FREE INSIDE! DESIGN SHEET FOR TALL JACOBEAN PLANT-STAND

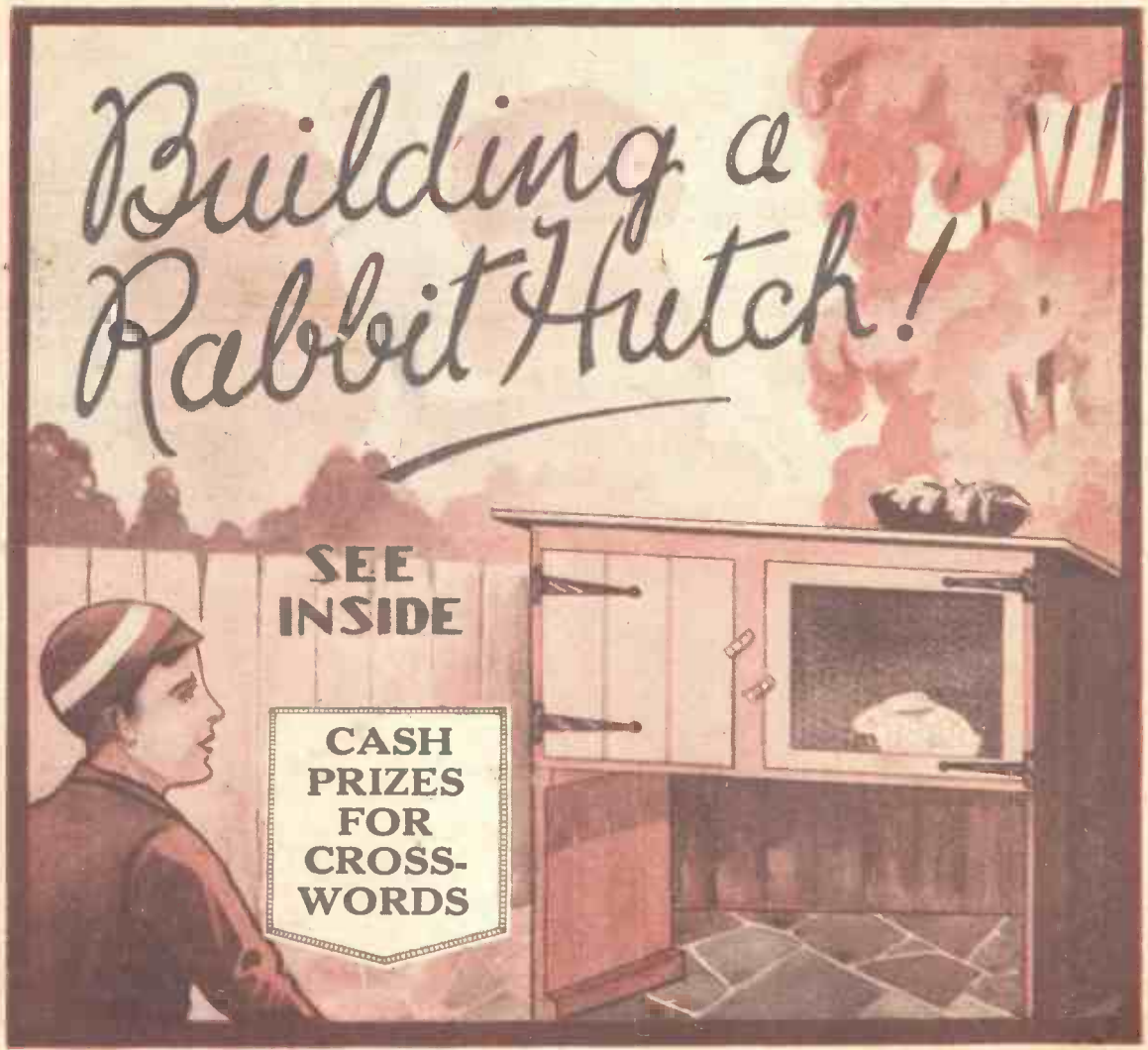
HOME CRAFTS
WOOD WORKING
MODEL MAKING
AMATEUR MECHANICS
ETC. ETC.

Hobbies

2D

August 29th, 1931.
No. 1871.
Published every Wednesday.

Building a Rabbit Hutch!



SEE INSIDE

CASH PRIZES FOR CROSS-WORDS

Published by GEO. NEWNES. LTD., 8-11, Southampton Street, Strand, London, W.C.2.

NEXT WEEK! SPECIAL CAREERS SUPPLEMENT! See page 648

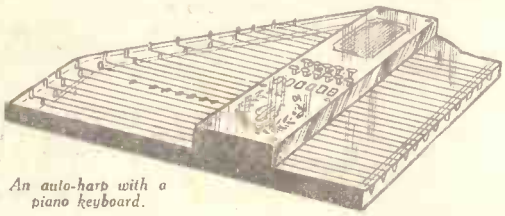
Hobbies

Vol. 72. No. 1,871 Published Every Wednesday AUGUST 29th, 1931

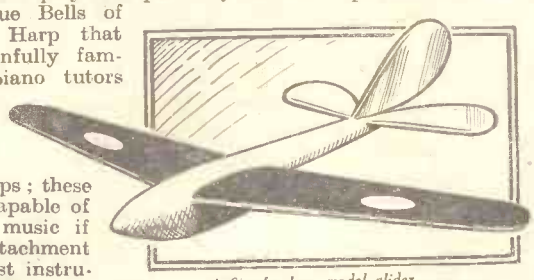
THIS WEEK'S CLEVER IDEAS

An Auto-harp Piano Keyboard.

TOY harps are not new nor can they be described as clever. Most readers will have possessed at one time or another one of those wire-stringed harps encompassing about two octaves minus the semi-tones on which it was possible to play such painfully familiar melodies as "The Blue Bells of Scotland" or "The Harp that Once." We say "painfully familiar" because most piano tutors include them and in the practice period most pupils make even pleasant tunes painful, and so it is with toy harps; these little instruments are capable of yielding quite sweet music if played correctly. An attachment supplied with the latest instrument of this sort enables anyone familiar with the tonic sol-fa notation to play correctly straight-away. It is marketed complete with tuning key and plectra in a variety of sizes—21 strings, 25 strings, 32 strings, 12 manuals, and a piano keyboard.



An auto-harp with a piano keyboard.



A fine fuselage model glider.

A Model Glider.

MORE and more do model aeroplanes and model gliders gain in popularity, as our correspondence shows. Those who do not care to make their own models or who have not the time to do so will be interested in the modern types of models now being sold. The model glider shown in the centre of this page has a wing span of 24in. and a length of 17½in. It will fly over 200yds., and a guarantee to this effect is given with every plane. By a simple adjustment they may be made to loop the loop and to perform many other aerobatics.

A Bow and Arrow Set.

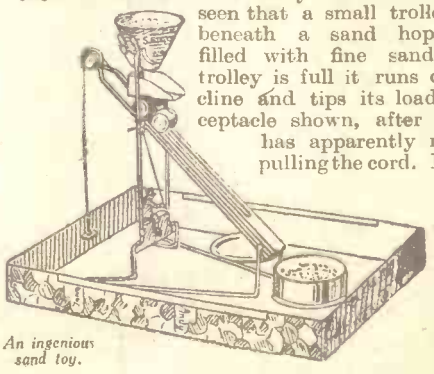
THE time honoured sport of archery has become popular again. With the usual form of pointed arrow it can be dangerous. A new bow and arrow set recently introduced consists of a powerful bow and arrows which have rubber suckers at the end. By moistening these suckers they will adhere to the smooth target supplied with the set. The bow will shoot the arrow for a considerable distance.

A Flash-light Pencil.

MECHANICAL pencils continue to come, and some to go. The least troublesome part of our personal equipment is the ordinary cedar pencil. In spite of this mechanical pencils by the hundred continue to be placed on the market. The latest is an illuminated pencil known as the "Ritalite." This ingenious pencil can be used as a pocket torch. It enables you to see to write or to find your way in the dark. It has a detachable compass at one end and takes a standard battery. It costs 2s. 6d.

An Ingenious Sand Toy.

KNOWN as "Sandy Andy" the automatic sand toy shown here costs 6s. 6d. It is 14½in. high. A workman, presumably "Sandy Andy," is seated in a position of comfortable and semi-comatose repose (after the manner of most navvies) beneath the instrument which really does the work. It will be seen that a small trolley is situated beneath a sand hopper which is filled with fine sand. When the trolley is full it runs down the incline and tips its load into the receptacle shown, after the workman has apparently released it by pulling the cord. It then returns to the hopper for a fresh load, continuing this sequence of operations until the hopper is empty.

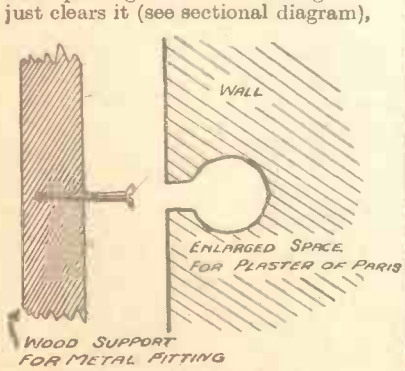


An ingenious sand toy.

NOTES AND NOTIONS from our READERS

Fixing Wall Brackets.

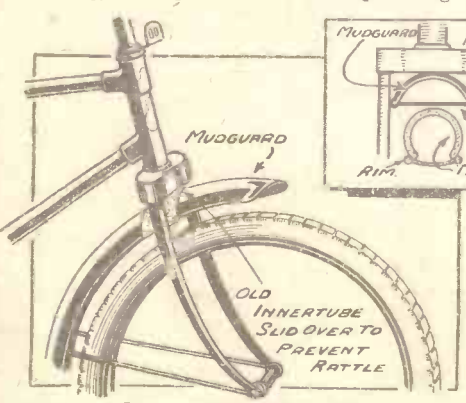
WHEN fixing brackets to a wall, such as a towel rail fitting, it may be found that the plaster is too soft to hold even one of the patent types of wall-plug. In such a case, prepare a suitable piece of wood to take the fitting, and screw into the back wood screws with large heads. Do not drive the screws home but leave at least an inch projecting. Now make holes in the wall to correspond with the position of the screws, and gouge the holes out inside as shown in the sketch. Next mix some plaster of paris, and fill the holes with it to within ¼in. of the surface. Then, immediately before the plaster has time to set, press the prepared piece of wood against the wall, so that the screws enter the corresponding holes and are buried in the plaster of paris When the plaster sets it will hold the bracket firmly against the wall.—A. L. (Manchester).



Fixing wall brackets to a wall.

Preventing a Mudguard from Rattling.

THE obvious method of stopping the mudguard on your bicycle rattling is by plugging; but this sometimes looks ugly, and is hard to fit up again when the mudguard is taken off periodically for cleaning. An easier method is to cut a thin strip of inner tube (about ¾in.) and slide it along the mudguard until it reaches the forks, or wherever the rattle occurs. In the sketch the tube is fitted to prevent rattle at the front fork. As well as preventing the mudguard from rattling against the forks the tube has another use. If the wheel is lifted or the mudguard lowered until the part of the tube passing below the mudguard just clears it (see sectional diagram), the tube will remove thorns, etc., that stick in the tyre and thus prevent punctures.—C. J. (Runston-on-Tyne).



Preventing mudguard from rattling.

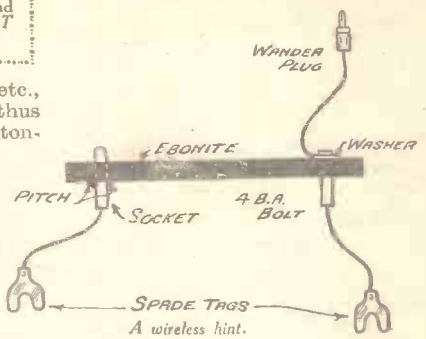
THAT DODGE OF *YOURS?*

Why not pass it on to us? We pay Five Shillings for every item published on this page. Mark your envelope "Notes and Notions." *Every notion sent in MUST be original.*

A Wireless Hint.

THE majority of milliameters have two terminals for connecting purposes, and it is a job when one wishes to measure the anode current of a set to connect wander plugs on to pieces of wire, etc. To overcome this make up the simple device shown in the sketch.

It consists of a piece of ebonite $\frac{3}{16}$in. or ¼in thick, about 2½in. long and ½in. wide. Drill a hole at one end to take a 4 B.A. bolt, and drill a clearance hole in the other end to take a brass socket which can be obtained from an old H.T. battery. Pitch should then be poured round the hole and allowed to set. Before inserting the socket into the strip, however, a piece of flex, about 2in. long and carrying a spade end tag at one end is soldered on the bottom of the socket. A similarly equipped piece of flex of the same length is secured under the 4 B.A. bolt, and also under this bolt is fastened a 9in. length of wire carrying a wander plug. To use the device the milliameter is connected to the spade ends, the H.T. lead on the set extracted from the H.T. battery and inserted in the socket, and the wander plug on the strip is inserted into the H.T. on the battery.—R. S. (London).



A wireless hint.

THIS WEEK'S MENTAL NUT.

THE top of a rectangular cardboard box has an area of 120 *square inches, the side* 96 *square inches, and the end* 80 *square inches. What are the exact dimensions of the box?*

Answer to last week's problem.

SUBTRACT every number in turn from every other number, and you get 358 *(twice),* 716, 1,611, 1,253, *and* 895. *As* 358 *equals* 2 × 179, *the only number that can divide in every case without a remainder will be* 179. *Therefore* 179 *is the divisor, which always leaves a remainder of* 164 *in the case of the original numbers.*

When Carrying Water.

IF during your stay in camp you are called upon to carry a couple of pails of water from the well, pump, or spring, follow the old countryman's idea of using an iron hoop as shown in the illustration. Not only will the hoop keep the buckets steady, but will also prevent the water spilling over your shoes.


A simple method of carrying two buckets of water.

ANY HANDYMAN CAN MAKE IT IN HALF AN HOUR FROM ODDS AND ENDS.

A CLOCKWORK CRANE

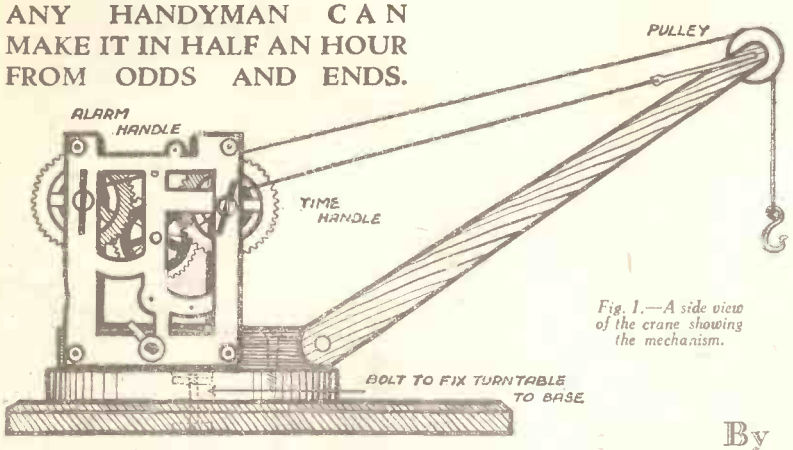


Fig. 1.—A side view of the crane showing the mechanism.

By "Handyman"

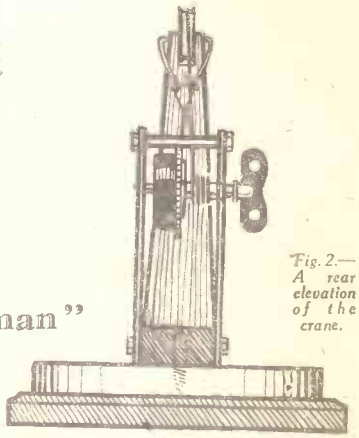


Fig. 2.—A rear elevation of the crane.

THERE are many interesting models of cranes that can be made by careful and intelligent boys. If you are interested in the mechanism of a crane, try this one. It is not really complicated, and its mechanism makes it quite realistic when working.

The Base.

Prepare an oblong piece of wood 12in. by 9¾in. and chamfer the top edge as shown in Figs. 1 and 2. This done, find the centre to enable you to fix the turntable to the bed. This is done by using a small bolt or machine screw, probably you will find a suitable one in your scrap-box at home; remember that the small bolt must be long enough to pass through the turntable and base.

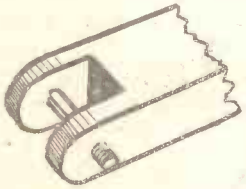


Fig. 4.—The base of the jib.

The turntable is a circular piece of wood made from a piece 6in. by 6in. by ½in. A hole is drilled through centre to take the above bolt.

The Mechanism.

This is part of an old alarm clock, as you will see from Figs. 1 and 2. Most boys have access to the old works of a clock, and here you can try your hand. This will have to be mounted centrally on to the turntable. To do this, shape a piece of wood that will fit tightly at the base of the works, between the framework of the clock. Fig. 2 will show you that it is first bolted to the sides of the frame, and then the distance-piece of wood just made is screwed down firmly to the turntable, see Fig. 3. Sufficient wood must be allowed to protrude out at the front of the works, to enable you to fix the jib at its base by another bolt, Fig. 4. See that the jib works freely at the base. The gib is 12in. long, and should taper slightly towards the pulley end. A suitable pulley can often be found in some old venetian blinds.

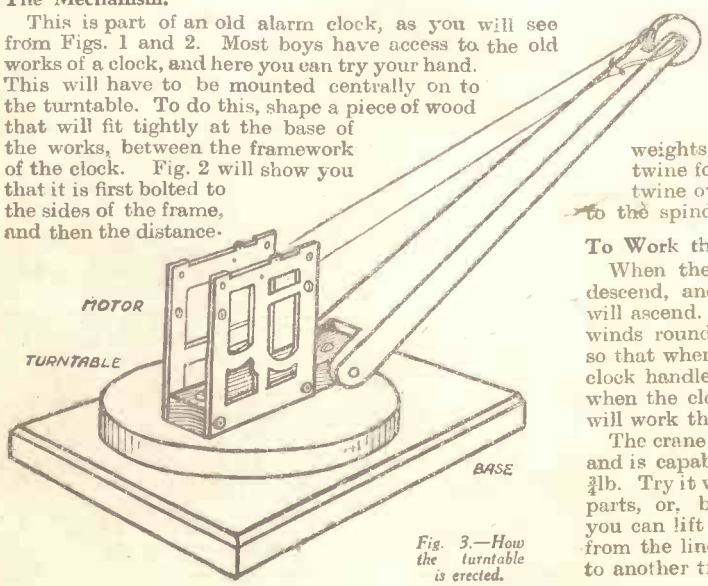


Fig. 3.—How the turntable is erected.

Fixing the Pulley.

Take a piece of wire and pass it through the end of the jib sides and the pulley wheel, allowing about 2in. of wire to extend either side of the pulley shaft. Bend the wire at the ends as in Fig. 5, so as to make a small eye, and bend each protruding piece with its eye towards the mechanism at right angles to the spindle. With some fine twine fix one end to the spindle of the alarm handle, and after winding a little on, the other end can be fixed to the two eyes on the spindle stirrup of the pulley wheel.

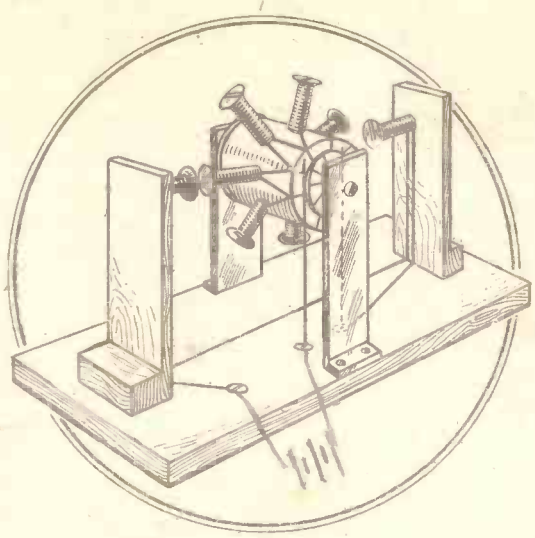
After making a small hook for lifting the weights over the pulley, allowing a fair amount of twine for depth of rise and fall of weights, pass the twine over the pulley, down the jib, and fix same to the spindle of the handle that winds the time up.

To Work the Crane.

When the time handle is wound up the hook will descend, and if you set the clock working the hook will ascend. Care must be taken to see that the twine winds round the spindle when winding up the clock, so that when set in motion it ascends. When the alarm clock handle is wound up, the jib itself descends, and when the clock starts the jib will work the other way.

The crane is now completed, and is capable of lifting some ¾lb. Try it with your Meccano parts, or, better still, see if you can lift your model train from the line and lower it on to another track.

Fig. 5.—The piece of wire to hold the pulley.



AN EFFICIENT ELECTRIC MOTOR

By A. Stewart

Any handyman can make this electric motor in an hour or so from a few odds and ends and a cotton reel.

MUCH of the interest of many hobbies lies in imitating, with pieces of string and nails, the experts with their lathes and other instruments of precision. A successful electric motor can be made from a cotton reel, a few iron screws, two strips of thin brass, a washer, and a few yards of insulated wire, and its performance will depend entirely on the patience and care with which the simple device is assembled.

A cotton reel is plugged at both ends and small screw-holes made accurately in the centre of both ends. Six or eight stout iron wood screws about an inch long are driven into the middle of the reel at exactly equal intervals, giving the appearance of an aero engine.

The reel is now mounted between two brass strips on a wooden base, and the balance of the reel carefully adjusted by turning the screws, afterwards removing the reel so that the coils may be wound.

The Coils.

A coil of 28 S.W.G. or coarser wire is wound on one screw, winding always in the same direction, round and round, but backwards and forwards to give three or four layers. The length of wire needed is cut from the reel and unwound from its screw so that other pieces of the same length may be cut.

The coils are now wound as nearly identical as possible, the ends of each coil being left an inch or two long and secured by tying with thread, care being taken to show, by a knot or otherwise, the inner end of each coil.

On one end of the reel is a slight projection. Take a brass washer a little larger than this boss on the reel, and accurately mark it off into as many equal sections as there are coils in the "armature." Centrally in each section drill a hole for a small wood screw. File a groove round the edge of the washer with a triangular or the edge of a half-round file.

Fixing the Washer.

Screw the washer centrally to the boss so that the screw-holes in the centre of each section are in line with the spaces between the iron screws, i.e., the marks on the washer are in line with the iron screws. Ease the screws till the washer is loose. Bare and twist together the inner end of one coil and the outer of the next all the way round, and pass these twisted ends behind the washer, round the screw facing each of them, and back out again. Drive home the screws, cut off the odd ends of wire, and with an old fretsaw divide the washer into sections as previously marked off. Fill in the saw-cuts with sealing-wax and clean the groove round the edge of the commutator, which is now complete.

The armature may now be replaced in its bearings and the balance checked, any adjustment necessary being made by means of small screws with washers or small nuts on them.

The Pole Pieces.

These are formed of two similar iron screws mounted on wooden supports at either side of the armature. After winding the first field coil, do not cut the wire, but, allowing several inches of slack, proceed to wind the other coil the opposite way round its screw. This is very important, for unless the poles are opposite, the motor will not revolve.

Next take two short lengths of springy wire, turn one end of each piece into an eye, and fix them on the base-board on either side of the commutator, by means of a small wood screw and washer. Arrange them to bear lightly in the groove at points which are exactly opposite and horizontal.

Connect one end of the field coils to the bottom of one brush, and then the other end of the field coils and the other brush constitute the terminals of the motor.

The Supports for the Field Coils.

A four-volt accumulator should drive the motor satisfactorily, but its performance can be greatly improved, the design given above being the first and not the last word, thus making further experiment possible. For example, the supports for the field coils might be a strip of iron bent U shape, and each screw might be replaced by a pair, thus making the coils larger, heavier gauge wire being used to keep down the resistance—a very important factor.

If enamelled wire is used, the exposed part of the shanks of the wood screws should be covered with insulating tape.

The axis of contact of the two brushes may be rotated slightly in the direction in which the motor revolves, but they must always be exactly opposite each other for proper running.

It will be advisable, when first connecting the motor to an accumulator, to insert an ammeter in the circuit, to ensure that the accumulator is not being overloaded.

A NOVEL TOY FIELD-GUN

By A. J. Budd

Any handyman can make this toy gun in an hour or so from a few odd pieces of wood and cardboard.

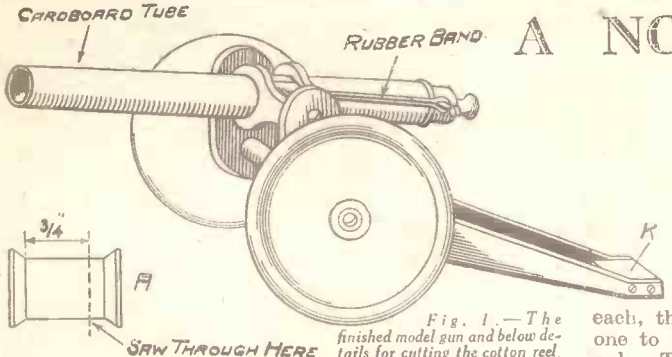


Fig. 1.—The finished model gun and below details for cutting the cotton reel.

ALL that is required to make this toy gun is a piece of cardboard postal tube, some cotton reels, pieces of dowel rod and odd bits of fretwood. To provide the power for firing, rubber bands are used, while the ammunition may consist of small indiarubber balls.

First of all obtain three empty cotton reels and saw an end off one as indicated at A, Fig. 1. Now obtain a cardboard postal tube, into the end of which the body of the cotton reel just fits, as shown at B, Fig. 2. The plunger rod is a piece of dowel rod 5½in. long, which should be an easy fit in the hole in the cotton reel. If it fits too tightly, rub it well with glasspaper. The part C consists of the body of another cotton reel, both ends being sawn off. The part D is a similar piece of another cotton reel. These parts are glued on to the ends of the rod after passing it through the part B, which is then glued into the end of the gun tube. Into the part D screw two screws opposite each other, as shown, and then screw a small wooden drawer knob into the end of the plunger rod.

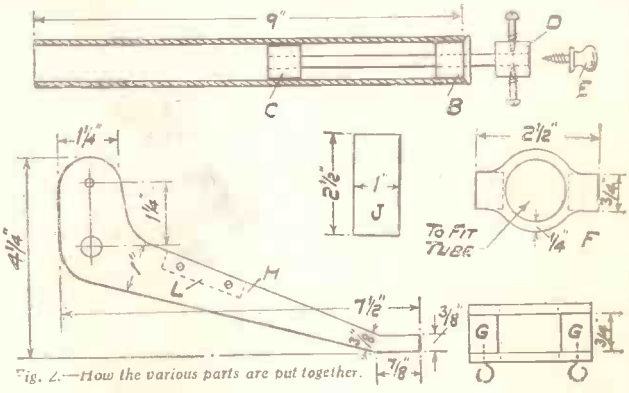


Fig. 2.—How the various parts are put together.

The Trunnion Block.

The next part to make is the trunnion block F. Cut two pieces of ordinary fretwood to the shape shown, with a hole in the middle of each a rod fit to the gun tube. Between the ends of each piece glue two blocks of wood G G, and when the glue has set hard screw in two little hooks, as shown. Slip the trunnion block on the tube and glue it in place 2¼in. from the rear end of the tube.

For the trail cut two pieces of fretwood to the shape and sizes given at H. Make two holes in each, the top one for the pivot screw and the bottom one to fit a piece of ¼in. dowel rod, which forms the axle. This is 4½in. long. Cut a piece of wood J, and screw it between the ends of the trail, as shown at K. Another piece L, also 2½in. wide, is screwed in place in the position indicated.

Assembling the Gun.

Now fix the gun tube and trunnion in position by means of a screw through each side of the trail. Push the axle through the holes in the trail and glue it in place. Obtain two wooden wheels, about 4½in. in diameter, and fix these to the ends of the axles with round-headed screws, placing a washer under the head of each screw before screwing them in.

Lastly, obtain two strong rubber bands, about 2in. long, and loop them over the hooks and screws, as shown at M M, Fig. 3. The finished toy, with the exception of the rubber bands, can be given a coating of grey enamel.

To work the gun, simply put a small rubber ball down the gun tube, pull the knob back and then let go. Plenty of amusement can be had by shooting at toy wooden soldiers.

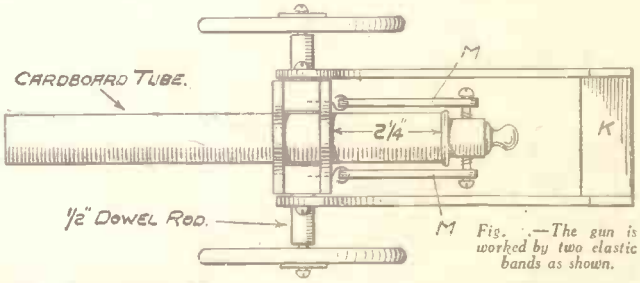
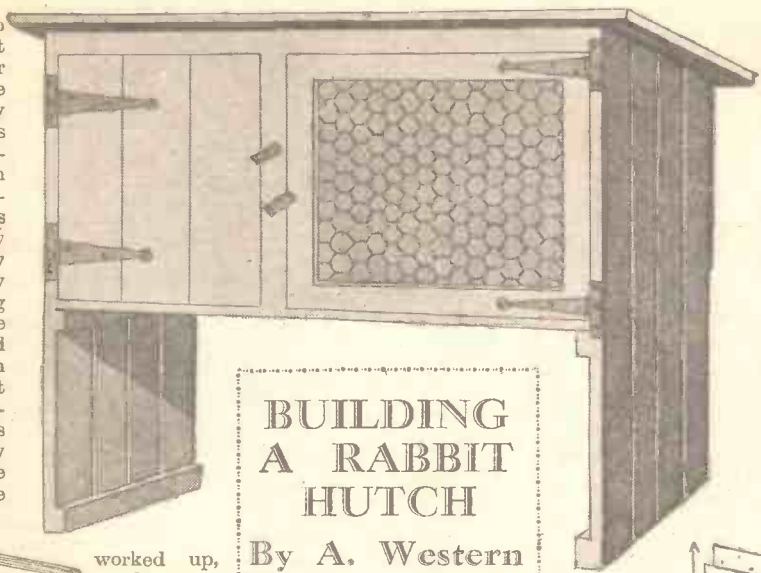


Fig. 3.—The gun is worked by two elastic bands as shown.



BUILDING A RABBIT HUTCH

By A. Western

A cheap and comfortable home for your pet.

MOST boys keep rabbits at some time or other, and there must be very many amongst our readers who will be interested in the hutch shown and described on this page. The work may be undertaken by any boy, as it chiefly consists of sawing and nailing the parts. It would look best made from new material, but it will not be necessary to go to this expense, as any pieces which may be on hand could be worked up, and even that obtained from large packing boxes will be quite suitable, providing it is from ¾in. to 1in. thick. The hutch is divided into two compartments by a partition in which a round hole is cut, one compartment is enclosed with a solid wood door, and the other with a framed and netting-covered one.

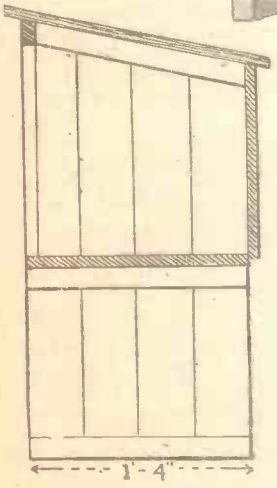


Fig. 2.—A sectional view.

The Sides.

This hutch is intended to stand on the ground, so the sides have been extended below the bottom to form legs, but should a hanging hutch be desired then the sides should be finished level with the bottom. Front and sectional views, with the sizes, are shown at Figs. 1 and 2. The sides are first made, as shown at Fig. 3, boards being cut to the length required and joined together with three battens about 1½in. wide, nailed on the inside. The bottom is then cut to length and nailed over the middle battens on the sides, while the top ends of the sides are joined by a top rail 1½in. wide let in level and nailed to the edges, as shown at Fig. 4. The back is boarded up, the boards being nailed to the back edges of the sides.

The next consideration will be the division, which is made as shown at Fig. 5. The boards forming it are held together with battens nailed at the top and bottom, and a round hole about 6in. diameter is cut as shown. A fret or key-hole saw may be used to cut the hole.

(*Continued on page 632.*)

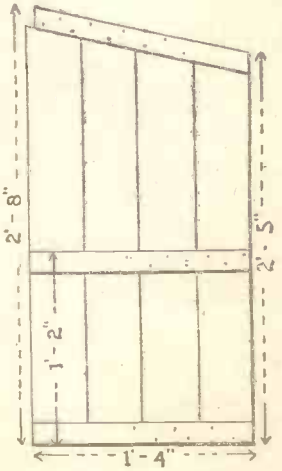


Fig. 3.—The shape and measurements of the sides.

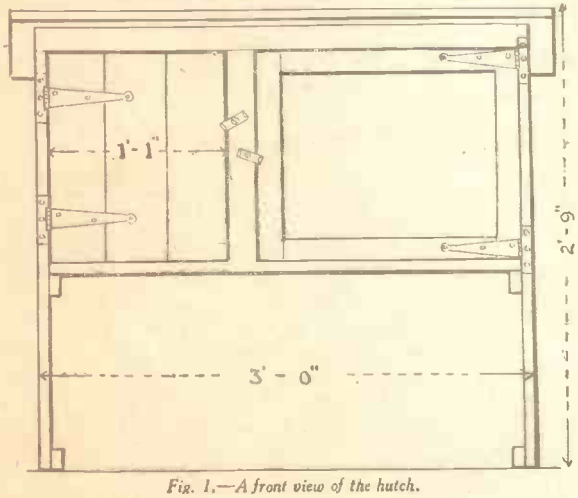


Fig. 1.—A front view of the hutch.

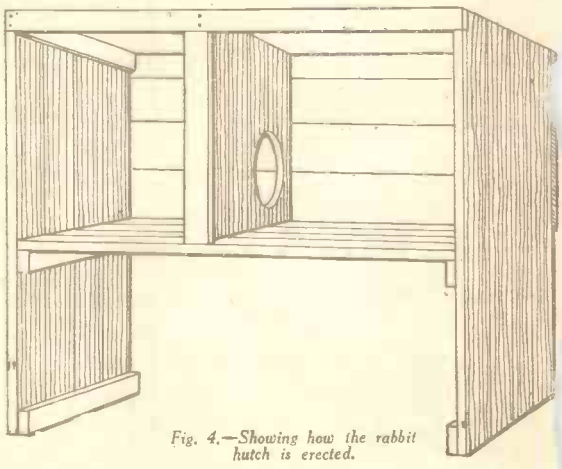


Fig. 4.—Showing how the rabbit hutch is erected.

HARD SOLDERING FOR AMATEURS

By H. Greenly

HARD soldering the joints of such metals as brass, copper, silver, nickel, and gold, is a process quite distinct from the method of soldering in which the solder is a mixture of tin and lead and known as "soft soldering."

Both hard and soft soldering may be employed with equal facility for jointing all the metals mentioned above, gold having the advantage that no great amount of cleaning and no flux are required, but to the metals of low melting point like lead, zinc, and the pewter alloys of tin, soft soldering only is applicable. The same remark can be made in respect to soldering tin-plate. This material is thin sheet-iron or steel coated with tin, and as this bright covering melts at about 450 degrees Fah. it is obviously impossible to employ a method of hard soldering which necessitates a temperature of at least 1,400 degrees Fah. Such can only be soft soldered, and although the basis of tin-plate is iron or steel, brazing is impracticable because of the coating.

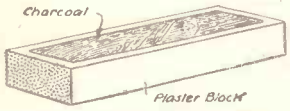


Fig. 1.—Charcoal block mounted in plaster cast.

Melting Points of Alloys.

It is important to note in dealing with alloys that, almost always, the melting point of a mixture is lower than either of the two metals in their pure state. The lowest temperature of a mixture depends on the exact proportions of the alloy, and this particular temperature is called the eutectic point of the alloy. Brazing is another soldering process, but for the amateur it may be considered as applicable only to steel and iron, as the soldering medium is a brass, brazing spelter it is called. This melts at a point not far below that of copper, and therefore a considerable degree of skill is necessary to make a joint at a brazing temperature without "burning," as overheating a job is termed, the work being operated upon. Obviously it is impossible to braze brass, as the spelter is really a kind of brass. Therefore I strongly recommend that the amateur should braze only steel and iron objects. Non-ferrous metals like copper, brass, and nickel, which are required to be "hard soldered," should be worked up with one of the many grades of silver solder.

Fig. 2.—A charcoal chunk.

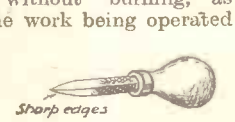


Fig. 3.—The scraper.

Grades of Silver Solder.

The workshop method of making silver solder practised by many working jewellers is to melt up with a gas blowpipe in a hollow formed in a block of charcoal some scraps of pure silver and brass pins, about three parts of silver to one of brass, by weight. If brass pins are not to be obtained—iron is commonly used nowadays in making pins—then employ brass cuttings instead. When a molten globule is obtained—using a little borax as a flux to make the metal run easily—tip it out on to a wooden bench and drop a flatiron on it. A thin sheet of silver solder will then be obtained without resort to hammering or rolling, and this can be cut into strips for future use.

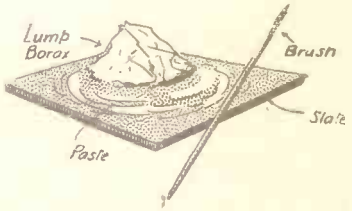


Fig. 4.—The slate and borax.

A finer quality of solder—more near to pure silver—will be obtained by a mixture of seven parts of silver to two of brass. The melting temperature of this mixture will be about 1,500 degrees Fah., and therefore no advantage will accrue except that the joint the solder makes will be whiter and more suited to work on silver and nickel objects. The same melting point will be obtained by using six of silver to four of brass, and at the same time cheapening the solder. The three-to-one mixture gives the lowest melting point of about 1,435 degrees Fah.—*i.e.* it is nearer the eutectic mixture.

Silver soldering methods vary considerably with the size of the job to be tackled. For small work such as that necessary to joint brass fittings to $\frac{1}{4}$in. or $\frac{3}{8}$in. copper pipes such as used in model engineering, and soldering other objects of similar calibre, the heat to be obtained from a mouth blowpipe operating in a horizontal gas jet (not a Bunsen burner necessarily) will be ample. All that is required to conserve the heat around the

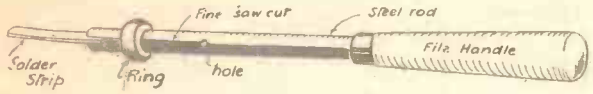


Fig. 5.—The clip to hold the strip solder.

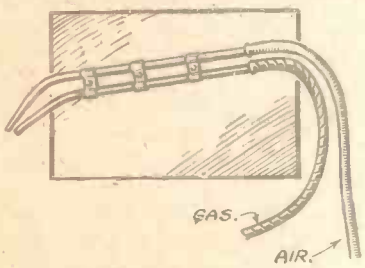
part being soldered is a block of charcoal. These blocks are sold in the toolshops built up, for convenience in handling, in a plaster mould or case of the shape sketched in Fig. 1. Otherwise natural lumps of charcoal, chunks made up from split branches of small trees, as shown in Fig. 2, may be employed.

The other necessary tools may be enumerated as follows :—

(1) A scraper (Fig. 3) made out of a piece of a small three-cornered file sharpened up with knife edges on an oilstone and stuck into a short handle. The whole thing should not measure more than 3½in. overall.

(2) A piece of slate (Fig. 4), with a small camel-hair brush for rubbing up lump borax and water into a paste as occasion may require. This paste is painted on to the part of the work to be soldered.

(3) A clip to hold strips of solder in the flame. One form is shown in Fig. 5. This is quite a home-made device, formed by sawing down a piece of ⅛in. diameter steel rod and slipping a metal ring of the same internal diameter over it to grip the strip of solder placed between the jaws formed by the sawcut. The other end of the rod may be filed down to a point and forced into a wooden file handle.



(4) A gas blowpipe. These only cost a few pence and can be obtained from any well-stocked ironmonger or tool shop. (See Fig. 6.)

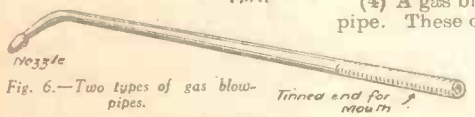


Fig. 6.—Two types of gas blowpipes.

The gas jet should be placed horizontally and a made-up fitting is arranged so that when it lies across the front of the worker the gas is full on. When it is pushed away from him the gas jet is only just alight (see Fig. 7). This saves the trouble of handling a separate tap. These special jets can also be obtained ready made from ironmongers.

A further requirement is a pot of "pickle," a mixture of one part of sulphuric acid (oil of vitriol) to twenty parts of water in an earthenware jar. In mixing up this it must be remembered that it is dangerous to pour water on to the acid. Always add the sulphuric acid to the water, and even do this slowly, to allow the heat generated to disperse gradually and without ebullition. Sulphuric acid has a great affinity for water

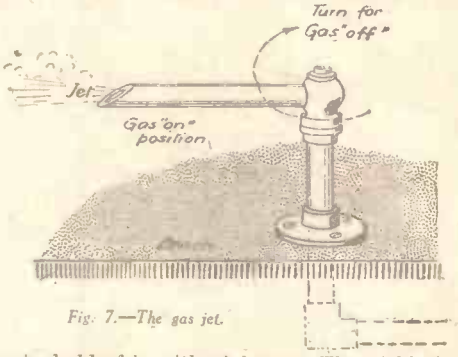


Fig. 7.—The gas jet.

and grabs hold of it with violence. The pickle is used in silver soldering to clean the metal being operated on, both in preparing it for soldering and to clear off the burnt-on borax after the job has been jointed up. The initial cleaning may be done by the pickling; but it is not quite sufficient to ensure that more than the grease and organic dirt are removed. All parts where the silver solder must be run in require to be scraped clean, or filed, as well as pickled.

(*To be concluded next week.*—Ed.)

BUILDING A RABBIT HUTCH (*Continued from page* 630.)

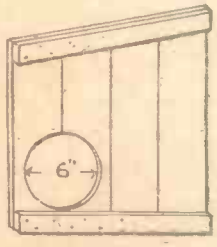


Fig. 5.—The partition, showing the size and position of the hole.

The division is nailed through the bottom, back, and top rail, and a rail about 2in. wide is nailed at the front edge to fit between the top rail and the bottom. The roof is covered with boards arranged to overhang at the front, back, and ends, and to make the hutch quite waterproof a piece of canvas or roofing felt may be nailed over the roof boards.

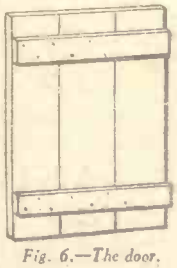


Fig. 6.—The door.

The Doors.

To complete the hutch it only now remains to make the doors, which are fitted to the front. The solid door is prepared to fit the opening, and the boards are held together with two battens nailed on the inside, as shown at Fig. 6.

The framework of the netting-covered door should be about 1½in. wide, half-lapped and screwed together at the corners, as shown at Fig. 7, and the wire netting is fixed on the inside. Both doors are hinged as shown, and fastened with turn buttons screwed to the rail between them.

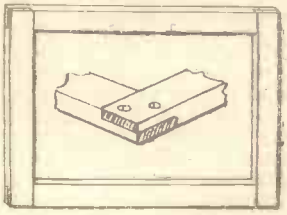


Fig. 7.—The framework for the netting-covered door.

Before it is put in use the hutch should be painted outside, and limewashed inside.

A FINE ELECTRIC CLOCK

It runs for one year on two Leclanche cells.

By H. R. Langman

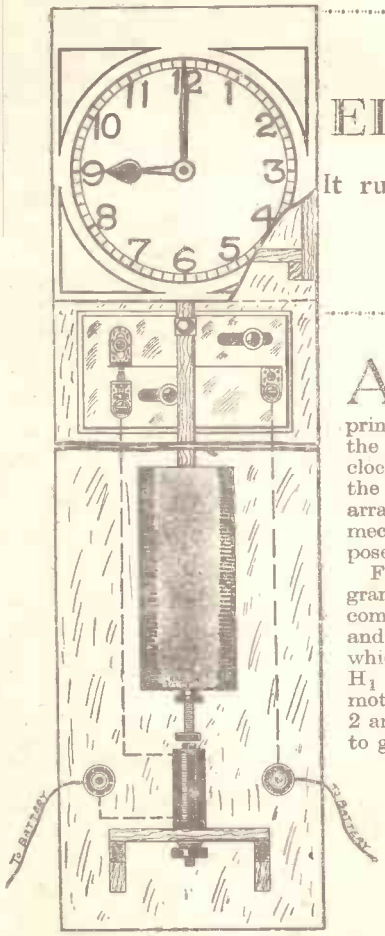


Fig. 3—A front view of the clock.

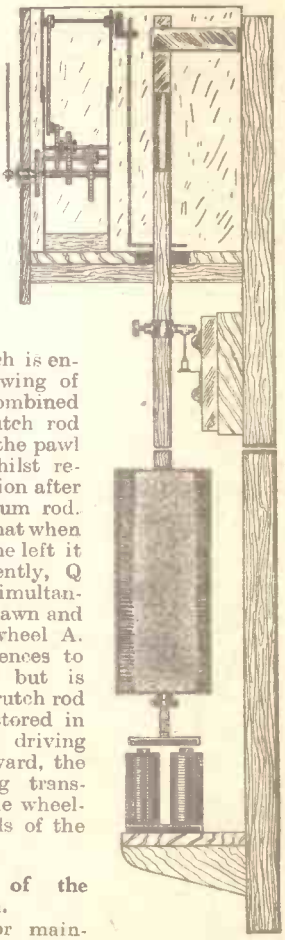


Fig. 2.—A sectional view showing how the clock should appear when assembled.

AT the outset it will be as well to outline the principle underlying the action of the clock, and so acquaint the reader with the arrangement of the mechanism and purpose of each part.

Fig. 1 shows diagrammatically the complete mechanism and the manner in which the hands H, H_1 receive their motion, whilst Figs. 2 and 3 are intended to give some idea of how the clock will appear when the components have been assembled.

Referring to Fig. 1, A, B and C are three wheels mounted on independent arbors G, N and I, the wheel C rotates once each hour from whence it follows that the arbor I carries the minute hand H_1. Loosely mounted on the same arbor is the "cannon" J, carrying the hour hand H, one end of J is attached to the wheel O receiving motion through two similar wheels L and L_1 and a pinion K; the wheel L is driven by the arbor I. This group of wheels constitutes the "dial wheels."

The wheel C meshes with the pinion E of the arbor N; on the same arbor is mounted the wheel B that meshes with the pinion D carried by the arbor G, to which is secured the ratchet-wheel A, driven by the "gravity arm" Q through the medium of the pawl P. The arm Q is secured to the arbor R, oscillated by a crutch rod S, and which is engaged at every alternate swing of the pendulum T. The combined weight of the arm and crutch rod must be adequate to cause the pawl P to propel the wheel A whilst returning to their initial position after displacement by the pendulum rod.

Matters are so arranged that when the pendulum swings to the left it displaces S and, consequently, Q in the same direction, simultaneously the pawl P is withdrawn and picks up a tooth of the wheel A. The pendulum now commences to swing towards the right, but is now followed up by the crutch rod and arm Q, the energy stored in the arm is now utilised in driving the wheel A one tooth forward, the movement in turn being transmitted through the wheelwork to the hands of the clock.

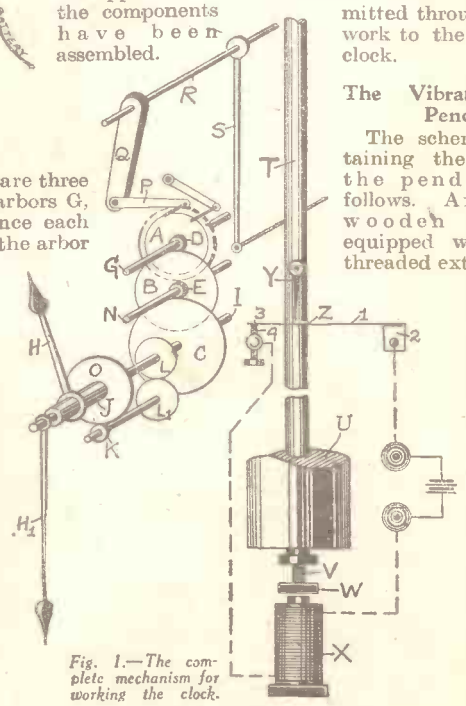


Fig. 1.—The complete mechanism for working the clock.

The Vibration of the Pendulum.

The scheme for maintaining the vibration of the pendulum is as follows. An ordinary wooden pendulum equipped with a heavy "bob" U has a threaded extension V terminating in the armature W. Fixed rigidly beneath the armature is an electro-magnet X so that the armature just swings clear of the electro-magnet. When, however, the arc of vibration becomes reduced to a predetermined value, a small "finger" or "trailer" Y pivoted to the upper portion of the rod T, fails to swing clear of small wedge-shaped block Z attached to a light spring 1, one end of which is riveted to a bracket 2, whilst the free end of the spring is equipped with a contact 3, engaging a stationary contact 4. On the return swing of the rod T, the finger Y having previously dropped into a nick in the block Z, levers down the spring and momentarily the con-

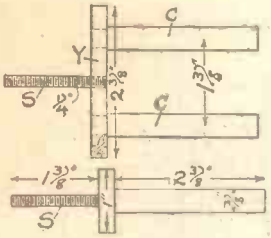


Fig. 4.—The soft iron yoke.

tacts are closed, and the magnet X is energised. When the contacts close, the leading edge of the armature W is just about to pass over the magnet cores, consequently the excitation of X attracts the armature and the pendulum is impulsed. An increased arc of vibration of the pendulum results, so that the finger Y is again carried clear of the block Z for several swings of the pendulum.

Gradually, however, the swing becomes reduced and the finger again fails to clear the block Z, when the contacts are again closed.

This simple means of impulsing the pendulum is automatic in action and economical as far as current consumption is concerned, and two or three quart Leclanche cells should run the clock for at least twelve months without any attention whatever.

The Electro-magnet.

The soft iron yoke Y (Fig. 4) has riveted to it the soft iron cores C, the ends of which are shouldered down and are a driving fit in the holes drilled in the yoke.

Fig. 5.—The bobbin.

For securing the electro-magnet in position a screw or piece of threaded rod S is riveted to the yoke. Slipped over the cores are the bobbins (Fig. 5), these are wound with the magnetising coils.

The bobbins are easily built up from thin brass tube of a size to fit the cores snugly, and are completed by soldering to the ends of the tube brass flanges in which a hole has previously been cut for the insertion of the tube. Before winding on the wire wrap a couple of turns of note paper around the tubes and well brush with shellac varnish. To insulate the flanges, cut some discs of paper, of course, cutting the centre of the disc for the tube; cut through one side so that the discs can be placed on the bobbin and then well brush with varnish. A couple of small holes may be drilled through one flange of each bobbin for threading the ends of the coil through.

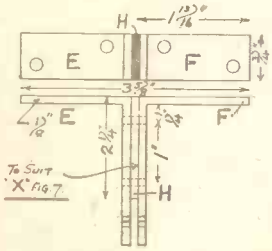


Fig. 6.—The suspension bracket.

Now proceed to wind on each bobbin as evenly as possible about 3½oz. of No. 30 single silk-covered wire, cotton-covered wire may be used if at hand. Be particularly careful not to reverse the direction of winding during the process.

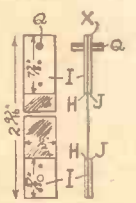


Fig. 7.—The distance piece.

When the coils are wound, slip them over the cores and connect the finishing end of one coil with the starting end of the other, the two remaining ends of the coils should now be connected to a couple of dry cells or Leclanche cells to ascertain if there are any breaks in the wire; also, to check the pull of the magnet with a piece of soft iron.

Assuming the test is satisfactory, finish off the coils with a coat of some insulating varnish, and to give a pleasing appearance the coils may be covered with a piece of black velvet.

The Suspension Bracket.

Two pieces of steel or brass, E and F (Fig. 6) are bent at right angles and drilled with two holes for attachment to the backboard. Inserted between E and F is a distance piece H, a shade thinner than the thickness of the brass at X (Fig. 7). After trueing up the sides of E and F coming against the piece H, the whole is drilled and riveted together, ensuring that the top and bottom edges of the bracket are square and parallel. Carefully cut a "V" notch in the top edge of E and F to receive the suspension pin Q (Fig. 7).

If necessary, file out the cheeks of the bracket until the brass blocks of the suspension spring are a snug fit and will permit the pin Q to rest in the notches.

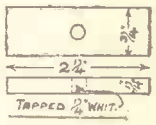


Fig. 8.—The armature.

Armature.

For the armature (Fig. 8) use a piece of soft iron. A centrally-drilled hole is tapped to suit the screwed rod attached to the end of the pendulum rod and is locked in position by a nut. It is as well to anneal the iron by allowing it to remain in the fire overnight.

The Pendulum.

The pendulum is built up, a main portion P (Fig. 9) consists of a piece of ¼in. wooden curtain rod, the ends being fitted into pieces of brass tube, A and B.

The tube A is closed at one end with a piece of brass rod D slotted to receive the suspension spring S, a small bolt and nut being the means of attachment. The rod is reduced to fit into the tube and a couple of small holes are drilled through the whole to receive rivets made from soft wire.

The tube B is attached to the rod in a similar manner, but before attachment a ¼in. brass collar N (or nut filed down) is driven into the end of the tube and soldered; screwed into the collar is a piece of threaded rod T to carry the timing nut U and the armature L. Sliding freely over B is the bob M which should weigh from 10 to 15lb., and may be of iron or lead.

Fig. 7 shows the method of attaching the suspension spring to the brass chocks I by small rivets.

(To be concluded next week.—Ed.)

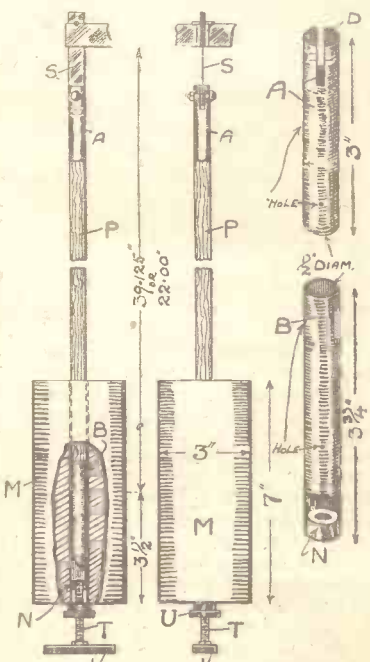
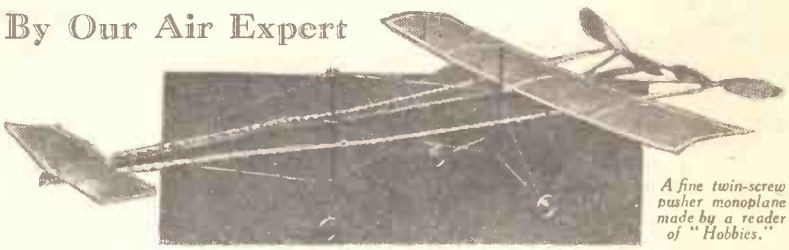


Fig. 9.—Details of the pendulum.

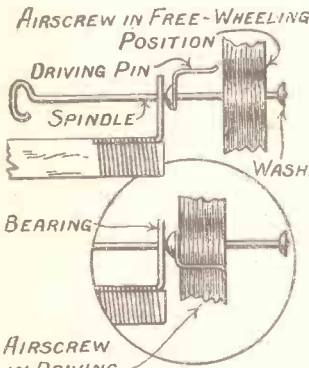
MODEL AEROPLANE TOPICS

By Our Air Expert

This feature is conducted by the World's acknowledged authority on the subject. He will be pleased to answer any queries.



A fine twin-screw pusher monoplane made by a reader of "Hobbies."



A free-wheel device for pusher-type model airscrews, which enables the latter to spin freely when the elastic is unwound and so prolongs the glides.

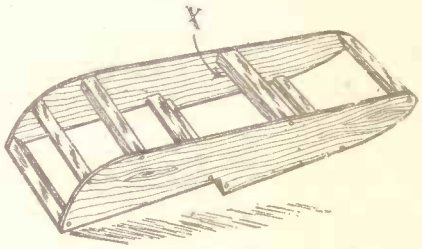
Free-wheel Device for Pusher Models.

IT will be found by using the free-wheel propeller device illustrated here that the resistance is greatly reduced when the elastic is unwound, which gives the model aeroplane a better chance to glide longer and more evenly. As shown by the sketches, it is quite a simple device to make. The spindle is made from 18 S.W.G. wire, and a piece of 20 S.W.G. wire is formed to shape for the driving pin. A washer is soldered to the end of the spindle to prevent the airscrew from slipping off. When the airscrew is being wound it is forced up close to the bearing; the driving pin also holds tight. When unwound the airscrew slips back to the end of the spindle and thus is free to revolve.

Mr. A. T. Willis, of the Model Aircraft Club, with his fine model "Condor."

A Shock-absorbing Chassis.

The chassis generally used on model aeroplanes very often bends badly out of shape when the 'plane lands steeply. By adopting the idea shown at the foot of this page most of the jar is absorbed. The usual materials are employed, but the wire is bent to the shape shown.

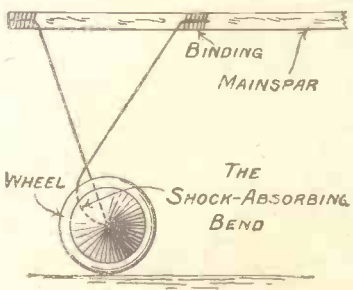


One method of making model hydroplane floats. The pieces X are pinned and glued.

Result of the Wakefield International Tournament.

Place.	*Contestant.*	*Address.*	*Time (Secs.)*
1st	Joseph Ehrhardt	St. Louis, Mo.	264·8
2nd	Elmer Lueckerath	Ferguson, Mo.	217·8
3rd	Richard Herrick	Champaign, Ill.	207·2
4th	R. N. Bullock	England	162·0
5th	Albert Levy	Toronto, Canada	151·5
6th	Ross Farquharson	Vancouver, Canada	138·0
7th	Edward Becvar	Chicago, Ill.	118·8
8th	Edward Miller	Oak Park, Ill.	106·0
9th	C. F. Sanders	England	95·4
10th	Robert Syer	Battle Creek, Mich.	83·7
11th	Dick Hiscocks	Toronto, Canada	62·8
12th	J. E. Pelly-Fry	England	52·4
13th	J. W. Kenworthy	England	45·3

It will be observed that the English competitors did not do very well. That fuselage formula needs revising!



A shock-absorbing model aeroplane chassis.

Making Model Hydroplane Floats.

Model hydroplanes are not popular models, chiefly because a suitable stretch of water on which they may alight and from which they may take off is not always available. Nevertheless, several readers are inquiring how to make the floats, and accordingly I show a sketch illustrating one very simple system of construction.

Youth and Charm.—Mrs. Dennis, of the Model Aircraft Club, and Master E. Walker, with their fuselage models.

It will be seen that a step is formed on the bottom surface, which materially assists the model in lifting from the surface of the water. A great deal of power is lost in "unsticking" the floats, and this step, by allowing air to enter, enables the float to lift more rapidly.

Soldering Aluminium.

For those who wish to embody aluminium in their designs, but are unable to solder it, the following information will be useful. For an aluminium solder to be successful, it must contain a percentage of phosphor tin. A solder I can personally recommend is composed of tin, 75·5 parts; zinc, 25 parts; phosphor tin, 1 part; and aluminium, 1·5 parts. Melt the aluminium first, add the zinc in small pieces, then the tin in small pieces, and, finally, the phosphor tin. Steorin is by far the best flux to use.

The temperature required to make a sweated joint with the above solder is about 700 deg. Fahr., and a blow-pipe is preferable to a soldering bit, as heat may be maintained. If, however, a bit is preferred, it should be aluminium or nickel instead of copper.

Petrol Engines for Model Aeroplanes.

The Bonn-Mayer Petrol Engine shown in the photograph was one specially designed for models, and in its tests many years ago it proved to be very successful. As can be seen, the engine is of the 2-cylinder V-type; its weight, complete in running order, including a 3ft. 4in. propeller, a certain amount of fuel, ignition coil, etc., is only 11lb. 2oz. The engine alone weighs 7lb. With the propeller of 2ft. pitch, and of the diameter given above, a speed of 1,200 r.p.m. has been attained, with a thrust of 14lb. Greater power was obtained in later experiments.

What Horse-power Does an Elastic Motor Develop?

To calculate the horse-power of a rubber motor: Assume the screw is wound to 500 turns, that it runs down in 20 secs., and the mean thrust is 3oz., pitch being 15in., and mean speed 1,100 r.p.m. The number of foot-pounds of energy developed=

$$\frac{3\text{oz.} \times 1{,}100 \times 1\tfrac{1}{2}\text{ft. pitch}}{16\text{oz.}}$$

$$= 258\text{ft. lb. per min. approx.}$$

Since the motor runs down in 20 secs., the energy actually developed=

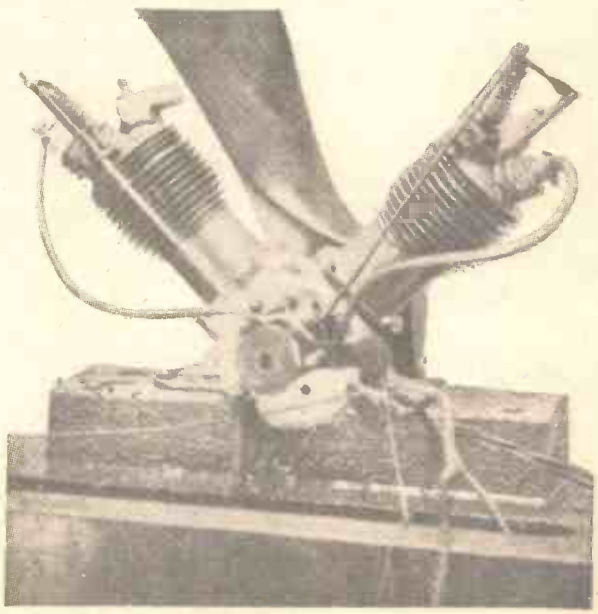
$$\frac{258 \times 20}{60} = 86{\cdot}0\text{ft. lb.}$$

The motor develops power in the order

$$\frac{258}{33{,}000} = {\cdot}0079\text{ h.p., but for 20 secs. only.}$$

The Clarke Y Section.

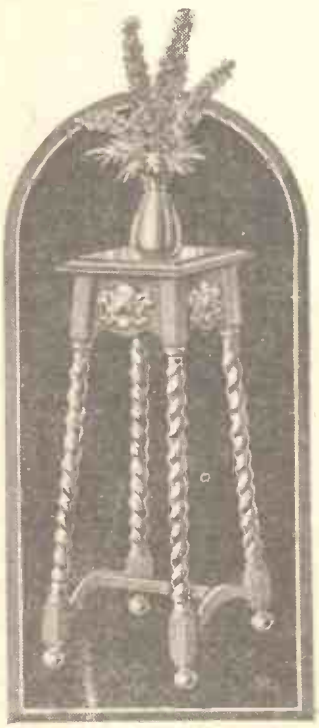
I do not recommend readers to adopt the Clarke Y wing section; a simple single-surfaced low-cambered wing will give by far the best results. It is sometimes stated by certain writers who do not understand very much about aerodynamics that the Clarke Y section will give astounding results. Of course, some people are astounded at anything, and perhaps that is why they make such astounding freaks. Do not be misled, therefore, by authors who are merely copying what has been done and found impracticable many times before; their machines are generally the result of guesswork, gaudily painted and having a fancy name painted along the fuselage.



A fine V-twin model petrol engine for model aeroplanes made some years ago and included here to show what has and can be done. It was known as the Bonn-Mayer.

The AMATEUR WOODWORKER

A PLANT table on typical modern lines, but which does not involve any great amount of work for the amateur carpenter, is the subject of this week's design sheet, and we are sure a large number of our readers will be delighted to be able to make up such a useful piece of every-day furniture. As the illustration shows, it has Jacobean legs, spread at the bottom and tapering to a top forming a platform 10in. square.



A PLANT TABLE

A Useful Size.

The height of the finished table in oak is just 2ft. 6in., and spread of the feet at the bottom takes a space of 12in. square. As the legs are supplied already turned, in oak, the rest of the work must be carried out in that wood also, and the usual parcel of planed timber, cut to the size of the various parts required, is supplied by Hobbies for 10s. This includes the four necessary legs, turned and smoothed ready to fix, and the four raised square buttons ready to glue on. The parts generally are all planed boards, without any interior work to be undertaken, and the usual carpentry tools are all that is necessary, providing one has also a fretsaw to shape up the side panels, rails, etc. The top is made up of two pieces ½in. and $\frac{3}{16}$in. thick. All the rest of the work is in ⅜in. wood, with the exception of the four ornamental frets on the sides, which are cut from ⅛in. material.

Simple Construction.

The general construction is obvious from the drawing at Fig. 1, which shows exactly the manner in which the sides and rails are fitted into the legs. The top has been purposely omitted, as this is merely laid on the hollow frame. The first work, of course, is to get the four legs together and saw any odd pieces from the top end, so they are all the same length. On two sides of each leg—marking them off all at the same time—measure down 4in., and then with a marking gauge run a centre line up to the top. On each side of this centre-line mark off $\frac{3}{16}$in., again using the marking gauge.

A Groove for the Sides.

This measurement serves to provide the groove which will hold the projecting tenons of the sides (see Fig. 1), and by using a centre line on the leg, one is sure of getting the groove in its right place. A detail of this is given at Fig. 2, showing exactly how the groove has to be cut on the two inner sides of each leg at the top. Cut out these slots by means of a tenon saw and ⅜in. chisel, but do not overrun the width or the joint may be loose when the sides are tested in. The sides should fit in quite firmly, and, of course, will finally be glued in place.

The Taper Sides.

The four sides can be next cut out with a fretsaw to the shape given on each pattern. It will be noted that the shorter edges taper towards the top, and this provides the slope for the legs. Cut the parts out and test them in the grooves in the legs themselves, making a light pencil mark to ensure that the same parts are returned to the same slots when they are ready to be finally glued in place. At the bottom of the leg we have to fit in three cross rails. Two legs are held by an arched stretcher rail, which is in turn held apart by a straight cross rail fitted at right-angles, as can be seen clearly in the illustration.

The Lower Rails.

The arched rails are fitted into the legs by means of a mortise and tenon joint, and this is marked off as shown at Fig. 3. The mortise in the leg is 1⅜in. long, ⅜in. wide and ½in. deep. It is made with a brace and bit, and finally cleaned with a sharp chisel. The arched rail is cut from ⅜in. wood with a fretsaw, care being taken to ensure a good fit of the tenon at the end. These two arched rails are cut and tested in their positions in the leg, but should not be finally glued in. The cross rail fits into the top of the arch at A with a mortise and tenon joint cut with a fretsaw.

Constructing the Work.

The parts are now ready to put together. Take one of the arched rails and one of the sides and glue them into their respective slots in two legs. Then get one of the other sides and the other arched rail and do the same with the other two legs. This will make two pairs of frames, and these can finally be put together to complete the article by the addition of the remaining two sides and the straight cross rail at the bottom. There is a very slight slope in the straight cross rail which may have to be fitted up when the parts are put together, but this can be easily regulated with a chisel or the fretsaw. Use a square to test out the accuracy of the frame and then tie strong cord round the top of the legs (padding the corners, of course) to hold it together until the glue is set.

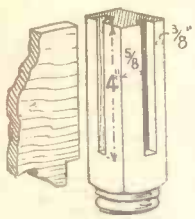


Fig. 2.—The grooves in the legs to hold the tapering side pieces.

The Ornamental Parts.

In the meantime, the four ornamental pieces of fretwork, which form the overlays on the sides, can be cut. They are taken from ⅛in. wood, so that two can be cut together by pasting the design provided on to the upper one when the two boards are nailed together round the outside of the pattern. These overlays should be carefully cut, and if a handframe is being used one must take care to see that the floor is upright, so that the lower piece of wood is cut exactly the same shape as the upper one. The outline of the pattern should be cut last, because when this is done the two pieces of wood will fall apart. Clean the paper remains off, and give the wood a light rubbing of glasspaper on the reverse face, to take away any slight burr made by the sawblade. The position of the overlays on the actual sides is indicated on the pattern by dotted lines, but, of course, this will have been cleaned off before the parts are put together.

A Point to Note.

This is immaterial, however, as the position is obvious, and the fretted overlays are merely glued centrally between the legs and the top and bottom edge of the sides. The centre of each overlay is a solid piece of wood, and this provides the foundation for one of the square oak ornaments supplied in the parcel or obtainable separately (No. 210). It will be noted, by the way, that the grain of the overlay runs vertical, and in glueing on the wooden ornaments be careful to see that their grain runs in the same direction. If the back of the ornament is so smooth that the glue will not get a good grip it can easily be scratched with a file to roughen up the surface.

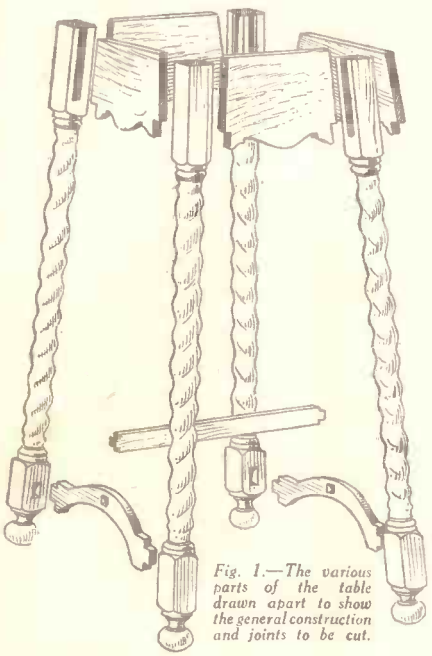


Fig. 1.—The various parts of the table drawn apart to show the general construction and joints to be cut.

The Two-piece Top.

The top, as has been mentioned, is composed of two parts, but when put together they are made to look like one solid piece of material with shaped edges. The bottom board is the thicker one, 10ins. square, and with its upper edge rounded off. This is easily done with a 6in. semi-coarse file used across the grain with the wood lying flat on the bench or held upright in a vice. Get a nice, even curve the whole length, and finish off with a fine grade of sandpaper to smooth the wood down. The underneath edge is also slightly rounded, as clearly indicated in the section of this part shown on the design sheet. This thick piece forms the main top and is glued to the legs and upper edges of the sides. Because of the sloping edge of the sides, the legs themselves will taper outwards. and in consequence the top will not be level with the sides, but will slope a little upwards.

Get the Legs Flat.

This must be taken off to ensure that when the top is put on it will lie flat across the whole surface of the sides and the legs themselves. Get someone to hold the framework firmly on the bench, and then use a large file across the top of the legs, keeping it flat with the upper edge of the sides to ensure the same plane. Test out frequently with the top itself, and work until the top of the legs is perfectly level with the upper edge of the sides. Get it centrally on the framework and glue it down squarely, also driving screws in so that they hold the thickness of the sides. Further, small blocking pieces can be added inside if necessary.

Covering the Screws.

The screws, of course, will be flat headed, and countersunk below the surface of the wood so that they can be covered later by the smaller piece which forms the upper part of the top. This piece is only 3/16 in. thick and 8in. square. It is a plain rectangle and must be glued down to the thicker piece of the top—with the grain running in the same direction, of course—and there clamped on until the glue has set. A fine panel pin or thin nail can be driven in at each corner. but the heads must be nipped off to prevent them showing and looking unsightly.

Finishing the Table.

The completed stand should be stained down, so that all parts are the same colour and then can be finally finished off with Lightning Polish if a glossy surface is required, or left a dull polish by using waxine or a similar preparation. When the plant stand is stood on the ground it should rest firmly on all four knobs at the bottom of the legs, but if there is any wobble it is quite a simple matter to file or sandpaper down the particular knob which is the cause of the trouble.

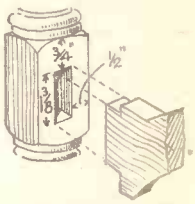


Fig. 3.—The mortise and tenon joint at the bottom of the table.

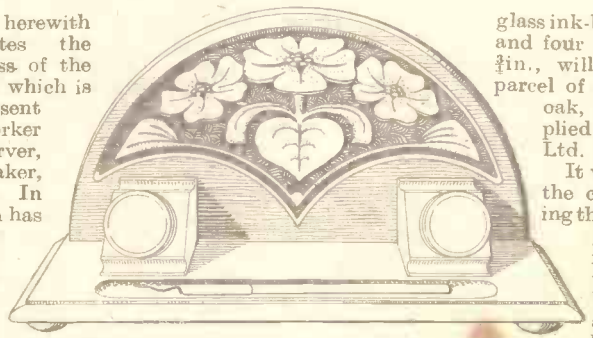
For making this table, Hobbies Ltd., supply a parcel of all boards in oak, planed ready to cut out, the four shaped ornaments, and the four turned legs, complete for 10s. From the usual depots or post free for 10s. 9d. from Hobbies Ltd., Dereham, Norfolk.

WOODCARVING

A SIMPLE PEN AND INK STAND

Many readers are asking us for a simple design in woodcarving. Here is one which is useful as well as ornamental and inexpensive.

THE sketch shown herewith sufficiently illustrates the beauty and usefulness of the Carved Pen and Ink Stand which is the subject of our present article, to induce every worker in wood, whether he be carver, fretworker, or furniture-maker, to put it in hand forthwith. In designing the stand our aim has been to combine taste and appearance with simplicity of construction to enable the carver who is not expert in constructional woodwork to proceed with the task without any trouble. The parts only need to be cut with the fretsaw and screwed together without bothering to make any difficult joints, and those who have never undertaken any serious carving before should have no difficulty in making a really creditable job of this if they approach it with care and patience. In fact, a small job of this kind is just the very thing for a beginner to start on, for even if the work is spoilt the material may be easily replaced at very little cost.



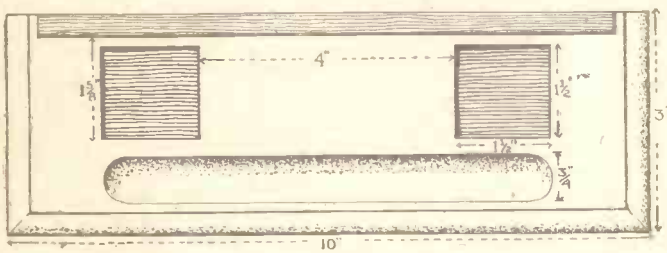


Fig. 2.—A plan of the base, showing how to mark it out and shape it up.

The Material.

The stand could be made in oak, mahogany, or satin walnut, and although mahogany or walnut are easy to cut, it will be found that oak is always the best carving wood, notwithstanding its toughness, because a sharper and much cleaner finish may be obtained, and the wood is not so liable to split. In the present instance there are but two pieces of wood, one for the base, 10in. long by 3½in. wide, and the other for the back, 9in. long by 4½in. wide, a thickness of at least ⅜in. being essential. To complete the stand a pair of glass ink-bottles (No. 5660, price 7d.) and four turned toes (No. 20), size ⅜in., will be required. A special parcel of suitable and good quality oak, with the four feet, is supplied for the work by Hobbies Ltd. for 1s. (post 6d.).

It will be best to proceed with the carving before finally shaping the parts, as the edges will not get damaged if this method is adopted. A full-size pattern for the carving on the back is given at Fig. 1, and a dimensioned plan of the base at Fig. 2.

Tracing Off the Design.

A tracing taken of the carving should be transferred directly to the wood and the lines plainly marked with a dark pencil to make working quite easy. The base is marked out (see Fig. 2), and it will be noticed that there are two recesses for the ink-bottles, and one for pens.

Those who have never attempted any carving before would be well advised to start on the base where the cutting of the recesses will give some good practice with carving tools. A parting tool or V-chisel, a gouge, and a small chisel will be required for this part of the work.

How to do the Carving.

Starting with the square recesses, they are first cut around just clear of the lines with the parting tool (see Fig. 3) and the recesses carried to a depth of ⅛in. The parting tool should be worked to nearly this depth. The waste material between the V-shaped lines should then be removed with the gouge, the surface is worked smooth with gouge and chisel, and finally the outlines

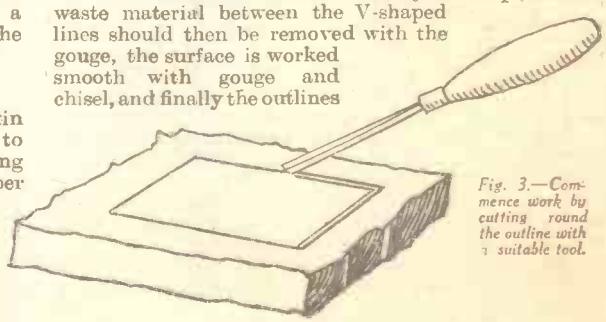


Fig. 3.—Commence work by cutting round the outline with a suitable tool.

are cut in perfectly square with the chisel to give a good fit for the bottles. The long pen recess is a little more troublesome to cut, as it is hollow in shape (as shown by the section Fig. 4), and the ends are rounded. It will be

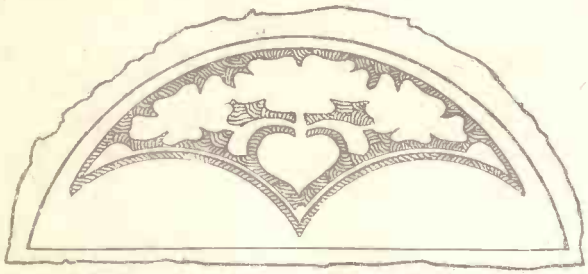


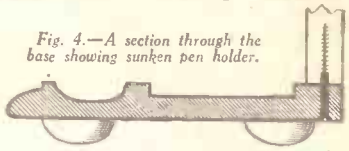
Fig. 5.—The first operation of clearing the ground for the carving.

a good plan to work a few V-lines along the face with the parting chisel first, taking care not to cut them too deep. The gouge must then be used to cut the recess to depth and finally shape it. A moulding is worked around the front and end edges of the base, but if suitable tools are not available it could be worked by hand or simply rounded over with file and glasspaper.

Coming to the carved back, the first operation will be to separate the design from the ground with the parting tool. This being done, the ground is recessed to a depth of from $\frac{1}{8}$in. to $\frac{3}{16}$in. with a small quick gouge. The work will then have the appearance shown at Fig. 5, the design standing up and the ground recessed.

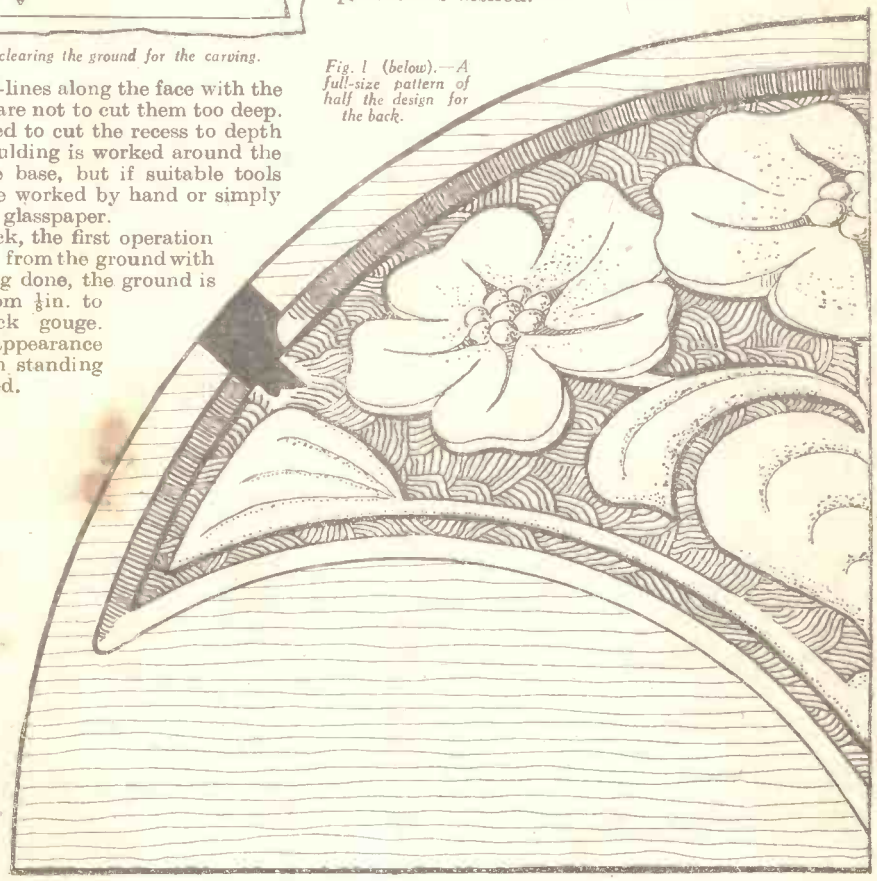
In separating the ground from the design the lines cut with the parting tool should just clear the design, and it will now be necessary carefully to set in these lines quite square with small chisels and gouges. The final operation of modelling the design is the most important. It gives scope for a considerable amount of self-expression, and it is extremely unlikely that any two carvers will get the same effect. The shading in Fig. 1 gives an idea of the result to be aimed at. Gouges and the parting tool should be used, and the work should be left straight from the tools without the use of glasspaper.

Fig. 4.—A section through the base showing sunken pen holder.



In assembling the stand the back is screwed through the base as shown at Fig. 4, and the turned toes glued underneath. Finally the work may be stained and polished as desired.

Fig. 1 (below).—A full-size pattern of half the design for the back.



PICTURESQUE ROOFS.

A CAPITAL method of keeping almost any building cool in the summer and warm in the winter is to cover the roofs with soil or turfs and allow grass to grow. The method is common, particularly where valuable poultry and other small stock is kept and where pride is taken in neat, pretty surroundings. It may be thought that grass will not grow on such roofs as slates, galvanized iron and earthenware tiles, but it is not so. Grass will grow to a good height and thickly. If it is ever trimmed the work should be done with a hook.

During spells of exceptionally dry weather it will turn brown, but is soon green again when there is more rain. Boards to the height of 6in. are fixed to the edges of the roofs to prevent the soil from slipping off. In time, as the roots of the grass spread through the turf, the boards can be removed. The soil is held together, and to the roofs, by the roots.

SUBSCRIPTION RATES.

Hobbies will be forwarded by post to any reader at the following prepaid rates: Twelve months, 13/-; Six months, 6/6; Three months, 3/3.

Registered for Transmission by Canadian Magazine post.

PUZZLING NAMES OF FOREIGN COUNTRIES

By P. L. Pemberton

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

DO YOU KNOW?

THAT one of the new pictorial stamps of India will show a view of the all-Indian War Memorial Arch at Delhi, which was only unveiled this year?

That only seven copies are known of the Honduras 5c. blue air stamp of 1925 with red surcharge?

That a copy was recently sold for £500?

That a regular air mail service between Manchester and the Isle of Man is to be inaugurated this year?

That the Soviet Government runs a department called the Soviet Philatelic Association?

That the functions of this department are to boost the sale of current and obsolete Russian stamps?

THE unwisdom of our remote ancestors in trying to build that presumptuous skyscraper at Babel is nowhere more vividly illustrated than in a well-filled stamp album. Time has intensified the curse that twisted the tongues of Shem, Ham, and Japhet: in spite of text-books, grammars and correspondence classes, and in spite of the efforts of Esperantists and Volapukites, 99 per cent. of the descendants of Ham can only communicate with the descendants of Japhet through the medium of an interpreter. Thus it has come to pass that the shadow of the tower of Babel has darkened the vision of a certain reader of HOBBIES, who has written to point out that the names of many countries, as presented on their stamps, are in such form that he is often unable to recognise them. I can appreciate the difficulty. It must present itself to all collectors of little experience and scant linguistic ability. How, for instance, is the unlettered beginner to know that Osterreich is the home name for Austria? While Norge, though a little cryptic, might suggest Norway, Sverige does not obviously suggest Sweden. The spelling of Iceland as it appears on the stamps is Island, and many young collectors have been puzzled by it.

Bulgarian stamp with Cyrillic inscription.

Even greater difficulties arise when we are confronted with stamps on which the inscriptions are not only in a foreign language but in a foreign alphabet as well. Fortunately China and Japan do not rely upon their own ideographs and alphabets, but bear the names of those countries quite plainly in English on every stamp; but some of our Indian States proclaim themselves in utterly unintelligible manner by means of such intricate script as Hindustani, Urdu, or other variety of native lingo. Nearer home we encounter similar difficulties, for some of the Slavonic countries, such as Russia, Bulgaria and Serbia, use an alphabet which is almost entirely different from our own. Take Bulgaria: any collector might be pardoned for not being able to recognise its stamps at sight. All the inscriptions are in Cyrillic characters—very similar to the Russian and equally difficult to decipher. The Bulgarians owe the form of their alphabet to the monk Constantine, who, in the ninth century, arrived from Byzantium to spread the Christian faith. This scholarly priest, who changed his name to Cyril, invented the alphabet which still bears his name, using the Greek letters as his groundwork. The Cyrillic alphabet was a great improvement on the old Slav characters which were used in even darker ages, but is no use to my young correspondent and is, indeed, one of those of which he complains.

The initials "C.C.C.P." on a stamp show at once that it belongs to modern Russia. They stand for "Union of Socialist Republics." Before 1923 the State was styled "Russian Socialist Federal Soviet Republic," and this was denoted by five initials beginning with P.C. and ending in C.P. The central initial, which can be seen in the illustration, is a Russian character corresponding to our "F," and stands for "Federal." All stamps inscribed with either of these sets of initials can be put down at once as Russian.

Russian Soviet stamp with initials at right denoting Russian Socialist Federal Soviet Republic.

Some countries inscribe on their stamps their classical or fanciful names. For instance, all Swiss stamps are inscribed Helvetia, the name by which the land was known to the Romans; and those of Greece have the ancient name Hellas in the Greek characters ΕΛΛΑΣ. Others, again, have always been known in England by names totally different from those by which their inhabitants know them. For instance, we call the Netherlands Holland, and the French name is Pays Bas, but the stamps are all inscribed Nederland. Finnish issues are difficult to recognise as they bear the native name Suomi, and the ancient kingdom of Abyssinia decorates its stamp with its old name, Ethiopia, though written in the French form—Ethiopie.

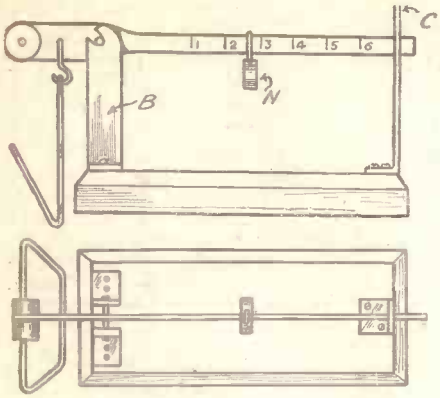


Fig. 1.—A side and plan view of the letter balance.

A LETTER BALANCE MADE FROM ODDS AND ENDS

By "Schemer"

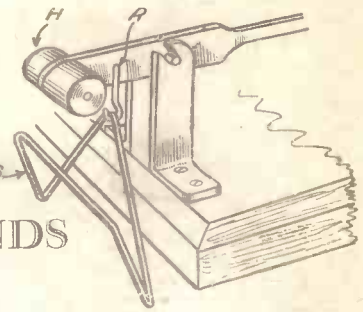


Fig. 5.—How the letter-holder is made.

HERE is another letter balance. First make the base; use a hard wood like oak, size 8in. by 3in. by 1in., plane it so that it measures when finished 8in. by 2¾in. by ⅝in. with a ¼in. chamfer along the top edges

The supports for the beam are now needed. Piece C, shown in Fig. 1 and Fig. 2, pieces B are shown in Fig. 1 and Fig. 5. All these three pieces are 1¾in. high, 1in. at the bottom and ¾in. wide, made of brass. Pieces B have a hole drilled in them 1½in. above the angle bend at the bottom ⅜in. diameter. Make sure that you drill the two pieces together to be certain they are in alignment, file a point at the bottom of the hole to take the knife edge of the fulcrum; to do this use a small three-cornered file. Now file a slant cut to the holes to permit the fulcrum to be placed in position about 45 degrees angle. Piece C is the same size as the other pieces, but it has a slot in it ¾in. long and ¼in. wide instead of a hole, the centre of the slot being 1⅛in. above the angle at the bottom.

Fig. 2.—The support for the beam.

The beam consists of strip mild steel 8¾in. by ¼in. by 1/16in. shaped as at D in Fig. 3. First draw a centre line along strip and square a line across 1¾in. from the end. This will position the centre for the hole that takes the fulcrum V, Fig. 3. Now mark off a distance of 1in. each side the centre of the fulcrum. The one on the right will give the first division mark, that on the left the position for the hole on which the wire holder for the letters is hung. The hole at V is just above the centre line, the others are on the centre line; they are all ⅛in. diameter. The long edges are now marked ⅛in. down as at E, Fig. 3, and then filed to F, Fig. 3, leaving this part of the beam only ¼in. wide. The fulcrum is made of a short piece of steel ⅛in. diameter, making a tight fit. Now correct balance of the beam. This is done by first supporting the beam by a silk thread slipped round the fulcrum and adding weights until a true balance is obtained.

Make a letter holder as at "S" in Fig. 5. This can be made of 1/16in. brass diameter. The counterpoise weights are made of lead cast in plaster of paris, as shown in Fig. 4, K, with a centre hole formed by a wire core pin. The two discs are ¼in. wide, but in the first place cast them ⅜in. thick and file them down to the correct weight. When you have done this, make the moving weight N by casting it to a diameter of ¾in. in plaster of paris as at Fig. 6. The loop is made from a hairpin. When cast, file it to weigh 1oz. Next mark off divisions, slightly notching the top of the beam, borrow some weights, 1, 2 and 4 oz., hang these on the letter holder, and then slide weight N along beam until balance is obtained, and repeat the process until you have secured your positions.

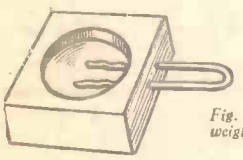


Fig. 6.—The loop for the moving weight is made from a hairpin.

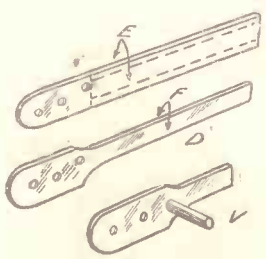


Fig. 3.—Details of the cross beam.

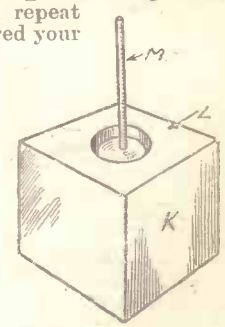


Fig. 4.—The mould for the counterpoise weight.