth.

WORN emery cloth will regain much of its former rough surface if placed in a warm oven for a few minutes.



A gas-heated soldering iron.

Handy Bootscraper for the Shed Door.

AN old bucket sunk a foot deep in the ground near the door makes an excellent bootscraper. In time it will become full, when it can be lifted by the handle, emptied, and replaced.

Home-made Glue.

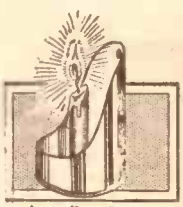
TAKE a little crushed starch, put it in a tin lid, and heat it. It will then turn a dark brown, and a constant stirring must be kept up. If too stodgy, a little water may be added. It comes out like seccotine, and when cool makes a fine glue.

How to Make Copying Ink.

ADD a little sugar or glycerine to ordinary ink, and this will give you a good copying ink.

Your Dog.

IF your dog has to be chained up all day, drive two short posts into the ground as far apart as possible. Now fix a wire or strong rope between them, and on this wire or rope attach your dog's chain. This will enable the dog to take a short run and provide a certain amount of exercise.



A candle reflector.

Inserting Screws in Awkward Places.

IT is often found difficult to insert small screws in awkward places; here are two tips worth remembering. Smear the end of the screwdriver with beeswax and you will find that it will grip the screw without slipping. Another good way is to magnetize the screwdriver by rubbing it on one of those small red magnets which most boys possess. The screwdriver will need to be remagnetized frequently.

HOW TO BUILD A FINE LONG-FLYING TAIL-LESS MONOPLANE

By A. Gunner

A photograph of the finished model

THE fine tail-less monoplane shown in the photograph at the top of this page and in plan and side elevation by Figs. 1 and 2 will fly for at least 200 yards when hand-launched and will rise off the ground under its own power and will fly for 150 yards. It is of interesting and novel design, and will provide the model-maker with a variation from the orthodox model aeroplane.

The Fuselage.

This consists of a length of birch or light wood 30in. long and ¼in. by ¼in. in section. The bottom skid consists of a piece of cane, 18in. long, split down the centre and shaped up to half-round section. One end of this piece of cane is split and bound to the front end of the fuselage, where the hook of 18 gauge piano wire is also put through and bound with strong carpet thread. At the other end, a bearing of wood must be fixed to take the airscrew. A detail of this is shown in Fig. 1. This piece of wood is ¾in. by ¼in., and a piece of fine brass tubing is pushed into a hole drilled in this wooden bearing block for the propeller shaft to pass through.

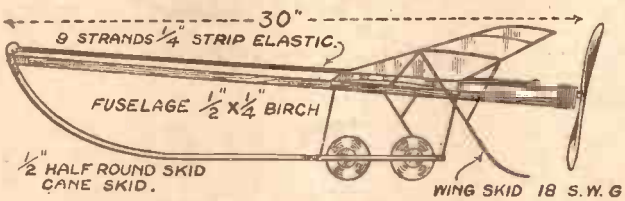


Fig. 2.—Side view of the tail-less monoplane.

The Propell r.

A detail of the propeller is shown in Fig. 3. This is 9in. diameter by ¾in. thick, and it must be carefully carved to the shape shown. Make quite sure that you attach the shaft in the right way, so that when unwinding air is driven *away* from the machine.

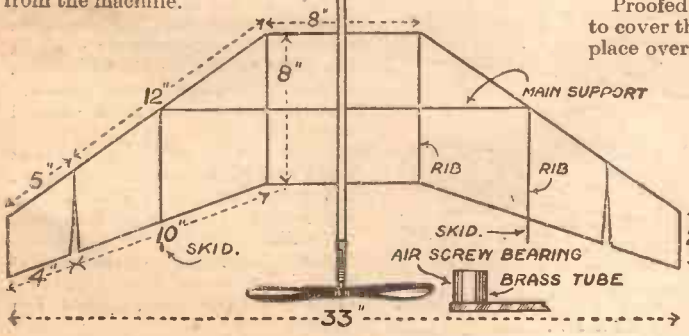


Fig. 1.—Plan view of the monoplane

The Mainplane.

It will be seen that this is of the swept-back type, with elevators on the tip of it. The leading edges of the wings are swept back to an angle of about 50 degrees, as shown in Fig. 4. First of all make the centre section, which is an 8in. square of 18-gauge piano wire with a centre strut. Next make the wing pieces, which are 12in. long at the leading edge of the wing, and 10in. long at the back. The width or chord of the wing varies from 8in. at the centre to 2in. at the tip. The elevators are made from 20 gauge wire, the leading edge of each being 5in. long, the back edge 4in. long, and the wing tip 2in. wide. The undercarriage, Fig. 5, consists of a wheel frame made from a piece of wood 10in. long, 1in. wide, and ¼in. thick. Two pieces are cut out to take the wheels as shown in Fig. 6, which are kept in place by two pins made from piano wire. Two lengths of 18-gauge wire are fixed to the centre of the wing, one in front, and one at the back, and are secured to the wheel frame, as shown in Fig. 5. After these have been made and fixed, the other end of the cane skid is bound to the front of the wheel frame, and this completes the framework.

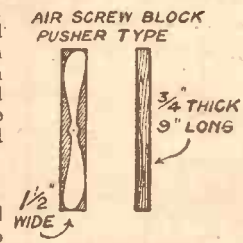


Fig. 3.—Details of the propeller.

Covering the Wings.

Proofed silk should be used to cover the wing. Pin this into place over the wire framework, carefully removing all wrinkles, and then stitch it to the frame with an over and over stitch, neatly trimming off superfluous fabric.

The Motive Power.

This consists of nine strands of ¼in. strip elastic, well lubricated with pure soft soap. To fly the model, first of all glide it, and continue to do so until the model glides to earth on an even keel. If, when gliding the model, it tends to dive, move the mainplane forward, and vice versa. Also give the elevators a slight bend-up at the

rear edges. Next, give the airscrew about 200 turns, then hold the airscrew by the right hand and support the front skid with the left, and launch rather swiftly. When the proper adjustment has been found, the model will fly gracefully at a height of about 40ft. The full number of turns to give to the elastic motor is 400.

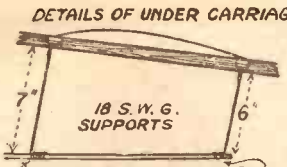


Fig. 5.—Details of the under carriage.

Frequently lubricate the bearing with vaseline and smear some lubricant on the elastic every third or fourth flight. It is important to note that whatever covering is used for the wings it must be both air-proof and waterproof. The photograph given on the preceding page, if carefully compared with the diagrams, will explain any detail of the construction not made clear from this description. But if the slightest difficulty is experienced in constructing or flying the model it is merely necessary to address a letter to the Editor, when helpful advice will immediately be forthcoming from our Model Aeroplane Expert.

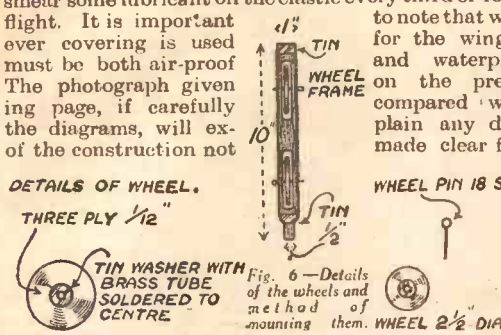


Fig. 6.—Details of the wheels and method of mounting them.

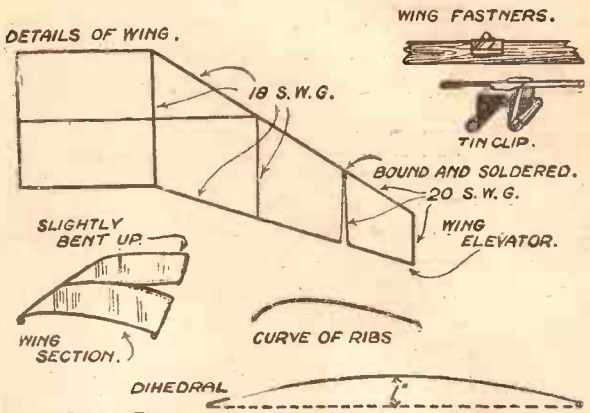


Fig. 4.—The above sketches show the construction of the wings.

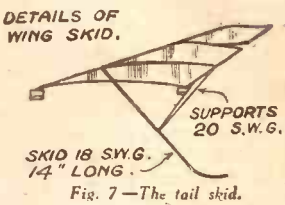
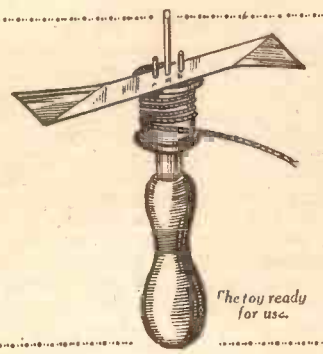
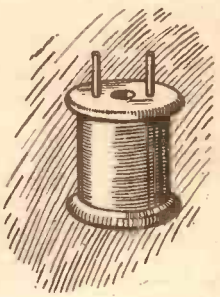


Fig. 7.—The tail skid.


The toy ready for use.

A SIMPLE FLYING TOY

By H. M. Eton


Two nails with their heads filed off are driven into a cotton reel as shown.

HERE is a model which requires the minimum of material in making besides being very easily constructed.

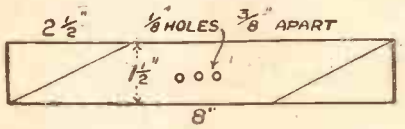
The chief part is a strip of fairly stout tin—the lid of an old biscuit tin serves admirably—and this should be cut to the dimensions shown in the sketch: if no "snips" are available, an old pair of scissors may be used for the cutting.

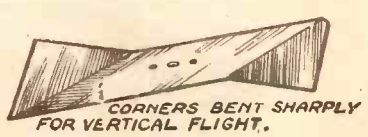
Three holes must be drilled in the positions shown, about ⅛in. diameter; if a drill is not handy, holes may be made with a large nail, filing the burrs off afterwards.

An empty cotton reel and a bradawl will now be required; also two wire nails 1in. long; these latter are driven in the reel, one on each side of the central hole, to the depth of ½in.; the position of the nails must coincide with holes in the tin strip; also, the heads are removed. Before the toy can be worked, the corners of the strip have to be bent slightly: the best angle may easily be found by a little experiment; the more acute the angle, the higher the flight. To use the toy, the strip is placed on the reel, bent corners downwards, and the nails through the holes provided: the bradawl is also inserted and acts as a handle.

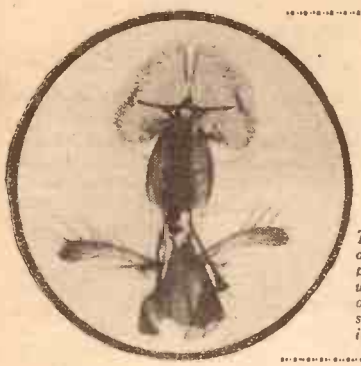
A length of string is wound round the wheel.

Hold the bradawl in the left hand and pull the string sharply; the model will then ascend into the air and come to earth again, some distance away, in a graceful circle. This toy, of course, is essentially an outdoor one, and should not be tried inside the house.





A piece of tin should be cut to the above dimensions and bent according to the flight required.



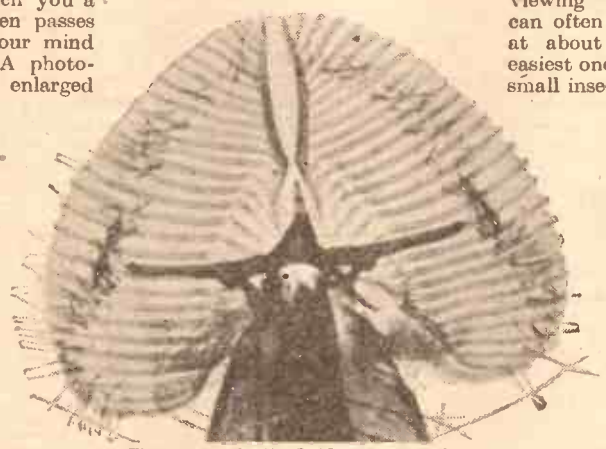
The proboscis of a blowfly photographed with the aid of a microscope 24 times its actual size.

SIMPLE PHOTOMICROGRAPHY

By Owen Wheeler, F.R.P.S.

A practical article on a very interesting subject.

PHOTOMICROGRAPHY, or the making of enlarged photographs of very small objects, is a most fascinating pursuit which opens up a very wide field of both interest and instruction. Looking at tiny things through a microscope or a magnifying-glass may give you pleasure and teach you a lot, but what you see often passes almost as quickly out of your mind as it does from your eye. A photomicrograph captures the enlarged image you have seen, and months or years afterwards you can examine it at your leisure and very possibly find a number of interesting details which may have escaped you when you first focused the object with a magnifying lens or a regular microscope.



The proboscis of a blowfly 73 times its actual size.

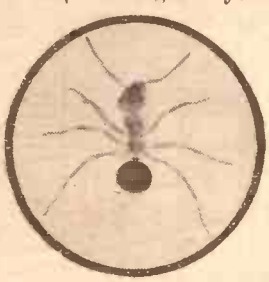
With a Microscope.

There are, of course, a great many objects for which an enlargement of at least × 100 up to × 1,000 or more is necessary. In passing. it may be explained that all microscopic and photographic enlargement is *linear*. In other words, a × 100 enlargement of a postage stamp would occupy as much space as 100 × 100 or 10.000 stamps. For anything over × 100 a microscope is practically essential, and photomicrography with a microscope is not child's play by any means. If the microscope is a good one, you can buy a special camera to fit on to it, or you can adapt your own by taking out the lens, and in that way can obtain very good moderate power photomicrographs. But this article is not written for microscope owners. Those who have suitable instruments can mostly afford to buy one of the standard textbooks on photomicrography. Those with only the cheap microscopes made for boys' use will find it difficult, if not impossible, to do any decent photography with them, owing to the poorness of the lenses and the deficiency of light.

Without a Microscope.

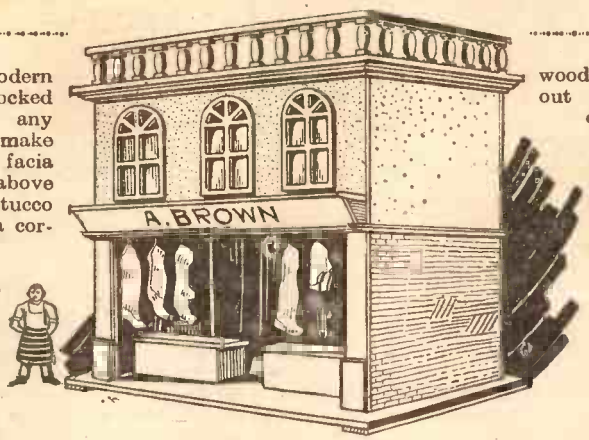
Photomicrography with an ordinary camera and lens is limited to very low powers such as × 5 or × 10, but the amount and variety of interesting work that can be done at these small magnifications are surprising. Whole insects, portions of flowers, sections of stems and wood, and numbers of other objects only need to be magnified slightly to reveal all sorts of beauties and peculiarities which, if perceptible to the unaided eye, cannot be properly taken in by it. The simplest method of selecting and procuring such objects when one is a beginner is to buy two or three ready mounted for viewing in the microscope. They can often be picked up secondhand at about sixpence each, and the easiest ones to photograph are whole small insects, or parts of larger ones, which have been rendered transparent for use with transmitted light. To all intents and purposes, such an object is practically the same as a lantern slide, and can. indeed, be shown in an optical lantern with a proper appliance. Now, if you put a lantern slide, instead of a negative, into an enlarging camera —the simplest form of which is a daylight enlarger—you get an enlarged negative, which is what you want in photomicrography. But the degree of enlargement would usually be quite small, say, × 3, because the focus of the lens used for enlarging would be long in comparison with the length of the camera. To get an enlargement of only × 3 with a 5in. lens, there would have to be a distance of 20in. between the lantern slide and the sensitive plate, in addition to nearly 7in. between the lens and whatever has to be enlarged. Consequently, if you use an ordinary camera or a daylight enlarger in order to get at least five magnifications, you need a lens of very short focus in order to keep the length of your apparatus within convenient limits. The shortest focus photographic lenses are those used in cinematography, and if you can get hold of one of these, with a focal length of, say, 1in., you can make capital photomicrography at from × 5 to × 8 with an ordinary ¼-plate camera. A 3in. lens, such as fitted to some of the smaller

(*Continued on page* 654.)



A wood ant five times its actual size.

A TOY BUTCHER'S SHOP



THE sketch shows a modern shop equipped and stocked with supplies, which any reader with a fretsaw can make in his spare time. A neat facia runs the whole width, and above are three windows set in a stucco wall and surmounted with a cornice and stone balustrade. The lower portion of the structure is covered with brick paper, while the stucco above is represented by fine sawdust thrown on wet glue. The illustration (Fig. 1) shows at a glance the general construction of the house, a portion of the front and side being cut out to expose the interior work. Access to the top portion of the house is gained by a falling door or flap hinged at the back, as the larger detail indicates. Three-ply wood is suggested throughout with triangular fillet pieces where necessary for strengthening.

The base is a rectangular piece 13in. by 7in., with narrow strips glued and nailed on each end underneath (see Fig. 1) to stiffen it up. The front and the back of the house are the same in size, so two pieces 12¾in. by 12in. may be cut together if desired. The former measurement is the height. The front will have the large shop-front opening marked and cut out, as well as the windows above (see Fig. 2). Cut these with the fretsaw and then mark the door or falling flap on the piece forming the back. Set out a width of 1in. from one edge of the back and then 10in. Now from the extreme top set down 1in. and then 5in., making a 10in. by 5in. door, which must be re-inserted in the opening and fixed with a pair of hinges (see Fig. 1). Two small photo clips will hold the flap closed.

Forming the Windows.

The window openings in the front of the house are designed to take pieces of glass 2⅜in. by 2½in. (obtainable from Hobbies Ltd. for 1½d. each, the number to quote when ordering being 5825). The overlays forming the frames and the bars of the windows are cut from thin wood to the shape and dimensions shown in Fig. 3. The three overlays can be cut in one operation if ⅛in. wood is used, or one may be cut out and used to set out the others by drawing a pencil line round the outline and openings. Glue on the overlays with an even border round inside to form the rebate for the glass. Lay the pieces of glass inside and secure by means of small wood slips glued to the top and sills. A good effect may be obtained if pieces of green or red paper are stuck to the backs of the window overlays at the tops behind the circular portion before they are glued to the wall of the house.

For the sides, cut two pieces of wood, each 12¾in. by 6in., and 6in. from the bottom glue pieces of triangular fillet (see Fig. 1) for the floor to rest upon. The sides of the house must be glued and nailed between the front and back, and the floor then cut from wood to the exact dimensions of the inside of the house. The tops of the angle fillets are coated with glue before the floor is put down. The roof measures 14in. by 8¾in., which allows an overlap of 1in. all round. Cut the piece square and nail it on, and then to form the cornice underneath glue on pieces of No. 21 moulding (see Fig. 4), mitred at the corners. The balustrade is formed on the front and two sides with pieces of ⅛in. by ¼in. stripwood with the specially turned little balusters (No. 12a) sold by Hobbies Ltd. at 4d. per doz. glued as shown in the diagram at Fig. 4. The top and bottom pieces A and B are mitred at the front angles of the house, but cut square at the back. Twenty-six turned balusters will be required, spaced 1in. from centre to centre.

Making up the Name Board.

The facia, or name board (see section at Fig. 5), is built above the shop-front, whilst along the side of the house are glued pieces of No. 21 moulding. Above this at 1in. distance, a piece of 1in. by ⅛in. wood is glued to form the top of the facia. In between is the sloping name board made by fitting in another piece of wood. The edges of this piece are chamfered to obtain a sound

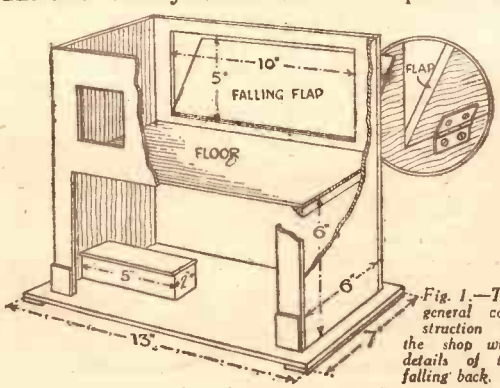


Fig. 1.—The general construction of the shop with details of the falling back.

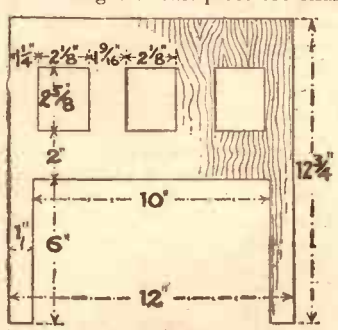


Fig. 2.—Details of the front to be marked for cutting out.

(Continued on page 646.)

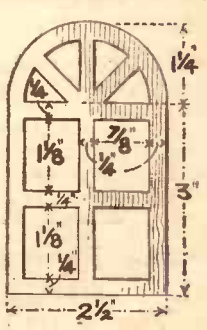


Fig. 3.—Draw this shape on to pieces of wood for the window overlays.

The Fretworker

HOW TO MAKE THIS CANDLE BRACKET

Decorate the walls of your home with this artistic piece of fretwork. It is easily cut from the full-size patterns printed with this week's gift design sheet. Simple and straightforward, even to the beginner.

Full particulars of the wood required, as well as the price of the mirror and candle holders themselves, are given on the next page.

THIS week's design sheet contains the patterns and particulars for making up the striking candle bracket and mirror frame illustrated herewith. Its appearance and usefulness will appeal to a very large number of our readers, and induce them to start work on the cutting immediately. Fretwork has a very wide range of usefulness, and this is another illustration of how we can turn the ordinary set of Hobbies fretwork tools to excellent account. The work involved is reasonably small, whilst the parts do not entail a quantity of intricate cutting or time spent on fitting. The patterns are illustrated full size on the sheet, so all one has to do is to cut close round them with a pair of scissors, and paste the parts down on to their respective pieces of wood.

All Wood Supplied.

A piece of work such as this would look well in almost any ordinary fretwood, but we particularly recommend mahogany as being most suitable. It is, moreover, possible to cut all the necessary parts from two pieces of wood—one 15in. by 7½in., and the other 10½in. by 7½in. For this reason, we recommend the panels specially supplied by Hobbies Ltd. for this purpose. These panels are obtainable in various thicknesses, and we shall want one, A, in ¼in. wood to take the back and the other patterns as illustrated at Fig. 1, whilst another, D, in ⅛in. wood will take the overlay holding the mirror in place. These two panels cost only 1s. 5d., and the only additional piece of wood is a strip of No. 21 moulding to decorate the holder above the mirror. The mirror itself is a handsome piece of bevelled plate. cut to an oval 7½in. by 5½in., and its addition to the bracket makes a very big difference to its appearance. One can, of course, add a piece of clear glass and put a picture behind it if so desired, but it is very much better with the mirror, as when the candles are lighted the effect of the reflection on any wall is quite striking. The large pattern is pasted down to the panel of wood, and the smaller parts—all of which are cut from ¼in. material—are put on in various odd positions (see Fig. 1). The holder is composed roughly of two principal parts—the main back and the overlay for the mirror. The other smaller pieces merely go to form up a projecting candle bracket, one of each being fixed in the top right-hand corner just above the mirror itself.

Fig. 1.—This is the way the patterns are pasted on a panel of wood to prevent waste.

The work on the back should be undertaken first, and in cutting particular note should be made that the mortises, A, are cut to the size given. Keep them on the small side if anything, in order to get a good fit when the tenons on the brackets are fixed in. If these mortises, A, are cut too large, the brackets will not fit tight, and the error cannot then be easily rectified. Beyond the outline there is little work to do in cutting the small amount of interior fretwork. The large centre oval provides the opening for the mirror, and the waste piece which is cut out is used for the patterns of two of the actual candle brackets. The dotted lines on this part indicate the position of the overlays, and it will be necessary to mark on where the piece of moulding comes along the top before cleaning off the paper. Then the whole part can be cleaned up so that it is ready for testing out with the other pieces.

Cut a piece of the shaped moulding (No. 21) 5½in. long, and then with file and sandpaper shape the ends to make them the same outline as the front—called 'returning'—as shown at Fig. 2. Then glue this piece of moulding along the top so that the ends are parallel with the shape of the sides. You will remember the position was pricked out previously. Immediately beneath the moulding comes an ornamental overlay which is cut from the waste wood of the mirror

overlay and is glued close up immediately beneath it.

Each candle bracket is composed of three pieces, and the illustration at Fig. 3 shows one completed. The main bracket fits into the back by the tenon A, but before this piece can be fitted we have to put on a lateral support piece, which is halved in (see A, Fig. 4). At the other end another cross support is provided for the candle holder. This is a small piece cut from ¼in. wood, which halves up into the joint at D. When this part is in place, it will be found that there is a square recess (see B, Fig. 4) in which we have to fit a block of wood to take the screw portion of the brass candle holder. This block can either be cut from a ¾in. thick piece of wood, or can be made up as shown on the design sheet by three separate pieces of ¼in. wood. The three small blocks are ¾in. wide, so that when joined together they make up a piece ¾in. square and ¼in. deep, as shown in the small detail at Fig. 4. This block should fit in the recess provided by the cross pieces in the front end of the candle bracket and is there glued in place quite firmly. The candle socket and drip plate (No. 6101), which is supplied by Hobbies Ltd., is suitable for use, and a ½in. screw is provided to drive down into the solid block just fitted. Make a hole first to take this screw, and hold the bracket firmly whilst the part is being driven in so that none of the wood is broken.

Fig. 2.—The way the ends of the moulding are shaped before fixing.

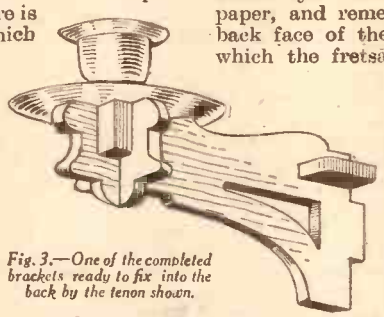


Fig. 3.—One of the completed brackets ready to fix into the back by the tenon shown.

Special panels of wood are supplied by Hobbies Ltd. for cutting all the patterns. A parcel containing two pieces of mahogany (panels A and D) with enough moulding (No. 21), for 1/6, or 2/- post free. Also a bevelled mirror (No. 5746), 3/-; a pair of brass candle holders ready to fix (No. 6101), price 2/-; and a pair of bracket eyes for hanging, price 1d. Post is 6d. extra on the fittings. A complete parcel of wood and fittings for 6/6, or 7/- post free, from any branch of Hobbies Ltd., or Dereham, Norfolk. Canadian Depot: 844, Yonge St., Toronto

If so desired, the top of the block can be made slightly hollow in order to take the shape of the drip plate to make it sit more firmly. The whole of this candle bracket should be completed before it is fitted into the back, that operation being performed by putting glue on the mortise and tenon joint, and along the flat edge of the bracket itself to hold it firmly. Be sure that the fit of this joint is good, but if it is necessary screws can be driven through from behind into the edge of the wood to make it even firmer.

The overlay of the mirror is cut from the $\frac{3}{16}$in. board to the pattern shown, and can be added to the back either before or after the fitting of the candle brackets. It is advisable to make the first operation the getting out of the central ellipse, in order that we may bevel the edge down to the section shown whilst there is still a considerable amount of wood to handle. If we do this chamfering last, the wood is much more fragile because there is so much less of it. The work of chamfering is done directly across the grain with a 6in. or 8in. half-smooth file used in two hands, with the wood held firmly in a vice or laid on a fretwork cutting table. When this bevelling has been satisfactorily completed, the rest of the work and finally the outer edge can be cut away. Then clean up the whole part with sandpaper, and remember to give a light rubbing on the back face of the wood in order to take off any burr which the fretsaw may have made. This overlay is glued down to the main back so that there is an equal projection all round the opening cut in the latter part. Thus the overlay forms the rebate to hold the mirror in place, and it is essential to see that it is glued firmly for this reason.

When the overlay is in place, the mirror is put in from behind and followed by a padding piece of blotting paper, the same shape. There will probably still be a recess in the thickness of the wood, and this can be filled up with a thinner board—probably ¼in. thick—cut the same size and shape as the opening. This board should bring the surface level over the whole of the back, and it is held in place by pasting stiff brown paper over the whole thing. Cut a square of paper and dampen it slightly with a sponge or rag. Apply the paste to the wood, and then put on the paper. Rub it flat so that there are no wrinkles, and leave until the whole thing is dry. It will be found then that the paper has become drum tight and makes a neat finish to the job.

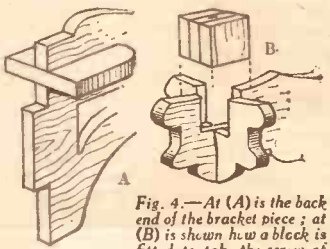
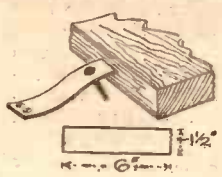


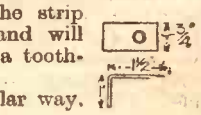
Fig. 4.—At (A) is the back end of the bracket piece; at (B) is shown how a block is fitted to take the screw of the candle holder.

The bracket is fixed to the wall by means of two hangers which are screwed on to the back immediately above the joint of the candle bracket. This position is shown by the dotted lines on the design pattern. Be sure to use short screws so that they do not come through the front.

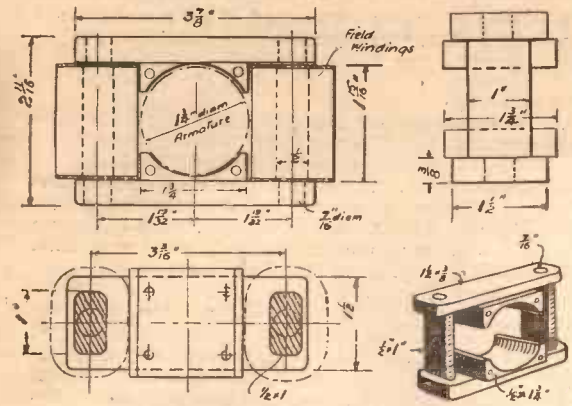
TWO HOME-MADE BENCH STOPS.

THE woodworker is sometimes at a loss to prevent his wood sliding along the bench or table when he is planing it, unless he has a proper bench top. Here are illustrated two simple forms of stop easily made by the handyman, and fitted up at a minute's notice. They can thus be taken off and put on the bench or table as required. A strip of strong spring steel will do for either, and the illustrations show how they are bent and fixed. The strip in the first stop is 6in. long and 1½in. wide, but can be narrower and shorter if only thin, small pieces of wood are likely to be used. One end has two holes bored by which it can be screwed down to the work bench. The other end is lifted to the angle shown, and is held there, away from the bench, by a long screw. The end of the strip provides the stop for the wood, and will "bite" better if it is serrated to a tooth-like edge by means of a file.





The second stop is made in a similar way.



MAKING A SMALL CHARGING DYNAMO

By Henry Greenly

Fig. 1.—The field magnet fo a 15 watt charging dynamo

AS the exact purpose for which a model dynamo is intended must be decided upon before it is possible to proceed with the design, as a preliminary to the description of the making of a small charging dynamo, I shall refer to the two main types of miniature machines that can, without difficulty, be made by the amateur mechanic. These are (1) the continuous-current dynamo with wire-wound field magnet, and (2) the "magneto" machine, which has a permanent magnet field like that used in the motor-car ignition magneto. It is intended to describe the last-mentioned type of machine in another article.

The Principle of the Dynamo.

The dynamo produces an electric current by virtue of the fact that the wires of the armature are forced to pass through a magnetic field. The armature wires are said "to cut" the "lines of magnetic force" which are concentrated between the poles of the field magnet. Until that "field" is produced by the windings of the dynamo there is no resistance to the rotation of the armature. Further, there is no resistance to the turning of the shaft other than the normal friction, until the armature circuit is closed to allow the current to pass. Mechanical energy is then converted into electrical energy.

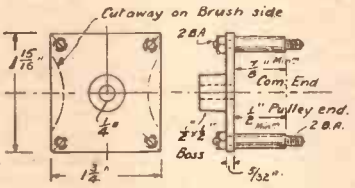


Fig. 2.—The bearing plates

The dynamo itself also consists of two main parts: (1) the field magnet which is generally the stationary carcase of the machine, and (2) the armature which is a sort of wire-wound bobbin of some particular formation which rotates on a shaft in the tunnel (*i.e.*, between the poles) of the field magnet. Besides the wire-wound bobbin, the armature comprises a very necessary feature, which needs some mention at this juncture. Alongside the latter on one end of the shaft is fixed what is known as the commutator. This is a copper drum, divided up into as many separate segments as there are poles or slots in the armature. These segments are insulated from each other, but are electrically connected to the armature coils On the carcase of the machine are fixed copper or carbon brushes which collect the separate currents from the armature coils and from an alternating form commutate them into a direct or continuous flow of electricity. The currents, although continuous in direction, are, to a certain extent, pulsating, but with a large number of segments in the commutator and a high speed the "jumps" from no volts to full voltage are converted to steady flow with an almost imperceptible ripple.

The "magneto" type of dynamo is only suited for the production of light. The current being an alternating one—the commutator is usually eliminated—cannot be stored in an accumulator. This type of machine is exemplified in the small dynamos made for the lighting equipment of pedal cycles, and, as a rule, are driven by a rubber pulley engaging the rim of one of the road wheels.

A Small Charging Dynamo.

The small charging dynamo, the construction of which we are now describing, is suited for an output of 10 to 16 watts at a maximum voltage of 10 to 12 volts, and to dispense with castings it is arranged to be built up entirely of raw material. For this reason the "Manchester" type of field magnet has been chosen as the most suitable. It should be borne in mind that the dynamo requires much more careful making than a motor, although the construction of the two machines is virtually the same. A badly made motor may just "go" if it is fed with an unlimited amount of current, but a dynamo of kindred make would not generate any useful amount of current however fast it were rotated. Therefore, in building up the parts it is essential that a lathe shall be used to provide a truly bored-out armature tunnel, also an armature which equally well fits in the tunnel with the minimum amount of air gap. The efficiency of a dynamo varies as the square of this air gap, which means that a machine with a space between the tunnel and the armature twice that of another will only havo one-fourth of its efficiency.

The Field Magnet.

The present design requires material (mild steel bar) of three sections, ½in. by 1¾in., ⅜in. by 1½in., and ½in. by 1in. All these bars are commercial sizes, and can be obtained from any metal merchant.

The ½in. by 1¾in. pieces are 1¾in. long and are screwed,

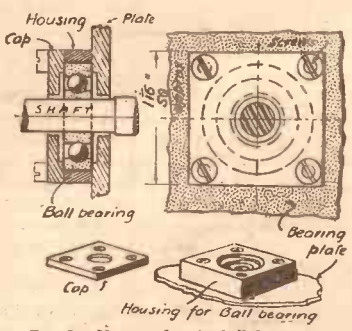


Fig. 3.—Housing for the ball bearings

with four screws each, on to the upper and lower limbs of the magnet (the 3 3/16 in. lengths of 3/8in. by 1 1/2in. stuff) to form pole pieces. This saves either making a forging or cutting the whole part out of the solid. The winding yokes (the 1/2in. by 1in. bars) are turned down at the ends to 7/16in. diameter, and forced into holes of the same size in the upper and lower limbs to make up the complete unit, shown in the perspective sketch (Fig. 1). When the parts are fitted together the field magnet is mounted up in a lathe—on an angle plate if the tool is large enough—and the tunnel bored out to a diameter 1/32in. larger than the actual finished size of the normal 1 3/4in. armature.

Bearing Plates.

The armature is arranged to be carried in bearings held in "spider" or end plates made up out of brass sheet and rod. These end plates are supported on pegs from the pole pieces of the field magnet. Owing to the presence of the commutator on one side of the machine, the pegs must be of two lengths, the longer set being used for the end plates at the commutator end of the shaft (see Fig. 2). The other end carries the driving pulley, which is, of course, placed outside the bearing plate.

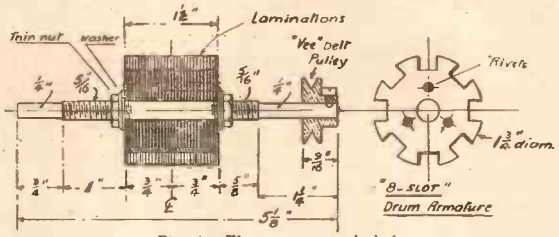


Fig. 4.—The armature and shaft.

Ball Bearings.

The bearings may be plain bushes with a lubricator fixed on top, but if the dynamo is intended to give continuous service, then something better is more or less essential to complete success. The spider plates should be bored out to fit standard ball-bearings. These fittings are obtainable in all sizes and in what is known as the "light type," the overall dimensions are such as make the bearings easily applicable to the case under consideration. There are several makes on the market, and the prices are quite reasonable. The sketch detail (Fig. 3) illustrates a good scheme for housing the ball-bearings. The inner race should be a "push" fit on the shaft and the outer one a similar tight fit in the housing.

A thicker piece of raw material will be required when using ball-bearings to allow for the housing of the bearings or the boss, as in the case of the plain bushes; this casing may be built up out of raw material applied by soldering to the pieces of 1/4in. or 5/32in. sheet brass out of which end plates are made and securing the parts with four screws, one in each corner If ball-bearings are used, the brush gear must be placed inside and the pegs carrying the bearing plates will have to be about 1/4in. longer. The dimensions on the drawing are minimum figures.

The Armature.

For the armature (see Fig. 4), an eight-slot drum type is recommended. The two-pole "Siemens" or "H" armature is not very satisfactory, although it is easy to build up and wind. It does not give a current which is suitable for charging accumulators and many other purpose. The voltage fluctuates too much. The three-pole (tripolar) armature, so much favoured by makers of small electric motors, is not very efficient in a dynamo.

The Commutator.

The eight-slot armature, of course, means an eight-slot commutator, but real success demands these complications, and if the reader's skill or his available workshop equipment will not meet the case, the commutator can be purchased as a separate unit ready made. All that it is necessary to state is the diameter of shaft (3/8in. in this case) to which it is to be fitted. If the purchased commutator is longer than that illustrated as Fig. 4, then the pegs supporting the end plates must be increased in length accordingly.

Making up the Armature.

The slotted armature should certainly be made up out of purchased stampings. These are made of thin sheet iron of a special quality and are so cheap that on no account is it worth the time, trouble and great risk of electrical failure that making up the slotted block of iron which forms the body of the armature in any other way, would entail.

The armature shaft is a piece of mild steel 3/8in. in diameter, screwed at each end, 26 threads per inch, and also turned to 1/4in. diameter to fit the bearings and driving pulley. The stampings are secured between two nuts and washers and, before threading on to the spindle, the stampings should be coated with shellac varnish. They are then set with the slots true with each other, and in line, gripped up, and then drilled for three 1/8in. iron rivets. Once these rivets are in place the armature can be removed without displacing the stampings. To obtain the perfect working fit of the armature in the tunnel, with the minimum of air gap, it will be necessary to skim up the outer diameter in the lathe while the stampings are in place on the shaft.

(To be concluded next week.)

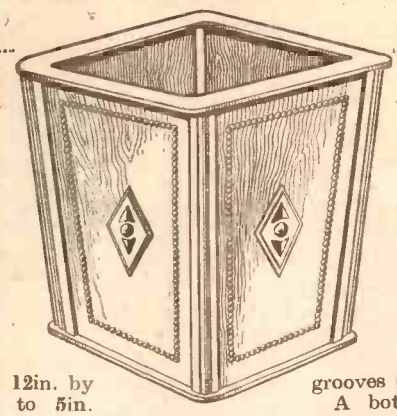
SOLDERING WIRE CONNECTIONS.

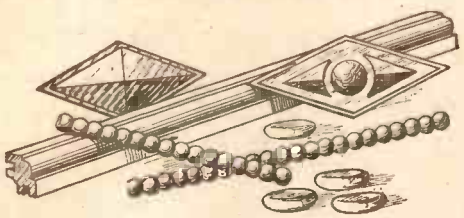
IF you are making up a wireless set, unless you are quite proficient in soldering it is preferable to purchase components which are provided with terminals, as a much better joint can be made by screwing a loop of wire under a terminal than by using a soldering iron which is half cold, or trying to solder a wire to a dirty soldering tag, etc. Furthermore, a very hot iron, if left too long in contact with a soldering lug attached to an ebonite or composition component, such, for instance, as a valve-holder, can cause a big loss in signal strength, if it does not actually prevent signals coming through. It has been known for the composition to run and get between a valve socket and soldering tag, and the constructor who made the set spent two nights trying to find out why the set would not work. It was the grid of a detector valve where this occurred, and he does not attempt to solder his connections now.

A HOME-MADE WASTE-PAPER BASKET

Know somebody who wants one? Here's one you can make quite easily and cheaply by using grooved corner moulding.

A WASTE-PAPER basket is a useful accessory to every home, and there is a good demand for this type of article where simple shape and effective design are introduced. The ideal basket must be strong and at the same time comparatively light, and in order to attain this the article is made from wood $\frac{3}{16}$in. thick. The usual trouble of getting the corners to fit properly is overcome by the use of Hobbies grooved moulding. This is supplied with recessed edges, and into the groove provided, the wood of the sides is slipped and glued. This simple operation prevents the usual trouble of butting up the corners or arranging for a suitable joint. Cut the sides 12in. by 8in., and taper the sides down to 5in.





This is the ornamental work supplied by Hobbies Ltd., cut and turned ready to glue on.

Get four sides true in order that they will fit nicely together. An ideal way of fixing the sides is by using Hobbies corner moulding (No. 45), with $\frac{3}{16}$in. grooves. Cut four pieces of the moulding 12in. long, and then fix the sides in temporarily, and see if any little adjustments are required. The top and bottom must be filed flat to make it stand level. In the centre of the outside face of each side fix a Hobbies diamond ornament (No. 205), size 3in. by 1$\frac{1}{8}$in., and then fix strips of $\frac{3}{8}$in. half-round beading 1in. from top and bottom edges and $\frac{1}{2}$in. from the side edges, as indicated by the dotted line position in Fig. 1. The beading should be glued on the inside of the lines shown, with the corners nicely mitred. The sides are now fixed by means of the strips of corner moulding with a little glue applied in the grooves (see Fig. 2).

Fig. 2.—How the sides fit into the grooved corner posts.

A bottom for the basket is made from a piece of wood 6in. square, with rounded corners to a radius of $\frac{1}{2}$in. (Fig. 3). This bottom is fixed in position with a little glue applied along the edges, and in order to add extra strength small screws are driven through each corner into the moulding and into the edges of the wood. In order to cover the corner ends of the moulding at the top of the basket, and at the same time adding a nice finished effect, a 1in. strip rim is cut (as shown at Fig. 4) and glued and screwed on. This holds the top of the basket rigid, particularly if blocking strips are glued beneath. We have now completed an attractive and useful basket as illustrated, and a nice finish is obtained by smoothing off with fine-grade sandpaper.

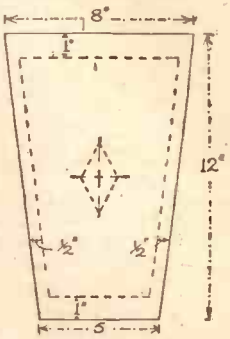


Fig. 1 (above).—The shape and dimensions of each of the sides.

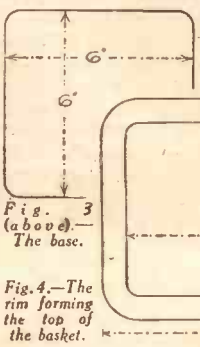


Fig. 3 (above).—The base.

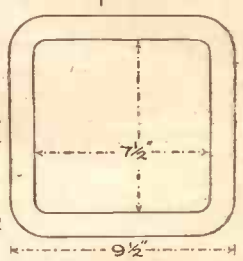


Fig. 4.—The rim forming the top of the basket.

A TOY BUTCHER'S SHOP (*continued from page* 640.)

fit. The facia ends are closed by pieces of wood cut to shape and glued in. To form bases to the uprights at the sides of the front opening, glue on pieces of wood as shown in Fig. 1.

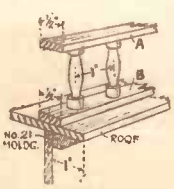


Fig. 4.—The balcony and roof with the cornice moulding beneath.

To complete the shop, two counters are formed from the wood cut from the front. Each counter has two sides (5in. by 1$\frac{1}{2}$in.) and two ends (2in. by 1$\frac{1}{2}$in.). Glue and pin the pieces together and fit on a top to overhang the sides and ends slightly (see in Fig. 1). Brick paper is cut to shape and pasted on the outer walls, while the upper portions of the house are stuccoed. If the whole surface is coated at once with glue it becomes set before the sawdust has time to stick properly. The cornice moulding and the underside and edge of the roof should be painted green, poster paint being very suitable for this covering. The balustrading and facia are painted white, the name being put in green. Mr. A. Brown, our proprietor, may be "made" of plywood, the simple outline being pencilled on the wood previously to cutting out and colouring in. A flat piece of wood forms the base to hold the figure. The choice "joints" and "sides" may consist of plasticine modelled up, or may even be cut from thicker wood, coloured.

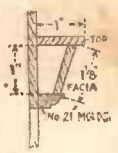
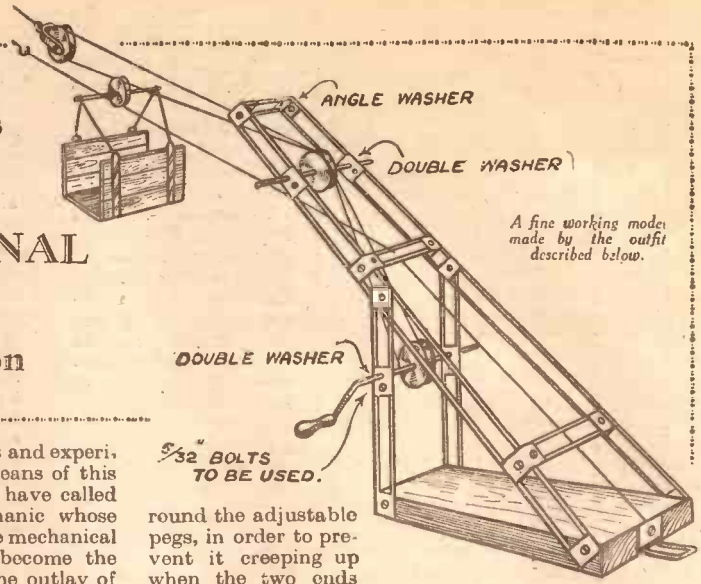


Fig. 5.—A side view of the name board, showing how it is built up.

Make This Ingenious WIRE CONSTRUCTIONAL OUTFIT

By L. Wallington



A fine working model made by the outfit described below.

OWING to the numerous working models and experiments that can be carried out by means of this cheap, efficient constructional set, I have called it "Invento"; and even the young mechanic whose pocket does not stretch to the more expensive mechanical outfits now upon the market can easily become the owner of a well-equipped set of parts for the outlay of a shilling or two upon a few feet of tinned iron wire of, say, gauges 12 or 13 and a soldering kit. Fig. 1 shows the plain building strip, and a number of each length must be made up. It will be seen that they are very simple to make especially if you use one or two jigs upon which to bend the wire. To make, say, the 12in. strip you take a length of the tinned iron wire, which, whilst possessing a splendid surface for soldering, has a fine polished finish and gives the set an excellent appearance, and cut a number of pieces off 25½in. long.

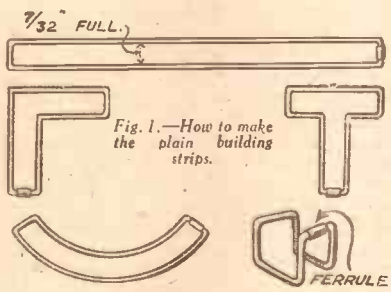


Fig. 1.—How to make the plain building strips.

Bending the Building Strips.

The space between the two sides will be seen in Fig. 1 to be 7/32in., so that a pair of flat-nosed pliers of that width, or a shade narrower, will be required. Grip the wire firmly in the centre with the pliers, and with the left thumb bend the wire as sharply as possible down either side of the jaws, as seen in Fig. 2. It is best really to bend all the lengths in this manner first and not finish off each strip separately. Having done this, take the jig which is shown in Fig. 3 and lay the wire in position with the bend round the adjustable pegs, in order to prevent it creeping up when the two ends are lightly tapped round the block with the aid of a small fretwork hammer. In carrying out this operation it is necessary to use care in order not to spoil the appearance of the wire with hammer marks or flattening. Now, to make any of the remaining strips of the straight type is, of course, a simple matter, bending them in exactly the same way, the only difference being the alteration in the length of the jig, which is brought about by shifting the pegs to or from the bending block in order to obtain the required length. Having now bent up, say, a dozen of each size, you will need some small ferrules with which to join the two ends. Any odd tins can be used for these, removing the bottom, cutting along the seam, and then snipping off some strips about ⅜in. wide. Take a piece of wire the same gauge as that you are using, and, nipping the end of the tin strip tightly upon it, gradually work it round until you have what is really a small tin tube, exactly fitting the wire. Snip it off and remove from the wire mandrill, making enough to join up all your strips, upon each of which you place a ferrule, covering the join; then, taking a nice clean iron with a touch of flux, run the solder well into the tin. If this is correctly done you will have a nice strong

Fig. 2.—Bend the wire strips as shown.

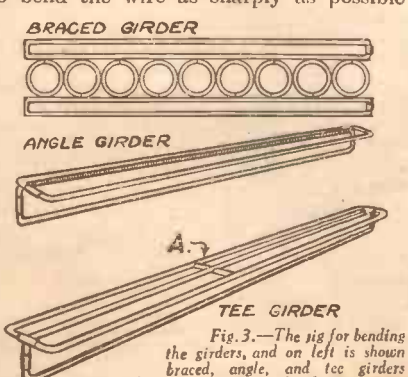
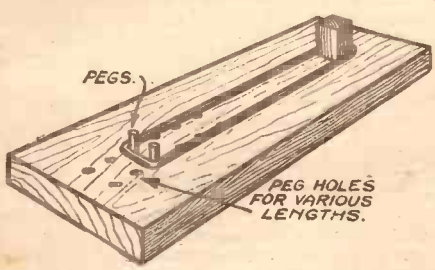


Fig. 3.—The jig for bending the girders, and on left is shown braced, angle, and tee girders completed.



(*Continued on page 650.*)

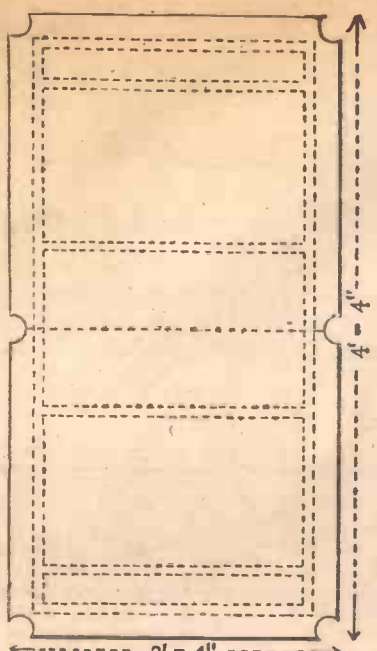


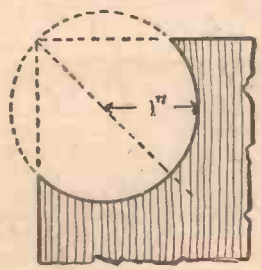
Fig. 1.—The top of the table.

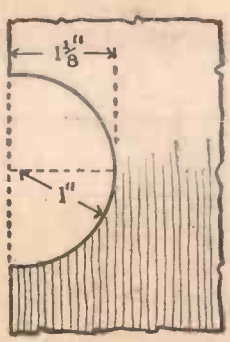
BILLIARDS hold premier place with all indoor games, but many have been prevented from frequently indulging in the game through its costliness and the large amount of room a full-size billiard table requires. The introduction of miniature billiards has brought the game within the reach of everyone, and what is more, anyone with even an elementary knowledge of wood-working can make a billiard table on which a very good game may be played. These tables are intended to stand on the ordinary dining table, and one is shown in the accompanying drawings and described in this article.

Standard sizes for miniature tables are:—

4ft. 4in.	by 2ft.	4in.
5ft. 4in.	by 2ft.	10in.
6ft. 4in.	by 3ft.	4in.
7ft. 4in.	by 3ft.	10in.

A table of the smallest size has been chosen for description, but it will be a simple matter to make any of those mentioned above from the instructions given. Although it is possible to play a better game on a larger table, it should be remembered that a smaller one is less difficult and costly to make, and requires less room. The table is made with a thick plywood top fixed to a strong frame. The top is covered with baize, the cushions are also covered with the same material, and four feet are screwed under the frame in such a way that the table may be adjusted and set quite level. Balls 1½in. diameter should be used.





Figs. 2 and 3.—How the pockets are made.

Fig. 11.—These diagrams show how the feet are made.

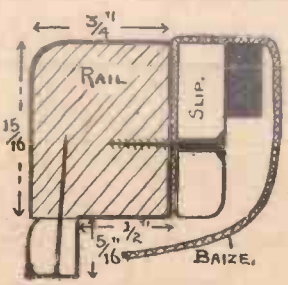


Fig. 6.—Small fillets pinned underneath to form the rebates.

A FINE BILL

and How t

By "Home

The Top.

The plywood top measures 4ft. 4in. by 2ft. 4in., it should not be less than ¼in. thick, and is set out as shown at Fig. 1. It will be necessary to choose a good board, free from imperfections. The pocket holes, one of which is cut at each corner, and the two remaining ones in the middle of the sides, are marked with a pair of compasses set to the radius of 1in., as shown at Figs. 2 and 3. The edges should be planed quite straight and square, and the holes may be cut with a fretsaw.

The Frame.

This is shown at Fig. 4, and is made with two sides 4ft. long by 2in. wide by ¾in. thick, and six cross-pieces 1ft. 11in. long by 2in. wide by ¾in. thick. The cross-pieces are framed to the sides by cutting grooves ¼in. deep in the latter and fitting the cross-pieces in, fixing them with glue and nails. Care should be taken in setting out and cutting the joints, for the frame must provide a perfectly level bearing for the plywood top. On completion it could be tested for trueness with the eye, and a straight-edge should be used to see that the sides and cross-pieces are level, if not they must be planed. To complete the frame two bearers 2ft. long by 2in. wide by ¾in. thick are prepared and fitted under the sides and the cross-pieces next to the end ones, screws being used for fixing. The top is pinned to the frame, the latter being shown under the top by the dotted lines in Fig. 1. If the frame is first placed above the top and its position is marked in pencil, the lines will form a guide for driving the pins. Brass pins with small heads are the most suitable to use; they should be punched in and the holes stopped.

The Rails and Cushions.

The table is surrounded with six rails, one at

Fig. 9.—The pocket plates

Fig. 8—How the ru to the cushi

view of the completed billiard table.

IARD TABLE

o Make it

Mechanic"

each end and two at each side. The end rails are roughly 2ft. 1in. long and the side rails 2ft. long by 1¼in. high by ¾in. wide. Rebates ¼in. wide by $\frac{5}{16}$in. deep are cut at the bottom edges of the rails for fitting over the plywood top, and the outer top edges are lightly rounded over, as shown at Fig. 5. If difficulty is experienced in cutting the rebates the rails could be prepared $\frac{15}{16}$in. high by ¾in. wide, and small fillets $\frac{5}{16}$in. high by ¼in. wide glued and pinned underneath to form the rebates, as shown at Fig. 6, the outer edges of the fillets being rounded over to break the joint. The rails should be fitted in place; they finish level with the edges of the pocket holes, and the ends are cut to an angle of 45 degrees across the width of the rebates, as shown at Fig. 7. The cushions are formed with strips of fairly soft rubber ⅜in. wide by $\frac{3}{16}$in. thick, and if strips of this size cannot be obtained they may be easily cut from a sheet about 2ft. 2in. long by 3in. wide. The strips of rubber are cemented to cushion slips $\frac{15}{16}$in. wide by ¼in. thick; the slips finish $\frac{3}{16}$in. shorter than the rails at each end, and the ends of the slips are rounded as shown at Fig. 8. The rubber should be held under pressure while the cement is drying, and the ends should be cut to fit against the rails, as shown at Fig. 7.

The baize which is used to cover the cushions should be cut in strips about 2ft. 3in. long by 3½in. wide, one edge is tacked to the back of the cushion slip, the latter is then fixed to the rail with screws, as shown at Fig. 6, and the baize is brought over and tacked under the rail, as shown at Fig. 5. The baize must be neatly fitted over the ends of the rails and fixed with a few small tacks to provide a smooth entry for the balls into the pockets.

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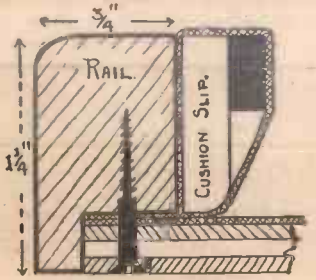


Fig. 5.—The outer top edges should be rounded off as shown.

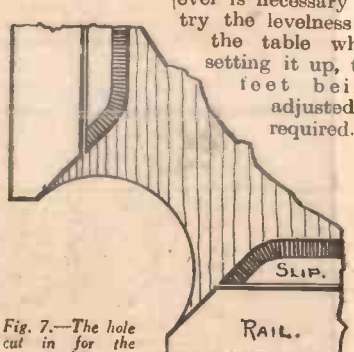


Fig. 7.—The hole cut in for the pocket.

Covering the Top.

The baize covering should be just large enough to cover the top, and it should be pressed with a hot iron before fixing. A few drawing-pins could be used to hold it in place at first. It is then stretched tight, and tacked around the edges, the ends are brought down over the pocket holes and fixed underneath, and the rails and cushions are fixed with screws driven through the top as shown at Fig. 5.

Finishing the Table.

The pocket plates may be fashioned from $\frac{3}{16}$in. round brass, flattened at the ends, and provided with screw holes for fixing, as shown at Figs. 9 and 10, while the pocket nets could be purchased.

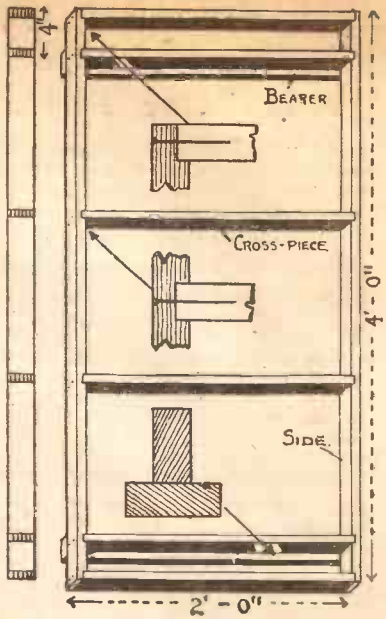


Fig 4.—The frame.

The plan of the finished table, Fig. 10, shows the position of the baulk line and spots, which may be marked with pipe-clay or a hard crayon.

Turned feet about 2in. diameter by 1in. high are fitted under the table, methods of adjustment being shown at Fig. 11. The simplest method is to drive dowel screws into the feet and screw them to the bearers of the frame so that the height may be adjusted. Another method is to drive metal-thread $\frac{5}{16}$in. bolts into the feet; the heads of the bolts should be removed and the nuts let in flush with the top of the bearers, while holes are bored through the bearers and a short distance into the cross-pieces of the frame. A spirit level is necessary to try the levelness of the table when setting it up, the feet being adjusted as required.

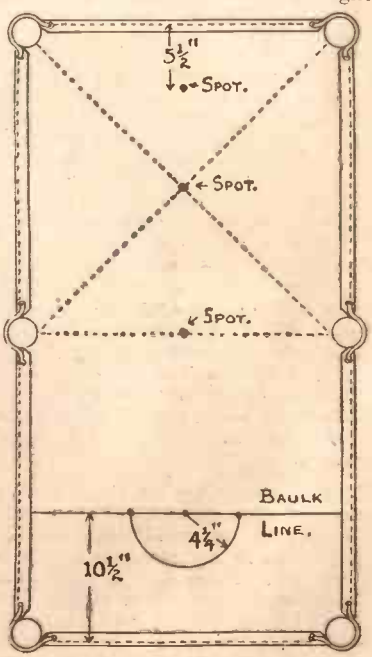


Fig. 10.—The finished table top.

OUR TELEVISOR

Some Readers' Queries Solved

And Some Improvements

In our issue of October 18th we published an article on a home-made Televisor. Owing to the widespread interest this has aroused among our readers, the following has been specially written to help those who found difficulty in constructing the Televisor.—Ed.

IN view of the enormous success of the Televisor described in the issue of HOBBIES dated 18th October last, we propose to give a few further details concerning improvements which may be carried out in this model.

First of all, with regard to the Osglim lamp. A large number of readers were in doubt as to what voltage of lamp was required. This is immaterial, as all the commercial Osglim lamps are fitted in the base with a wire-wound resistance which reduces the actual voltage on the elements to quite a low value. However, greatly improved results are obtained if this resistance is removed. This is not a very difficult thing to do, a soldering-iron, a small quantity of methylated spirits, and some Chatterton's compound being the only things required. Heat the soldering iron and apply it to the oval lumps of solder at the bottom of the lamp, and as soon as the solder runs give the lamp a good shake. The solder will come away, leaving a small hole exposed through which will be seen projecting a thin wire. When both holes are uncovered, stand the lamp in a cup or other vessel and pour in the meth. s. until the cap is covered. Allow this to stand all night, and in the morning it will be found that the brass cap can be easily removed. Inside will be found a small red fibre former containing a large quantity of thin wire. Unsolder this and conne t a short piece of wire in its place : thread this wire and the remaining wire through the holes in the base of the cap, resolder, and replace the cap, using the Chatterton's compound to make all firm. It will now be found that a much brighter image can be obtained with the lamp, although it must be borne in mind that on no account must the lamp in this condition be connected to the mains, as the lamp will be destroyed. A further improvement in the lamp consists of sticking ordinary silver paper to the part of the bulb farthest from the scanning disc, and placing a piece of thin ground-glass (or grease-proof paper) between the lamp and the disc.

The simple Televisor referred to in this article

Improving the Image.

A tunnel-shaped mask may be made from cardboard or thin wood and affixed to the board holding the lens. If the inside of this is coated with camera black still further crispness and brilliancy will be added to the image.

A good many readers have asked why dry batteries are unsuitable for working a television receiver, and we should therefore like to take this opportunity of pointing out that the Neon lamp requires a current of about 20 to 25 milliamps to give satisfactory illumination, and as the lamp is in series with the anode of the valve, quite a large voltage drop is obtained. Therefore it is essential, for the correct working of the output valve, to have at least 200 volts H.T. and an output valve which, under correct working conditions, delivers about 25 milliamps.

A still further refinement, and one which gives better detail to the received image, is to make the holes in the scanning disc of a square shape instead of round. This cuts out the dark patches seen on the screen of a disc which is cut with round holes. The holes should, of course, be 1/30in. square. Any overlap (or underlap) of these holes will result in the screen having light or dark lines running down it, and the utmost accuracy is needed if the screen is to be perfectly evenly illuminated.

WIRE CONSTRUCTIONAL OUTFIT (*continued from page* 647.)

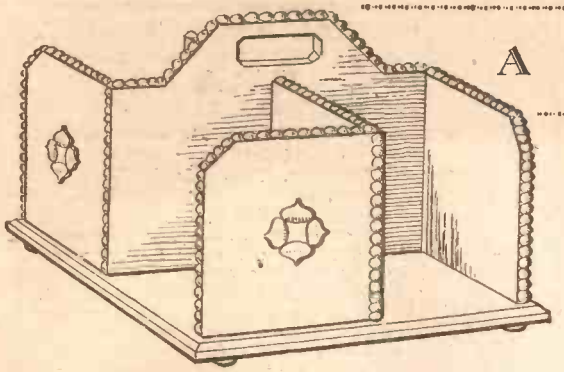
join without any blobs or lumps of solder sticking to the outside. It is hardly necessary for me to give you any further instructions for the making of other pieces in the set, as the same procedure is carried out, except for the slight alteration in the shapes ; and I have shown these, together with their measurements, in the diagrams.

The Girders.

For the girders we shall need some slight addition in the way of rings. Do not attempt to make these separately, but wind them upon a roller such as was described in my previous article in HOBBIES, December 13th. These rings are wound in the form of a long spiral spring, and their outside diameter will be determined by the width you require your finished girder. Nip off each ring in turn and lay them upon a flat surface in order to make quite sure that they are not warped. Take two strips similar to those that you have already made, and between them place enough rings to fill the entire length, allowing each ring to touch ; then with a clean hot iron run a little solder in at all connections. It is a mistake to use too much solder : it makes a clumsy job, and often is not so strong and reliable as the neat little triangular blob that rests in the corners if correctly done. You will not always require these braced girders to be the same length or width, so it is as well to make some of them with smaller rings and of various lengths. Girders in the form of angles and tees can be built from strips, as I have shown in Fig. 1, and in order to strengthen the tee-pieces short strengthening wire can be soldered in as shown at A. Angle pieces are made similar to straight strip, being bent to shape with your pliers.

(*To be concluded next week.—Ed.*)

A SIMPLE BOOK STAND



A BOOK stand of the kind shown here is one of the simplest little pieces of furniture which the amateur woodworker may set himself to make. The parts only need to be shaped and carefully fitted and screwed together, there being no difficult joints to bother about. The stand, which is made with four compartments somewhat after the style of a revolving bookcase, is especially suitable for placing on a table in the centre of a room. It measures 13in. square, and will hold from eighteen to twenty-four books.

The stand is made with any ordinary fretwood, and is ornamented with fancy beading and wooden ornaments. Oak, spanish chestnut, satin walnut, or mahogany are all suitable woods, but the kind selected must be ⅜in. thick. The bottom is 13in. square; of the two partitions, one is 12in. long by 8½in. wide, and the other 12in. long by 6½in. wide, while the four sides are 6½in. long by 5¾in. wide.

The bottom board should be taken first, and marked and cut exactly 13in. square. The edges are chamfered as shown at Fig. 1, or they can be neatly rounded over if desired. A small plane is required to work either the chamfered or rounded edge, the finishing touches being done with Grade 0 sandpaper.

Of the two partitions (Fig. 2) it will be noticed that the wide one is shaped at the top to form a handle, and that the narrow one is quite plain. The most difficult part of the whole construction is fitting the two partitions together, and it is done with what is known as a slot or halving joint. A slot 3½in. long by ⅜in. wide is cut up from the centre of the bottom edge of the wide partition, and a similar slot is cut down from the top edge of the narrow partition as shown. Care should be taken in marking and cutting the slots to see that a good fitting joint is obtained when the two part t ons are fitted together. If the slots are cut too wide the joint will be loose fitting, and if they are narrow the partitions may split. The four sides are shaped as shown at Fig. 3, the top front corner of each being cut across.

In fitting the parts together, the two partitions are glued up square across each other, and the sides glued and nailed or screwed to the ends of the partitions (see Fig. 4). About three nails or screws at each joint will be found sufficient. Finally the bottom is glued and nailed or screwed to the bottom edges of the partitions and sides.

Strips of fancy beading (Hobbies, No. 53), ⅜in. half-round size, are fixed to the edges of the partitions and sides, about 9ft. being required for the purpose. A rosette (No. 229), size 1⅜in., is glued to each side, and four large turned toes (No. 20) are fixed under the bottom. All the materials mentioned may be obtained from Hobbies Ltd.

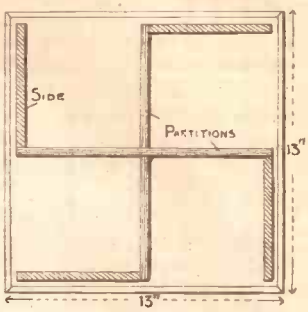


Fig. 1.

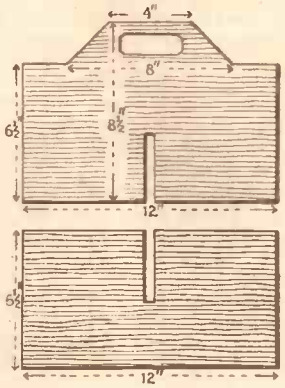


Fig 2.

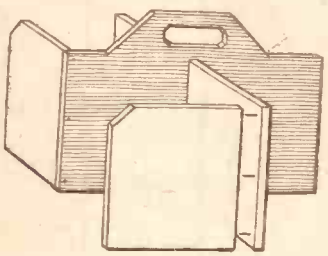


Fig 3

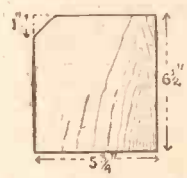
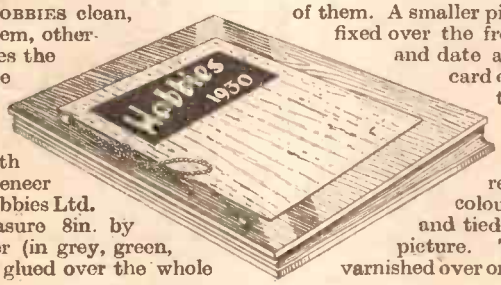


Fig. 4.

A BINDING CASE FOR YOUR "HOBBIES"



TO keep your copies of HOBBIES clean, you need a cover for them, otherwise their constant use causes the edges and corners to become turned up or torn. A suitable cover can be made from two pieces of 3/16in. plywood covered with some of that handsome veneer paper supplied cheaply by Hobbies Ltd. The two boards each measure 8in. by 10½in., and the veneer paper (in grey, green, walnut or red, as desired) is glued over the whole of them. A smaller piece, of a contrasting colour, is fixed over the front, as shown, and the name and date artistically drawn on a piece of card or paper. Two holes are bored through close to the left-hand side, and similar holes punched through the copies of HOBBIES to correspond. A piece of fancy coloured cord is threaded through and tied at the front, as seen in the picture. The covered boards should be varnished over or given a coat of glaze or polish.

THE AUTOGIRO AND HOW IT WORKS

By F. J. C.

An early design of Cierva Autogiro, which shortly will revolutionize the world of aviation. It is important to note that this machine is not a helicopter.

AS mentioned last week, the Autogiro is an aircraft which obtains the majority of its lift from a system of rotating blades mounted on a pylon, this pylon taking the place of the usual centre section on the normal aeroplane.

Apart from the rotor, the machine has the appearance of an ordinary aeroplane, and is taken off and flown in the same manner. It differs primarily from the aeroplane in that its supporting surfaces, or blades, are free to move at a speed independent of the machine as a whole, thereby introducing flying characteristics hitherto impossible of accomplishment. Thus the Autogiro can take off at a low speed after a very short run, and immediately assume a sharp angle of climb; it can fly at either low or high speeds, and can momentarily be brought to a standstill in the air.

The Rotor System.

The rotor system is the essential characteristic of the Autogiro, and gives it its name. It furnishes approximately 80 per cent. of the lift at high forward speed, and 100 per cent. in vertical descent. It consists of a set of four hinged blades mounted on a hub which rotates on ball thrust bearings set on a pylon structure above the fuselage. These blades rotate freely under the aerodynamical pressure of the wind produced by the movement of the machine. The rotor is wholly independent of power from the engine, whose sole function in flight is to propel the Autogiro. There can, therefore, be no cessation of rotation while the machine is in the air.

The rotor is designed to revolve about an axis approximately perpendicular to the longitudinal axis of the machine. The speed of rotation for any given system is defined by its design, and is practically constant for all flying conditions. The rotational speed of different rotors varies from 120 to 150 r.p.m.

The Purpose of the Hinges.

In straight vertical descent the airspeed encountered on all blades is equal. In forward flight it is obvious that this equality of airspeed is eliminated by a differential of the forward speed, which is added to the velocity of the advancing blade and subtracted from the receding one. Unless some means were taken to overcome the inequality of lift caused by this difference of airspeed, the machine would tip in relation to the line of flight; its stability would be lost. The simple and ingenious scheme of hinging the blades to the rotating shaft, so that they are free to yield up and down, balances the dissymmetry of lift on diametrically opposed blades and results in complete stability. The advancing blade automatically rises, decreasing its effective angle of incidence, and consequently its lift, to balance the lift on the opposite receding blade, which is moving down wind at a lower relative speed.

When the Autogiro is in flight. the rotating blades are subjected to two major and opposed loads, brought about by natural forces. Under the action of lift, the blades have a tendency to rise, since they are free to move about the hinge at the roots. This tendency to rise is overcome by the centrifugal force of rotation acting at right angles to the lift force. The equilibrium of the two forces results in a slightly coned disc for the rotor system in flight.

The Second Hinge.

The blades are also provided with a second hinge, giving an additional freedom in the plane of rotation. This freedom assures the smooth operation of each blade in its adjustment to varying loads and airspeeds. The restraining force over and above this freedom is centrifugal tension, which holds the blades in their relative position. Cables are provided between blades only to retain this relative position when the Autogiro is on the ground and the rotor is turning below the rotational speed necessary for centrifugal force to act. Shock absorbers are placed in these cables to protect the blades when taxi-ing over rough ground during this lower rotation. When the machine is at rest, the blades are supported by cables attached to the rotor head.

This hinging of the blades has the very important effect of eliminating most of the bending stresses. The load is carried by the tension system, in which centrifugal force provides the necessary restraint, and prevents the blades from rising under the load. This tension system enables the designer to save much weight and introduce flexibility into the construction of the blades. The flexibility of these blades is an important element of the Autogiro characteristics, and is rendered possible only by means of their hinging.

No Gyroscopic Action.

The hinging or articulation of the blades also eliminates

all gyroscopic action of the rotor, which is a force too powerful to overcome. This is one of the major reasons why the Autogiro is the only form of rotative wing aircraft that has been successful.

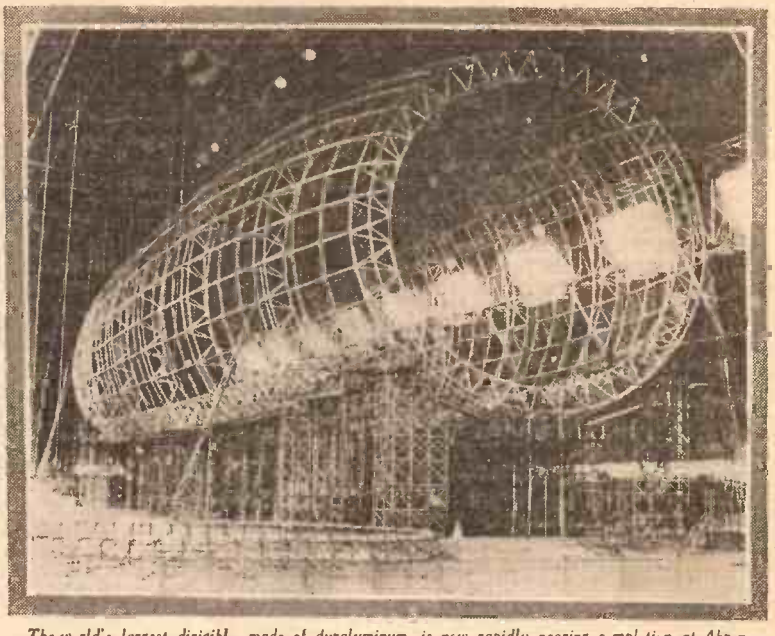
The Autogiro rotor, as a flexible yielding structure, is not sensitive to sudden varying loads imposed by bumpy air, and gives an unusual degree of riding comfort—a factor of considerable importance in decreasing the possibility of air-siekness.

The Self-starter.

One method employed for bringing the rotor up to sufficient rotational speed for take-off is the mechanical self-starter. It derives its power directly from the engine crankshaft through a manually operated clutch, and brings the rotor up to speed in less than a half-minute. In flight it is completely disengaged, and has no connection whatever with the rotation of the blades, thus eliminating all torque reactions found in helicopter experimentation. A simple braking arrangement, similar to the familiar wheel brake, stops the movement of the rotor after the Autogiro has landed. Another method in use with light machines is to deflect the slipstream from the engine on to the rotor blades, and thus to spin the rotor up to the required speed.

The fundamental principles upon which present-day Autogiros are built are not new and untried. The application of these principles forms the basis of Cierva's "Theory of the Autogiro," an exhaustive engineering treatise on Autogiro design. A study of this theory removes any element of mystery attached to the machine's performance, and enables the designer to definitely forecast the flight characteristics of any Autogiro he may elect to build.

THE WORLD'S LARGEST DIRIGIBLE.



The world's largest dirigible, made of duraluminum, is now rapidly nearing completion at Akron, Ohio, for the U.S. Navy. When completed it will be 785 feet long. Every part of the giant craft is undergoing rigid tests before being corp rated. The photograph shows the giant duraluminum framework of the dirigible during construction

SIMPLE PHOTOMICROGRAPHY (*continued from page* 639).

pocket cameras, will enable you to get five magnifications with a camera extension of 18in., and, failing a photographic lens, a microscope objective can be made use of if some means of "stopping down" are available. A little disc of black card with a hole punched in it, and kept in position by a wire ring, is one way. If your camera has not sufficient extension to give you the magnification you require, you can get an extra 6in. or more by fitting a lengthening tube well blacked inside to the regular lens flange.

The Object Carrier.

Some contrivance is needed to hold the microscope object at the right distance from the lens and to allow of a little adjustment for fine focusing. A simple arrangement of sliding tubes holding the short focus lens at one end, a little "stage" with clips at the other, and adapted at the lens end to screw into the regular flange on the lengthening tube, is not troublesome to design or expensive to have made up by a brass turner. Other dodges will suggest themselves, but the end to keep in view is to obtain a separation between the lens and the object which is slightly variable according to the camera extension, the latter also being variable if different magnifications are desired.

Method of Using.

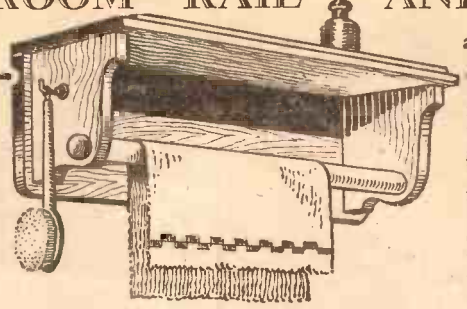
If the foregoing instructions have been intelligently followed, you have now a low-power photomicrographic apparatus on the lines of a daylight enlarger, but intended to make negatives instead of positives. Focusing must be done with care, a good plan being, first, to pull the camera out to half its full extension, screw it on its stand, and, with the object in position and turned to a patch of clear daylight, to adjust the separation between the object and the lens until the image is reasonably sharp. You will then know how you are situated as regards size. If you want a larger image you must increase the camera extension and decrease the separation between the lens and the object. The camera extension is the focus of the lens multiplied by the number of magnifications plus 1. Thus, for an × 5 enlargement with a 3in. lens the extension will be 3 × (5 + 1) or 18in. The separation between the lens and the object is the focus of the lens plus a fraction which gets smaller as the magnification increases.

Exposure.

There are no rules by which a beginner can calculate exposure in photomicrography, and he must just make trials until he gets the hang of the thing. With a little experience he will be able to make a fair allowance for light, magnification, speed of plate, and nature of object, but even experts are not infallible! After a time artificial light may be tried instead of daylight, and is, of course, more dependable, but it is better, perhaps, to begin with daylight. Slow plates giving plenty of density are best. For all-round low-power work Imperial Fine Grain Ordinary are excellent.

A BATHROOM RAIL AND SHELF

Easily Made in any Common Fretwood.



A USEFUL fitment for either the kitchen or the bathroom is shown in the sketch. A convenient length for such a shelf is 18in., as shown, but of course there is no reason why this length should not be increased to, say, 24in., or even more if desired. Any common fretwood such as supplied by Hobbies Ltd. is recommended, and it may be either varnished or painted to suit individual requirements. We must first prepare the back and the shelf from ½-in. thick wood, both pieces being cut to the same length and square at the ends, the corners afterwards being rounded off. The shelf will be screwed to the back piece (see Figs. 1 and 2) with 1-in. countersunk brass screws, and an edging bead fitted along the front to prevent bottles from falling off. This beading is Hobbies half-round beading (No. 35) at 1d. per foot, and it is simply pinned to the shelf with panel pins and shaped off at the ends (see Fig. 1). The brackets are cut from two pieces of ½in. stuff measuring 5½in. long by 5in. wide. Mark on one piece ½-in. squares and draw in the curve as shown in Fig. 2, following each square carefully in the enlarging process. Mark also the position of the centre of the towel rail shown dotted in the diagram. Use a fretsaw for the shaping of the bracket, and afterwards use this cut-out bracket as a templet for marking out the other. Clean them both up with glasspaper and glue and screw to the shelf and back, setting them ½in. inwards from the ends.

The towel rail is a piece of 1-in. diam. rod—a length of broomstick would suit admirably. Cut off a piece 16in. long and fix it to the brackets with two 1¼in. screws as Fig. 3, the heads being countersunk and afterwards covered with two turned buttons (No. 218) from Hobbies list.

If the fitment is intended for the kitchen it may be stained and varnished, or even just varnished. If a better finish is desired, and the article is required for the bathroom, then put on a coat of red lead paint (priming), followed by a coat of flat white paint and one of enamel. Two brass dresser hooks may be screwed onto the brackets as shown, to hang brushes or other articles.

Fig. 3.—A section showing how the towel rail is fixed and the head of the screw covered.

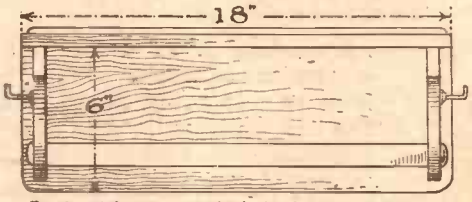


Fig. 1.—A front view with the brackets and towel rail in position. Measurements of the back are also given. Note the beading on the shelf to prevent bottles sliding forward.

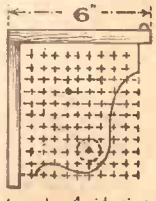
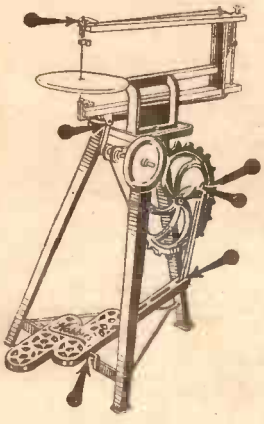


Fig. 2.—A side view. The ½in. squares are drawn on the shelf support for you to copy to get the shaped front.

TIPS ABOUT THE FRET MACHINE

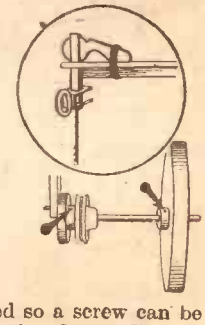


MANY readers of HOBBIES are now enthusiastic users of treadle fretsaw machines, with which to turn out their work. They are so easy to use and do the work so quickly that no end of pocket money can be earned with them.

But, like every other piece of machinery, they need periodical attention if they are to do the best work. A machine's greatest asset is whether it runs "sweetly," and it can only do this if an occasional spot of oil is put into the running parts. Dry bearings mean friction and harder work on the treadle. There is, of course, no need to cover the machinery with oil—a drop or two here and there is sufficient. All running parts—spindles, bearings, moving arms and so on, require a little occasionally, and the arrows on the accompanying drawing indicate the places quite plainly. The smaller drawing is a close up of the spindle under the table, and here special oil holes are provided in the framework.

Remember that the belt should not be oiled, nor the grove in which it runs, as this will tend to make it slip. Do not put the oil on anywhere before the parts have been cleaned of dust or sawdust. It will be found that the sawdust accumulates on the lower arm below the hole in the table. A clean small paste brush will easily clear this away before oiling.

It is a good plan, too, to rub over the bright metal parts occasionally with an oily rag, leaving a thin film of oil. This will prevent the plating becoming rusty if it happens to have worn thin. Tighten up the belt of the machine if it has become loose, but not so tight as to make treadling hard work.



It occasionally happens, too, that the lever of the saw tension clamp at the front end of the top arm jumps round when it should not. A simple method of preventing this is to put on a rubber band (as shown in the picture), so that it is held to the arm during operations.

The feet of all machines are bored so a screw can be driven through to hold them to the floor. This is advisable where possible, as the machine may have a habit of sliding when in use. If it cannot be fixed, and slides along the lino, fix on wooden blocks, or, better still, small rubber heels, such as are used on ladies' shoes.

AN EASILY-MADE PERFORMING TOP

By W. S. Gifford

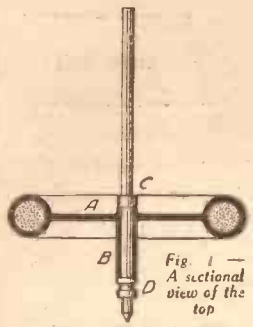


Fig. 1.—A sectional view of the top

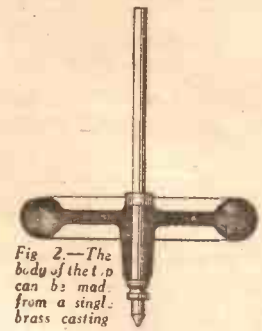


Fig. 2.—The body of the top can be made from a single brass casting


Fig. 4.—By holding the top as shown it will climb up the string.

THE top shown in sectional view, in Fig. 1, is made up from scrap without the use of a lathe. The small eye of a curtain ring to which the curtain hook is hitched is removed, and a hole drilled $\frac{3}{16}$ in. The ring is then set upright in sand and molten type metal should be poured into it until it is filled to overflowing. When cold the superfluous metal can be filed away.

The Disc.

The disc A is cut from stout sheet brass to fit closely inside the ring. The centre is drilled to take the short piece of stout brass tube B, which can be sweated into it, care being taken to set it truly square with the disc. The disc should then be fitted.

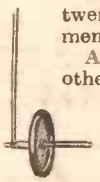


Fig. 3.—The top can be spun on a piece of string as shown.

The Stem.

For the stem, obtain a length of $\frac{3}{16}$ in. silver steel rod, the bore of the tube being of that diameter. The collar C, made from a piece of the same tube as that used for the sleeve, is soldered in place, and the stem inserted, after which the deeper collar D can be soldered to the stem, allowing a small amount of play up and down. Lastly, a groove is filed around this collar and the end of the stem brought to a neat conical point with a file.

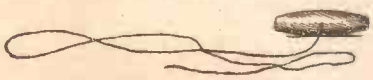


Fig. 6.—The cord for spinning the top

Those who possess a lathe might make the body of the top from a single brass casting, as shown in Fig 2, tooling it all over and polishing it.

A Form of Gyroscope.

A good deal of entertainment may be had with a top of this type It is, in fact, a form of the gyroscope, and may be spun and suspended from a looped cord with its axis horizontal (see Fig. 3); also, after a little practice, it may be made to mount a cord suspended from the ceiling.

Japanese professional top-spinners will send a top up twenty feet, arranging for it to be trapped in an ornamental lantern, and to release a shower of paper flowers.

A top like that described may be made to spin other smaller tops by contact (see Fig. 5). A few small tops having wooden discs, and stems pointed at each end, should be made for this purpose. The top is held lightly between finger and thumb, as shown in the illustration. It should be possible to start six of these small tops whilst the parent top is spinning, and have all in motion at the same time.

The Cord.

There is nothing better than sea fishing-line. Use about a yard of it, and to avoid cutting the fingers fix a toggle at the end of the cord (see Fig. 6).

One advantage of the form of top described is that it may be lifted by the stem without stopping the spin.

Such tops have been made with ball bearings, but there is nothing gained by doing so, as a certain amount of friction between the stem and sleeve is desirable, as the stem must be carried round by the sleeve.

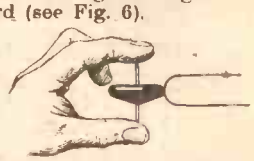


Fig. 5.—Spinning a smaller top by contact.

A CHEAPLY-MADE DRAWING-BOARD


Fig. 1.—Covering the board with lino.

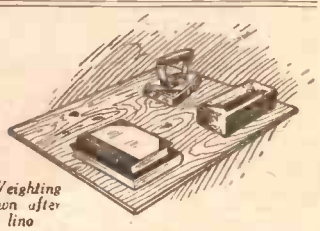


Fig. 2.—Weighting the board down after gluing the lino

GOOD drawing-boards are expensive things to purchase, and unless one has a good deal of use for them, the following is a splendid idea to construct a practical substitute.

The side of a wooden box should be prepared by smoothing the edges. Next procure a piece of thick cork lino, cut to the exact size of board. Cover the board evenly with some hot glue.

Place board on flat surface with the lino downwards, placing flat irons or any suitable articles on the top (see Fig. 2) until glue has set.

Unlike the usual home-made boards, which so often prove disastrous to finger nails and drawing-pins alike, the lino covered board is smooth and soft.

If, after a great deal of use, the lino becomes worn, it is a simple job to renew it.

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

A PACKET OF GREEKS

By P. L. Pemberton.

IT is doubtful whether the stamp-collector of mature experience ever recaptures the joys which came to him when first he started collecting. The beginner of to-day has incomparably richer opportunities than the beginner of the early days of the hobby, and his pleasure should be proportionately greater. With the expenditure of a few shillings, it is possible for a collector to begin where his father left off. I can remember the time when I managed, with difficulty, to get together a collection of 500 varieties, and though I have since extracted much pleasure—and profit—from the pursuit, the transports that accompanied my introduction to philately have never been reproduced.

The first type, head of Hermes, messenger of the gods. First designed and printed in Paris

In the hope of savouring once more those early delights, I tried the experiment of dissecting one of the "long sets," or packets containing assorted stamps of single countries, which are now such a tempting bait for young collectors. From a dealer's list I selected "100 different Greece" for 3s. 6d. Let me say at once that, if this is a fair sample, beginners should be encouraged to build up their collections by purchasing packets of this kind, for it turned out to be wonderful value.

The first Greek stamp printed in that country. A head of Hermes taken from an ancient coin.

For less than a halfpenny apiece, one cannot, of course, expect to find rarities, but in this packet I discovered two stamps catalogued at more than 1s. each, and many at from 4d. to 8d., enabling me to get at least an echo of the ancient thrills.

The First Type.

Among those hundred stamps I found one, and one only, in the design of the first issue. It was not, needless to say, a Paris print, but was an impression from the plate of the 20 lepta after it had endured twenty years' hard usage from the printers in Athens, and was printed in the rosine colour of 1882. It is not a rarity, and is only marked at 3d. in the magic book, but it is, at any rate, a representative of the "classic" period of Greek philately. The original plates were made in Paris, and the first printings, of 1861, were also produced by the expert French workmen. They may be distinguished from all later printings by the delicacy of the impressions, for when the Greeks themselves took over the printing they found it impossible to reproduce the *finesse* of the Paris prints. The Athens prints of Greece, from 1861 to 1879, have one feature which is unique in the history of stamps. All values save the two lowest bear on their backs numerals corresponding to the face value. This system was adopted because the denominations on the face of the stamps were expressed in very small figures, and though there was a different colour for each value, the numerals at the back no doubt helped both postal officials and public in quickly identifying the stamps. The main feature in the design of this first issue, which remained in use for twenty-five years, was a charmingly executed head of Hermes, who, according to ancient mythology, was the messenger of the gods, and hence, a suitable symbol of the functions of the post. During the whole course of this issue, the Greeks never went to the expense of having their stamps perforated, though long before the end of the period, all other countries of the world had availed themselves of Archer's invention.

The London printed issue of 1901, showing the Giovanni da Bologna statue of Hermes.

A New Issue.

About the year 1885, the Greek Government approached London firms with a view to having a new issue prepared, but the negotiations fell through, and the contract went to Brussels. The new stamps, which were printed at the Belgian Stamp Printing Works, appeared in 1886. The design was an adaptation of that of the first issue, but the head of Hermes was reduced in size to make room for larger numerals of value in the lower corners. The plates were afterwards sent to Athens, and again the Greeks failed to reproduce the excellent impressions of the original printers. The Belgian and Athens prints are only distinguishable by the character

The modified design of the first type printed in Belgium in 1886.

of the printing; of the three imperforated examples of the issue which I found in the packet, one, the 1 lepton, happened to be a fine used example of the Belgian print.

The revival of the Olympic Games, which took place in April, 1926, was commemorated by the issue of a special set of stamps. It was hoped to raise a sum of £20,000 by the sale of the attractive postal vignettes to collectors, but in this expectation the promoters were woefully disappointed. The stamps were in designs suitable to the occasion, and were printed in Paris. Ancient Greek statues, ruins of the Parthenon and the Acropolis, and other reminders of the "glory that was Greece" were featured on the various values. Of this set the packet produces only the 2 lepta.

One of the set overprinted in 1912 for use in territories taken from Turkey during the war with Turkey

The Hermes Tradition.

In 1901 a contract was placed with the celebrated London firm, Perkins Bacon and Co., for the preparation of a new set of stamps. For the design of this attractive set, which, unlike the earlier issue, was printed from engraved plates, the Hermes tradition was persevered with, but instead of the head only, we find a picture of the graceful Mercury of Giovanni da Bologna. The packet contains nine values of this set, including the 30 lepta on thick paper—by no means a common stamp. The next items I come to are twenty varieties of the issues of 1911-20. These were the first Greek stamps printed in the country and were the work of Messrs. Aspiotis Frères, of Corfu, though the designs were by an Englishman, Mr. Thomas Macdonald. The artist drew his inspirations from ancient Greek coins. A head of Hermes, much lessidealistically featured than that on the first issue, and copied from a coin issued at Sybarita in the fifth century B.C. is seen on one of the designs. Others show a figure of Hermes fastening his sandles, the goddess Iris before a D ric temple, etc.

The year 1912 found the Greeks engaged in one of their periodical wars with Turkey. For use in the territories that were wrested from their ancient enemies, the Greeks overprinted the stamps then current with the words ΕΛΛΗΝΙΚΗ ΔΙΟΙΚΗΣΙΣ, which stands for "Hellenic (*i.e.* Greek) Dominion." It should be noted that the Greek name ΕΛΛΑΣ appears in full or in a short form on all Greek stamps.

The Turkish islands in the Ægean Sea fell an easy prey to the superior naval forces of Greece, and the capture of Lemnos was proclaimed by overprinting the Greek stamps with the name in Greek characters. ΛΕΜΝΟΣ. Several values of these war issues are in my bonanza.

The Victory Issue.

Space will not allow of detailed reference to the fifty or so other stamps of which the packet is composed. Among them are examples of the Victory issue, brought out in 1913 to commemorate the expansion of the kingdom as a result of the Turkish War, and also of the set issued under the Venezelist *régime* in 1916. Then follow stamps with the small crown and monogram overprint of December 1916, which signified the ascendancy of the Royalist party: some of the "Social Providence" surcharges issued in 1917 during the Great War, and several values of the extravagantly long set of overprinted stamps issued to commemorate the revolution of 1922. A number of the pictorial stamps of 1927, several of the ordinary issues overprinted in 1920 for the province of Thrace, one or two odd commemoratives of recent date, and a set of postage dues makes 100.

A pictorial stamp of 1927, showing a female figure clothed in the picturesque costume of Macedonia.

DO YOU KNOW—

THAT a black 1 skilling stamp of the 1866 issue of Norway, printed on both sides, was recently sold at a London auction for £17?

That the stamp, which was recently discovered, is the only known copy of this variety?

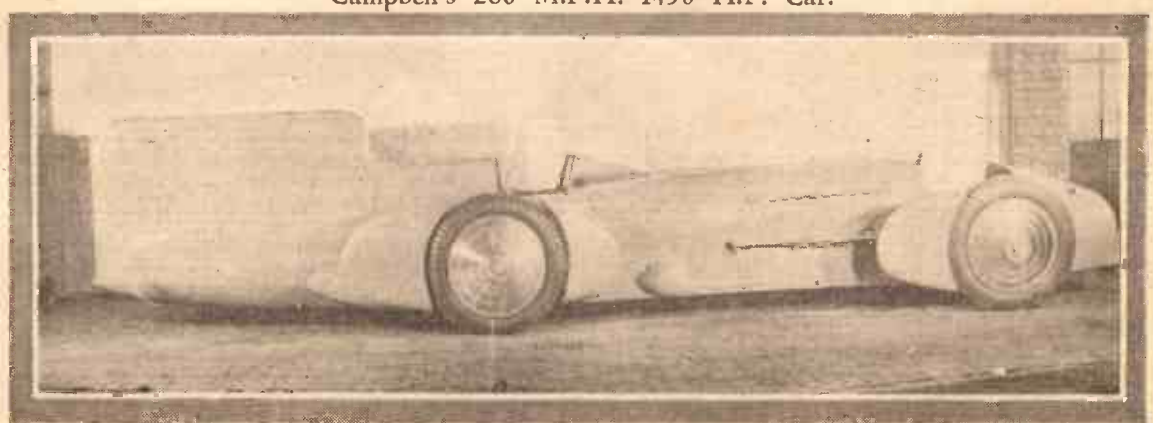
That 1931 is the centenary of the death of Simon Bolivar, who is known as the Liberator of South America?

That the occasion will be marked by an outbreak of commemorative stamps in many South American Republics?

That Belgium has issued a special air-stamp to celebrate the first direct flight to the Belgian Congo?

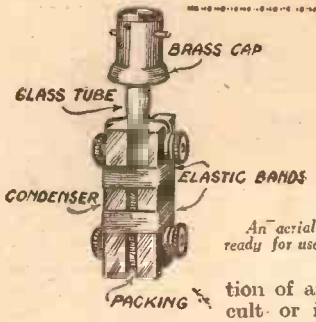
That the Dutch Indies is the latest country to issue a set of charity stamps?

Campbell's 280 M.P.H. 1450 H.P. Car.



The car on which Campbell will attempt to break the world's speed record. Note the careful streamlining of the parts. Perhaps by the time you read this he will have achieved his ambition.

ELECTRIC-LIGHT MAINS AS AERIALS



An aerial ready for use.

IF you happen to live in a flat where the erection of an outdoor aerial is difficult or impossible, or you are keen on experimenting, the following simple method of using the mains as an aerial will be useful. As naturally the device must be attached to a convenient lamp-holder, an adaptor is necessary, and this is easily and cheaply provided by using an old burnt-out lamp—the ½-watt type is the most convenient kind, as this is fitted with two long wires for filament suspension, and these come in very handy, as will be seen later. The glass bulb must be carefully broken away from the brass bayonet cap, leaving the glass rod, etc., inside, intact.

A simple way of doing this is to wrap up the bulb in paper, and give it a sharp tap with a hammer.

Any jagged glass must be carefully broken away round the brass cap. Two small fixed condensers fitted with terminals, and both of .0003 capacity, are required. The two long wires which formerly did duty for leading the current to the filament of the lamp must be connected to each condenser separately, taking great care that the wires do not touch. The top edge of each condenser should rest on the "pinched" part of the hollow glass tube carrying the leads from contact pieces of the brass cap, with a glass rod between them acting as a support.

Paper padding should be placed on either side of glass rod in such a way that when elastic bands are carefully stretched around at the top and bottom, the whole assembly is held firmly together, as shown in the sketch. The arrangement is now completed, and should be carefully inserted into a convenient lampholder, holding it, of course, by the brass cap. There are several ways of connecting to the wirelsss set aerial terminal; a connection may be taken from the condenser terminal, and a lead to the set taken therefrom; also the position of the brass cap may be reversed in any of the above positions. As all these varying connections give different results a trial will determine the best to use.

The idea works very well with valve sets, but is not generally recommended for use with crystal receivers, although results may occasionally be achieved under favourable conditions.

And now a word of warning. It is very important to use fixed condensers of a first-class make, as should a defective one be used, it would, in certain circumstances, cause the mains to be short-circuited. This point is of particular importance if you have "direct" current mains, as in this case one pole of supply is "earthed" at the power station, and a little consideration will show that a faulty fixed condenser may easily cause a bad short-circuit via your set and its earth connection.

WIRELESS NOTES AND COMMENTS

By "Hobbies" Radio Expert

THE question of the H.T. values applied to a wireless set is most important if good quality and all-round results are desired. The following values may be taken as more or less standard, but, of course, will require modification with certain types of non-standard valves. The H.F. stage (neutralised), 80 to 100 volts; H.F. stage (screen grid), 120 to 150 volts on the anode with 80 volts on the screening grid; detector (gridleak), 60 to 80 volts; detector (anode bend), 100 to 150 volts; first L.F. valve, 100 to 120 volts; output valve, 150 volts upwards. It should be borne in mind that 150 volts is really the minimum value which can be employed if really first-class quality is required. For good reproduction on a moving coil loud speaker, the last valve should be of low impedance (about 2,000 ohms) and have 150 volts or more applied to the anode.

Resistance and Capacity Coupling.

When using resistance-capacity coupling, remember that there is a drop in anode volts through the anode resistance. Therefore, if the amount of H.T. available is limited, it may be better to use a L.F. choke in place of the anode resistance, with a gain in both signal strength and quality. To ascertain roughly the voltage drop in the anode resistance, multiply the normal anode current in amps. (obtainable from the valve maker's published curves) by the anode resistance in ohms, and the answer will be the drop in volts. This value should then be added to the normal working H.T., and the answer will be the total value of the battery tapping for that particular valve.

Aerials.

Where interference is experienced from a nearby broadcasting station, a shorter aerial will be found of great use in improving selectivity. Sixty feet is ample for an aerial, and at a height of 30ft. will give very good all-round results. If possible, the aerial and down-lead should be of one unbroken length, the end nearest the house being taken once or twice round the end insulator and then continued down to the receiver. If a soldered joint has to be made, the joint should not be left exposed to the air, but should be either painted or wrapped with insulation tape (of the rubberised variety). Remember that upon the Aerial–Earth system depends the efficiency of the whole set. A simple way of obtaining the benefits of a short aerial without cutting down an existing aerial is to insert a condenser of the semi-fixed variety (total capacity .0003) between the aerial and the set, and to adjust this to get the selectivity required for the particular local conditions.

ONE OF OUR OLDEST HOBBIES

The Interesting History of Shorthand.

DO you know that shorthand, as a hobby, and as a practical art, is over two thousand years old? Most people are surprised when they learn this; yet it is a fact that when the great Roman orator, Cicero, made his wonderful speech on the Catiline conspiracy in the Roman Senate moro than sixty years before the birth of Christ, his fierce and glowing sentences were taken down in shorthand by his former slave, Marcus Tullius Tiro, and his assistants. These shorthand writers of long ago must have had considerable proficiency in the art, considering that their implements were not the fountain pen and the specially-prepared notebook, but the steel stylus and the wax-covered tablet.

Shorthand Systems.

It is a far cry since those days, and shorthand has had many ups and downs. Hundreds of inventors have made shorthand systems; some merely for their usefulness in rapid writing down of other folks' speeches, and some as a form of secret writing that should be rapid, facile, and understandable only to themselves. Of the latter, old Pepys, the famous writer of the Diary, was one, and we can quite understand that he would want to keep that diary of his in a form of writing that his wife could not read because the lady might have been angry at some of the things he wrote about her. Indeed, it was only the cleverness of a great scholar a long while after Pepys' death that enabled us to decipher and transcribe what he wrote, and print it for everyone to read.

'Shorthand."

The word "shorthand" itself was first used in 1661 nearly two thousand years after the art was invented, and one of the earliest uses of the word in England is to be found in an epitaph in the cloisters of Westminster Abbey:

"Shorthand he wrote; his flower in prime did fade;
And hasty death short hand of him hath made."

From earliest times men have tried to invent shorthand on the basis of their own written letters, and the shorthand of Tiro was formed from the old Latin capital letters that were used in his time. These he modified in various ways to form outlines for words, and thousands of these signs had to be committed by Tiro and his fellow slaves to memory. Cyprian, a bishop of Carthage, later on claimed that he had added 7,000 of these arbitrary signs for Scriptural expressions, and the great Roman philosopher, Seneca, took this form of shorthand back to Spain with him and added 5,000 more arbitrary signs. Who would have liked to be a shorthand writer in those days with 10,000 and more of these signs to learn?

Emperor Titus Vespasian.

Some of them were curious and amusing. For instance, a circle meant the world, and if one put a dot in the circle it meant the phrase "in the world." A dot over the circle meant "over the world," and so on. Yet, with all this difficulty of learning, shorthand was very popular among the Romans. Four hundred schools taught it in the Roman Empire, and many of the Emperors themselves boasted their skill, and one, at least, the Emperor Titus Vespasian, took part in public competitions with the professional scribes. One can well imagine that these scribes were discreet enough to let him win, because his power was great. Moreover, he was the person who opened the Coliseum for the public sports, and it would have been very awkward for a triumphant and winning scribe to have found himself face to face with a hungry lion in the arena.

Bright's System.

During the Dark Ages, as we call those four or five hundred years before A.D. 1600, shorthand practically disappeared. It was thought to be 'necromantic and diabolical and some shorthand writers were put to death as dealers with the Evil One. But it was in Italy again that shorthand was revived about the fourteenth century. The earliest English shorthand system of which we know was that of Dr. Timothy Bright, of London, who published it in 1588, and dedicated it to Queen Elizabeth. From that time, there has been a steady stream of shorthand inventors, and nearly three hundred systems were published in the one hundred and fifty years which followed Dr. Bright's.

Dr. John Willis.

Bright's system consisted wholly of special signs, such as those previously mentioned, entailing a tremendous burden of memorizing. In 1602, Dr. John Willis produced a system which used a shorthand alphabet; that is, an alphabet of simple signs which could be joined together and built up into brief forms for words. The "spelling" of these shorthand words was the same as that of the corresponding longhand words; but later, this idea was discarded in favour of forming shorthand outlines not in accordance with longhand spelling, but with the exact *sounds* of words. This is known as phonetic writing, and all shorthand nowadays is based on the phonetic principle.

Although agreeing on this principle, however, modern shorthand has followed one or other of two different styles; one, the geometric, in which the characters are taken from the circle, with its segments and radial strokes; and two, the cursive or script style, based on the characters and movements of our ordinary longhand with its easy, flowing penmanship. The chief representatives of these two styles are, respectively, the Pitman and Gregg systems.

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 Model Chevrolet Competition.

ALTHOUGH I am writing these notes before the closing date of the model Chevrolet competition, it is quite evident that the standard of workmanship of the competitors is going to be very high, and the work of the judges will not be too easy. Some of the models which have already come to hand are remarkably neat and do the competitors great credit. The result of this competition will be published in our issue dated March 7th, and on sale on March 4th, so you haven't long to wait before you know the names and addresses of the 250 fortunate readers who have succeeded in winning the splendid prizes offered in connection with it.

Our Model Electric Beam Engine Chart.

NEXT week's free design sheet provides a further example of the wide diversity of uses to which the owner of a fretwork set can put his tools. A working model electric beam engine is the subject of it. I have one of these models in my office, and I must say that it works most sedately from an ordinary dry cell and provides a source of power for driving other models. In the ordinary way this model would cost several shillings. It is substantially made, designed on correct principles, and the complete set of fittings and wood may be obtained quite cheaply. I anticipate that this will be one of the most successful of our design sheets.

How I Make My Hobby Pay.

IN our issue dated December 13th, I offered ten silver watches to the senders of what I considered to be the best essays on "How I Make My Hobby Pay." After carefully considering these, I have pleasure in awarding a silver watch to the ten following competitors:—W. Butt, 63, Stratford Road, Luton, Beds; T. Casey, Galtee Villa, Clogheen, Co. Tipperary; J. Domachie, 118A, Airbles Street, Motherwell; C. Halford, Bleak House, Morton, nr. Alfreton; W. C. Higginbotham, 43, Dawson Street, Dublin; A. D. Hubbard, 3, Kimbolton Avenue, Bedford; N. Nadin, 23, Bath Road, Cheltenham; J. Nichols, 24, Colegrove Road, Hill Street, Peckham, S.E.; Catherine Sauer, 15, Philip Road, Peckham Rye, S.E.15; and J. H. Taylor, 25, Chapel Street, Devonport.

Notes and Notions from Our Readers.

WILL readers please note that we cannot acknowledge individually all of the items sent to us for publication under the above title. Every item published on our "Notes and Notions" page is promptly paid for after publication.

Our Model Autogiro.

I EXPECT by this time most of you have completed that splendid model of the Autogiro which was given free in the last two issues. I shall shortly make a further interesting announcement on this page regarding another free gift. Watch this page!

QUERIES AND REPLIES.

World's Heavyweight Titles.

Replying to your query, F. C. (Portarlington), J. L. Sullivan was beaten by J. J. Corbett in 1892, who was champion for five years. J. J. Corbett was beaten by Bob Fitzsimmons in 1897, and was champion for two years. Bob Fitzsimmons was beaten by J. J. Jeffries in 1899, and was champion for five years and then retired. In 1906 T. Burns was champion for two years, and he was beaten by Jack Johnson in 1908, who was champion for six years. Jack Johnson was beaten by Jess Willard in 1915, and he was champion for four years. Jess Willard was beaten by Jack Dempsey in 1919, and remained champion for seven years. Jack Dempsey was beaten by Gene Tunney in 1926, who was champion for two years and then retired.

Transferring Printed Matter of Magazines.

J. D. (Doncaster) wishes to know of a preparation or formula that will transfer printed matter and cuts from magazines and papers to notebook paper. Herewith are directions for transferring printed matter from magazines, etc. For printer's ink rub a brush dipped in creosote over the print quickly. Prepare a piece of paper all immersed in a solution of one ounce of common soda, one ounce of oxalic acid and one pint of water. While the paper is still damp, transfer the printed matter to this sheet by rubbing. For transferring engraving, place the picture for a few minutes in a solution of iodine. Then dip a sheet of paper in a weak solution of starch and, when dry, in weak sulphuric acid. Allow this to dry, then lay the slip of paper upon the engraving and place in a press.

Travelling Plates.

The following letters, L. K. (Brighton), must be attached to all English cars and motorcycles touring abroad: Argentine, R.A.; Austria, A; Belgium, B; Bulgaria, B.G.; Czecho-Slovakia, C.S.; Danzig, D.A.; Denmark, D.K.; Egypt, E.T., Finland, S F.; France (covering also Algeria and Tunisia), F.; French Colonies in India, I.F. to be carried in addition to the ordinary "F" plate; Germany, D.; Greece, G.R.; Great Britain and Northern Ireland, G.B.; Holland, N.L.; Hungary, H.; India (British), B.I.; Irish Free State, S.E.; Italy, I.; Jersey, J.; Guernsey, G.; Alderney, A.; Malta, Y.; Gibraltar, Z.; Lichtenstein, F.L.; Lithuania, L.T.; Luxembourg, L.; Monaco, M.C.; Morocco, M.A.; Norway, N.; Poland, P L.; Portugal, P.; Roumania, R.M.; Russia, R.; Spain, E.; Sweden, S.; Switzerland, C.H.; Sarre Basin, S.A.; and Yugo-Slavia, S.B.

Cleaning Piano Keys.

The original whiteness can be restored to piano keys, G. M. (Gloucester), by applying a weak solution of nitric acid and water. Add 1oz. of nitric acid to 12oz. of soft water. Be sure to pour the acid into the water, and do so very slowly, stirring with a stick at the same time. Apply the solution sparingly to the keys, taking care that no acid gets on the black keys, on the woodwork, or between the keys. Rub the keys with a piece of cheesecloth to remove the stain. Then wash off all traces of the acid with a piece of flannel dipped in clean water, and wipe with a dry cloth. It is sometimes necessary to give the keys two applications. The solution may be put in a rubber-corked bottle, and kept for a future use if desired.

Charging Leclanche Cells.

To charge a Leclanche cell, L. P. (Yeovil), three parts fill the outer jar with a strong solution of ordinary sal-ammoniac; if the jar is filled more than this, the salts of the solution will creep up. In a few hours the cel will be ready for use. Should it not be convenient to wait, pour some of the solution through the little glass tubes in the seal into the porous pot, and the cell will be in working order in a minute or so.

Mile Square and Square Mile.

"Is there any difference between a square mile and a mile square," asks T. H. (Horncastle). There is, of course, no difference in area between a mile square and a square mile, but there may be considerable difference in shape. A mile square can be no other shape than square, whereas a square mile merely denotes a unit of area.

Advertisements are accepted for these columns at the rate of 4d per word, prepaid.

SALE AND EXCHANGE

Address communications to the Advertisement Manager, "Hobbies," Southampton St., Strand, London W.C.2.

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

ENGINEERING BOOKS, Booklet Free. —Bentley's Publishing Co. (Dept. H.), Halifax.

FRENCH POLISHING MADE EASY.—"Speedaneez" Friction Polish requires no experience, grain filler, oil or spiriting off, merely rub it on. Complete outfit, 1/3, 2/-, 3/- post free.—Speedaneez Products. 214, Walworth Road, S.E.

TRANSFERS. Wood Inlay, Floral, Dutch Japanese, Birds. Selection, 1s. 6d. Includes catalogues.—H. Axon, Jersey, Eng.

ART.—MAKE MONEY if you sketch: write for free booklet. Art Studios, 12, 13, Henrietta Street, Strand, W.C.2.

GRAMOPHONES, Motors, Fittings, Records. Catalogue free. Cash or terms. Build £12 model for £3. Instructions, 3d.—C. H. Burt. 185, High Street, Deptford, London.

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REPEAT ORDERS every post. Seven beautiful Coloured Inks, post free, 7½d.; 2 sets, 1s.—Hacketts, 23, July Road, Liverpool.

CONJURING Catalogue Free.—Messrs. Vandy, Hastings.

"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.—Texalo Co. (Dept. 32), Blackpool

1 HORSE-POWER PETROL MOTOR castings. Thousand sets partly machined, 9s. 9d. Catalogue 3d.—(H) Madisons Works, Littleover, Derby.

ALL ABOUT PHOTOGRAPHY.—Get the "British Journal Photographic Almanac" for 1931. The great book for every amateur photographer. It is a marvellous 2s. worth. The Almanac contains all that the amateur can and will want to know. Articles on all kinds of methods and gadgets. Descriptions of all the latest goods for amateur photography and cinematography. 748 pages: 64 pictorial photographs in gravure. From photographic dealers and bookstalls. Henry Greenwood and Co., Ltd., publishers, 24, Wellington Street, Strand, W.C.2.

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STAMPS.

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ENTIRES FREE.—Request my attractive stamp approvals.—Parson. 509. Filton Avenue, Bristol.

MECCANO SET No. 4, Clockwork Motor, several extra parts. Cost £3 10s., take £2.—Mogridge, Scalford, Melton Mowbray.

WIRELESS.—Powerful One-valve British and Foreign Broadcast stations receivers, complete, 11s. or C.O.D.—Laboratory, Chesnut Road, Enfield, Middlesex.

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EXPLOSIVE CIGARETTES, Bombs, Itchykoo, Sneezing, Snowstorms, etc. Parcel, P.O. 1/- Dance Novelties, sample parcel, P.O. 1s.—Fenton's Laboratory, 247, Haydons Road, London, S.W.19.

Printed by NEWNES & PEARSON PRINTING CO., LTD., Exmoor Street, Ladbroke Grove, W.10, and published by GEORGE NEWNES, LTD., 8-11, Southampton Street, Strand, W.C.2. Sole Agents for Australia and New Zealand: Gordon & Gotch, Ltd. South Africa: Central News Agency, Ltd.

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£850 IN CASH PRIZES

Competition closes February 28.

This delightful puzzle, a worthy successor to the three previous teasers, will provide lots of fun and entertainment for the whole family. The puzzle is to move the big square marked "my car" to the bottom corner labelled "home," without jumping or raising any block from the bottom of the box, and without turning any piece. £850 in cash prizes and numerous other prizes are offered for the solution of this perplexing puzzle.

TIT-BITS TEASER No. 4

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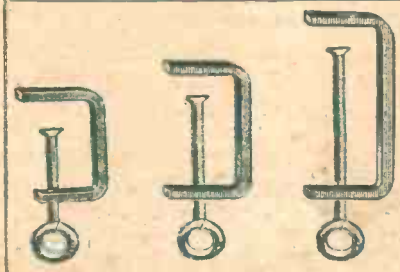

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		¼in. „	„ 9d.

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Post 3d. Post 4d. Post 4d.

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9/6 and 17/6.

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