Hobbies WEEKLY

CONTENTS

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Mechanical Cockerel

GARDEN WINDMILL

THERE are many craftsmen, we feel sure, who will want to make up the novel windmill and its working cockerel shown here, so that they can erect it in the garden.

The whole unit is intended to be placed on top of a post in the garden at a height of between nine and twelve feet. It is pivoted on a steel or iron rod securely let into the top of the post, and freedom of movement must be aimed at so the sails are carried round to face the wind.

The axle, running through the sails is carried back and over the pivot upright to a box-like compartment behind where a disc is located, having a screw and wire attachment. This gives the up-and-down movement necessary to the head of the cockerel on top of the box. A glance at the working diagram, Fig. 1, will make the moving parts clear, and show the relative positions of them.

The Wood Required

The whole thing can be made of wood about ⅜in. thick, except the top cover to the pivot box, and the rear wind vane which might be of sheet metal cut from an ordinary biscuit box or circular container.

First, then, let us start constructing the pivot box, which consists of pieces, A, B, C and D. All these parts are shown in the two diagrams, Figs. 2 and 3. To relieve workers of the task of working out sizes, we have been able to devote page 83 of this issue to scale diagrams from which it should be simple to set out the main parts.

Turning then to this page we see parts, A, B, C, D and F all drawn to scale and easily reproduced full size. Nail the parts together as shown in Fig. 2, except the top, A, member. This cannot be added until after the disc, H, with its fixing pin under, has been put on. A hole must be drilled in the iron rod upright 1½ins. down from the top for the passage of the pin. Upon this rests disc, H, which in turn, takes the weight of the box, etc. On top of disc, H, is placed a metal washer to form a good seating for the revolving unit.

The back of the box, C, must be carefully positioned before fixing, to get the axle holes immediately opposite each other so the axle bar, L, is level and true. We next prepare this axle bar, L, which could be of ¼in. hardwood rod or of metal, 11ins. long. In the latter material it would have to be drilled to take two metal pins to hold washers, I, in place against the pieces, B and C. Fix the disc, K, with its projecting screw pivot to the axle before adding the two short sides, E, the top, F, and the covering front, G.

Piece, G, in any case, will not be finally put on until the connecting wire leading upwards and through the slot in, F, has been fitted and fixed. The two sides, E, are plain oblongs measuring 5ins. by 2ins. The top, F, is shown on the pattern

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sheet. Note here that the slot in this piece must come centrally over pivot pin on, K, so that the wire runs freely through it later on. Washers, I, on the axle, L, must not be more than 1¼ins. in diameter, and the holes through them should be loose on the axle.

After the axle has been run through the holes in, B and C, and the washers, I, added, the curved protecting top shown in Fig. 4 can be

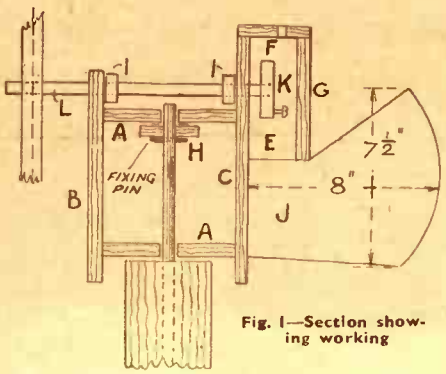


Fig. 1—Section showing working

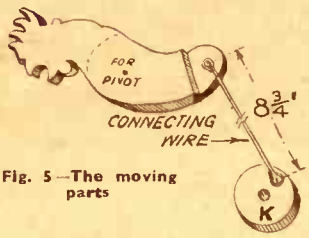
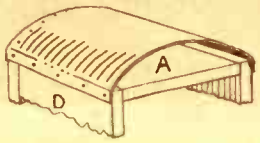


Fig. 5—The moving parts



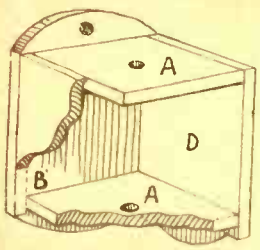


Fig. 2—Box Construction

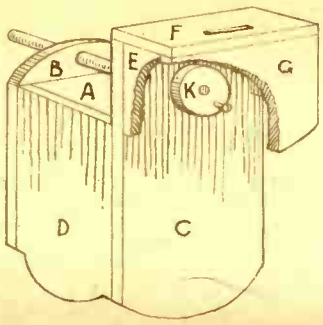


Fig. 3—(right) Action wheel on pivot

added. This top, as stated, should be of thin sheet metal, bent over and nailed to the top of back, B. It comes hard up against the rear of piece, C.

Thus far we have completed the main part of the windmill, and can proceed with the working figure of the cockerel and the mill sails. Overall, the bird measures 12ins. high and 10ins. wide, and ⅜in. wood is again used for this. There is no reason against using sheet iron of sufficient gauge to make a stiff and workable model. A metal model would obviously have a longer working life than one made from wood.

Outline Patterns

On the sheet of patterns will be found the outlines of all the parts of the bird which will require enlarging to full size. On a sheet of paper, therefore, construct an oblong measuring 19ins. by 10ins. and mark across this in both directions lines to make a number of 1in. squares. The simple work of filling in the six outlines can now be done, following the "copy" faithfully to get accuracy of working later on. Transfer each shape to the wood and cut them out in the usual manner with the fretsaw.

There will be wanted two pieces of the body section, P, one with the leg to the solid line shown, and one with the leg shown dotted, as at X. Between the two pieces the tail, S, and the breast piece, T, must be fixed, waterproof glue and some nails being used here. Piece, Q, will next be cut and at the smaller end of this a recess must be formed exactly as shown in the detail, Fig. 5. This recess, it will be seen, makes clearance for the moving action of the connecting wire when it is pivoted to this piece and to the disc at, K, below. Note carefully the position of the pivot hole in, Q, at, V, as this must coincide with the holes in the two body sections, P.

It will be necessary to glasspaper down the piece, Q, so it moves freely between the two sides, P. Put a round-head screw in the recess of piece, Q, at, W, and round it make a loop of stout wire to move freely just as is done round the pivot pin, or screw in K. The whole arrangement is simply explained in the detail, Fig. 5.

Movable Head

To form the head of the bird two additional pieces, as, R, must be cut and glued and nailed on at each side of piece Q. These pieces will be afterwards curved and pared away to get as realistic a head as possible. Then cut two pieces of outline, U, which may be of thinner wood. They are glued and pinned to the head pieces, R only. It will be found that these additional sides cover and hide the joint between the head of the bird and its body, and again when the figure is in motion greater realism is added to the whole neck.

Before the bird is fastened to the top, F, of the rear box, all the working parts should be tested and the inner parts as far as possible painted as a preservative to the wood.

The Sails

The final item to consider will be the sails, and these are comparatively easy to construct and fit to the axle. The four sails are made up in pairs as Fig. 6 shows. Each pair consists of a main back supporting rail with the two vanes or sails attached. The back rail, M, may be 20ins. long and cut from 1in. by ½in. wood.

Some little care must be exercised in marking out the rails and cutting them down to take the vanes. These, of course, lie at a given angle with the rails to catch the wind and so cause the sails to revolve. In the large diagram in Fig. 6 the method of shaping the rails is shown. First, however, cut holes ⅜in. in diameter, exactly in the centre of the rails. Then, measuring ½in. each side of the centre line, run lines at right angles across the width of each rail to get the

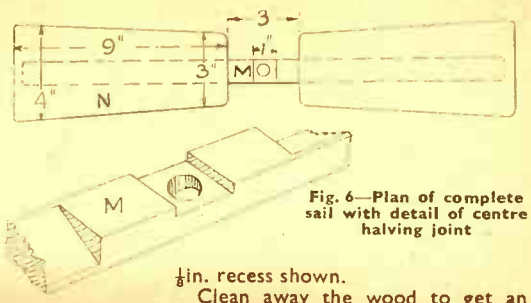


Fig. 6—Plan of complete sail with detail of centre halving joint

⅛in. recess shown.

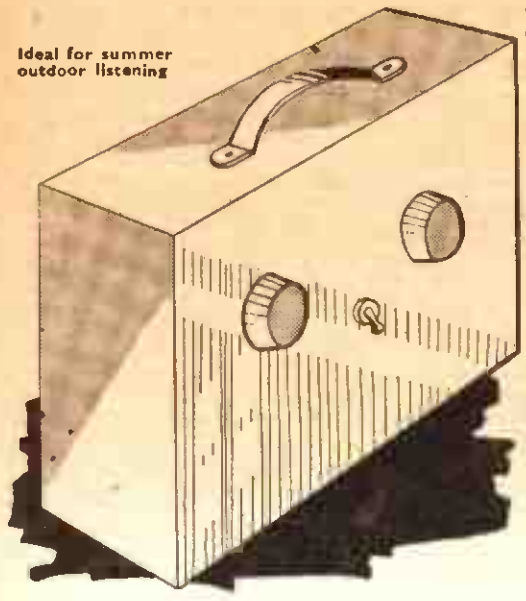
Clean away the wood to get an even surface so both rails joggle with one another and form a rigid joint when together on the axle. At a distance of 1½ins. from the centre of each rail, draw lines across the 1in. width. Then cut down with the fretsaw on an angle as shown, and clean away the wood for the remainder of the length of the rail. It should be observed that the two slopes worked on each of the two rails must be reversed so as to get the "pitch" necessary to catch the wind. This is simply explained in the enlarged detail in Fig. 6.

Now for the sails themselves. These may be of wood or of metal cut to the shape shown in Fig. 6. Fix each sail centrally on the rails and finally paint with two or more coats of paint and enamel. This also applies to the whole of the woodwork. Certain parts could be picked out in some brighter colours if desired.

The rear vane of the mill can be made either of wood or of metal to the measurements shown in Fig. 1. The latter material is, perhaps, more appropriate to the job. Form a right angle bend on the vane where it connects with the back of the box, C, and fasten it with screws. Paint the vane also at the finish.

The radio enthusiast can easily make for himself

A PERSONAL PORTABLE



Ideal for summer outdoor listening

BY using two of the low consumption octal valves now so easily obtainable, a light compact portable receiver can be made which will operate from small cheap batteries. The set described here is made up in this way. It is efficient and provides all the volume normally wanted under average conditions without any external aerial or earth.

No accumulator is required, a 4·5 volt flat lamp battery being used instead. The consumption from this is ·05 amp.—rather less than one-sixth the consumption of an ordinary small torch bulb. For high tension, grid bias batteries can be used and with regular use these have a life of quite six months. Operating costs are, therefore, very low indeed.

The Valveholder Assembly

This can be made up first on a piece of 3-ply 2ins. by 7¾ins. to form the baseboard, an underneath view of which is shown in Fig. 1. Two 1in. diameter holes must be cut for the valveholders, which may be bolted on either the top or bottom of the baseboard. Both keyways should face the same direction, as illustrated.

It is now necessary to connect up, using insulated wire. Where battery leads are required, flex leads about 9ins. long are provided. Plugs and clips are fitted to these for battery connection. Average suitable component values are as follows: R1—2 megohms. R2—40,000 ohms. R3—·5 megohms. C1—·0003 mfd. C2—·01 mfd.

However, any value between 1 and 3 megohms is satisfactory for R1. For R2, resistors of from 25,000 to 50,000 ohms can be used, but the value should not be too high or the voltage reaching the first valve anode will be severely reduced. For R3, values between ·25 and 1 megohm can be used with success. It will also be found that any condenser between about ·001 and ·1 mfd. will function well for C2. C1, however, is more critical, though a ·0002 or ·0005 mfd. component can be used if to hand.

The Frame-Aerial

The detail at Fig. 2 illustrates the frame-aerial required. A wooden frame 8ins. by 6½ins. by 2ins. is made and the baseboard fitted in as shown, leaving just sufficient space for the valves to be inserted.

Drill a small hole near the rear edge of the frame and pass the end of a length of 28 S.W.G. double cotton covered wire through, plugging it firmly with a pointed matchstick. This forms connection "A" (Fig. 2), and is subsequently connected to the fixed plates terminal of the ·0005 mfd. tuning condenser.

Now wind on 22 turns, spacing each turn from its neighbour by approximately the diameter of the wire. Secure the end as before, making point "B". This will be connected to the moving plates terminal of the tuning condenser.

At the same point secure the beginning of a length of 36 S.W.G. wire. Leave a space of about ⅛in. and wind on six turns closely side by side. Anchor the wire to form point "C". This is afterwards connected to the moving plates of the reaction condenser. This condenser may be either ·0003 or ·0005 mfd.

The Case

The container for the whole thing is a case made from 3-ply and its size is such that the frame-aerial can just slip inside (see Fig. 2). As its construction is straightforward, details will not be given. Three holes will be drilled in the front for variable condensers and switch, and a small handle is screwed to the top. Clips or catches can hold the back in place.

A strip of strong paper 2ins. wide and about 3ft. long should be wound completely round the frame-aerial before inserting the latter in the case, so turns are not pushed out of position.

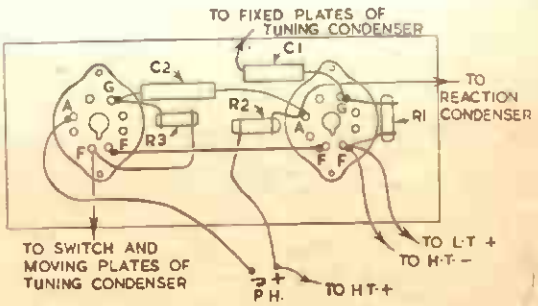


Fig. 1—The wiring under the baseboard

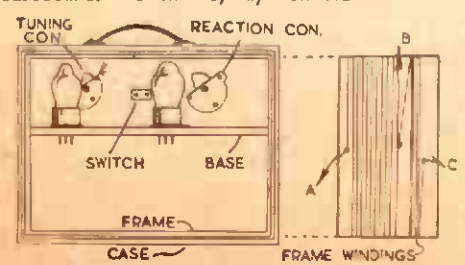


Fig. 2—Front and side view of frame aerial

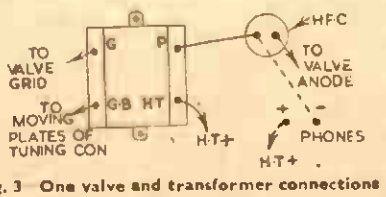


Fig. 3—One valve and transformer connections

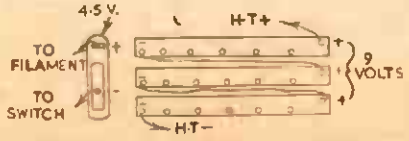


Fig. 4—Details of battery connections

Adjusting the Receiver

The ease with which the valve oscillates depends upon the high tension voltage used. Therefore, the voltage should be decided upon (see notes), so that the small winding on the frame-aerial can be adjusted, if necessary, for a suitable degree of reaction.

The details given are generally suitable for a H.T. voltage of about 30 to 60. Reaction will be weak with lower voltages, and stronger with higher voltages. If reaction is so weak, oscillation cannot be obtained when tuning through a station, slip the turns of the small frame winding closer the other winding. In extreme cases where it is desired to use

very low voltages—say, under 18 volts—a few more turns will require to be added to the smaller winding.

If reaction proves too fierce, move the turns of the small winding a little farther away from the other winding.

If flexible leads 2ins. or 3ins. long are used in wiring up the condensers and switch on the cabinet front, the frame-aerial, with valves, can be drawn back out of the case. Any adjustments to the winding can then be easily made. Once correct, no modification will be necessary, unless the H.T. voltage is radically changed.

Phone terminals may be on the front below the switch or on the baseboard at the back.

The Batteries

The easiest method of obtaining H.T. is to connect three or four 9 volt G.B. batteries in series, making up 27 or 36 volts. This is shown in Fig. 4. It is also possible to buy midget H.T. batteries, or to make a small battery by connecting a number of pen-torch cells in series. Or 4·5 volt flashlamp batteries can be used, depending upon individual preference.

For low tension, a 4·5 volt battery is used, though a 3 volt battery works quite well. The actual voltage of these so-called 4·5 volt batteries is generally 4·2 volts on discharge. Each valve thus receives 2·1 volts and this is satisfactory for the 2 volt filaments.

For exact operation, connect a 10 ohm resistor in series with one battery lead to drop the excessive voltage. In practice, this only makes an extremely small difference, but the user may care to adopt it as a refinement.

Transformer Connections

If a small coupling transformer is to hand, volume will be increased to some extent by its use. It provides additional step-up and avoids the voltage drop present in R2. To use it, omit C1, R2 and R3 and wire the transformer as shown in Fig. 3. With some transformers it is now necessary to add a small high frequency choke or the primary capacity will prevent reaction.

As a One-Valver

As one valve only provides reasonable volume on local stations, the receiver can be built alternatively in this form. Omit R2, R3, C2 and the second valveholder and connect the phones as shown by dotted lines in Fig. 3. No transformer is required, of course. A H.F. choke is then usually necessary for the reason mentioned.

A 4·5 volt battery must not now be used for low tension. Instead, a 3 volt battery with a 20 ohm resistor to dissipate the unrequired volt is best, though a single 1·5 volt cell can be used.

Operational Notes

The tuning control must be operated slowly as tuning is sharp, and the reaction condenser should be adjusted as necessary to keep the receiver in a sensitive condition, as shown by a faint hissing and oscillation when tuning through a station.

As the frame-aerial operates because of the difference in phase of currents induced in the vertical sections, any transmitter lying in line with the axis of the winding cannot be heard. Therefore, the receiver may be turned a little one way or the other to make sure this directional effect is not reducing volume.

Though Fig. 1 shows wiring for the Mazda HL23 valves, other valves can, of course, be used if desired. Batteries go in the bottom vacant space to fit snugly into the available room found there.

From the Editor's Notebook—

ON her just completed maiden voyage to Bombay, the 8,489 ton steamship *Jaljawahar* took a wonderful model of herself, 9½ft. long and valued at over £600. Its construction was by a Glasgow fellow of enthusiasm and grit who three years ago commenced a one-man business as a commercial model maker. His opportunity came when an exhibition of models by the Kilmarnock Model Engineering Society was burned out.

Among the models lost were nine marine models, including a 7½ft. H.M.S. Hood and a miniature battleship Queen Elizabeth, which had been loaned by Lord Howard de Walden. Our enthusiast, an opportunist, wrote that night, offering to make replicas and the Society agreed to let him experiment with the Hood. When they saw the result they gave him a contract worth over £1,000 to replace the entire collection! Just shows what you can do with ability and opportunity, doesn't it?

* * *

THERE'S nothing like making your hobby a family affair and getting everyone interested. Then you will probably be able to carry on in peace, without the usual cry of "When are you going to clear up that work?" or "Don't make a mess on my table!" If you can get your wife or mother to find enthusiasm in making something, or giving a helping hand to what you are doing, then things will be much more plain sailing. Here is proof. Mr. D. Sears of 116 London Rd., Nottingham, has made 600 models in 17 years, and now has the assistance of his wife and son. The former is the sailmaker, whilst son Rodney carves and polishes. So you see—everyone is happy!

* * *

THAT the keeping of fish in a home aquarium can be very fascinating is proved by the collection made by 17-year-old Anthony Torney of Hillingdon, Middlesex. He has built up a fine tropical aquarium of three tanks and over 200 fish which provide a delightful and never-failing source of interest. The tanks are thermostatically controlled for suitable heat and illuminated by strip lighting. Actual running costs are low and feeding is quite simple. At least the hobby is a noiseless one!

* * *

I AM taken to task by A.P.G. of Liverpool for varying statements on the use of fretwood and plywood. In a book of fretwork, he says, plywood is not recommended, yet it is in certain articles. Another is that you do not stain wood to represent other wood—yet in some cases deal, etc., is recommended to be stained. As A.P.G. does not give his address (which is a pity) I cannot write to him direct, but an answer may be of equal interest to other readers. The statement about not using plywood was made originally when all kinds of fretwood—mahogany, beech, walnut, etc.—was readily obtainable at little cost. How different now—when one just has to use whatever one can get. Changed circumstances demand altered usages. If you can gec deal, then it must be stained, of course, to make it of pleasing appearance. In the days when you could buy what you liked and do what you liked (almost impossible to realize now) many things were reasonable, but which now seem ridiculous. We have to use what little we can get and compromise to obtain results. See the answer A.P.G.?

* * *

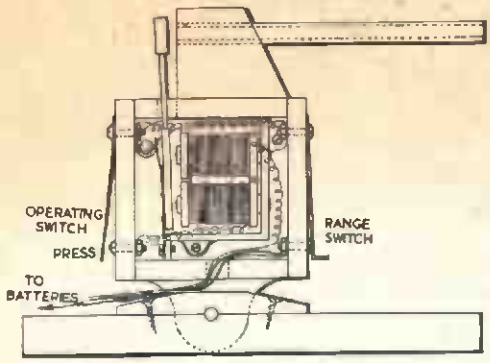
BY the way, will those who write to me—even a "snorter" for criticism!—please add their names and addresses. I have quite a lot of letters in a filing basket where the reader has failed to do so. You may be perfectly wild about something and write me accordingly, but do remember there is usually a very good reason, and it is only fair to me to be able to give you an answer. Meanwhile if you have written and heard nothing—write again. And this time make sure you add your address! You would be suprised to know the number who do not.

The Editor

An ordinary electric bell movement is used for this

ELECTRIC MODEL GUN

THERE is always something fascinating about a model gun, especially if it really shoots shells at a target. The interest is greatly increased, however, with the model described on this page, which is electrically operated, the shell being fired simply by pressing a button. The actual mechanism is made from an ordinary electric bell movement and, with the exception of the gun barrel and switches, the model is made entirely from odd pieces of wood.



Side view with lid removed

Before starting to make the model we must first get an old electric bell, as the size of this will determine the size to make the gun. Try to get one having nice fat coils of wire; this increases the power of the magnet and enables the gun to shoot further.

Take the movement off the baseboard to which it is usually held by two or three screws. If the board is not too thick—say, about ⅜in., you may use it for one side of the gun. Cut this board to the shape shown in Fig. 1, making it just large enough to take the magnets with a space all round for a wood casing of about ¼in. thickness.

Lid and Baseboard

A lid is made to the same thickness and shape as the baseboard. Both baseboard and lid should be cut with a rounded end as shown. A piece of dowel rod fixed through the centre of this end forms a trunnion to enable the gun to be elevated and increase its range of fire.

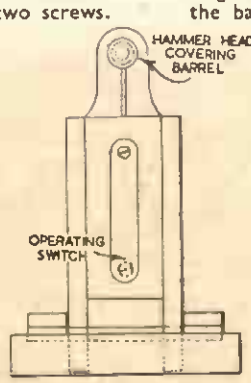
The casing round the magnets is glued firmly to the baseboard. The depth will be determined by the size of your magnets—1in. should be about right. A slot is cut in the top piece of the casing before fixing it in position for the hammer wire to go through. Make it plenty big enough to enable the hammer to swing freely.

There is also a block of wood to cut and fix on to this same piece of casing before finally gluing it in place. This is cut to the shape shown and has a hole bored through it to take the gun barrel, into which it should fit tightly.

A piece of metal tube about 4ins. long and with an inside diameter just large enough to take a match stick easily is required for the barrel. See the inside is smooth, otherwise the range of the "shell" will be decreased.

The hammer wire is sure to be too long, so this must be cut and a small block of wood drilled and slipped on to form a hammer head. A suitable length for the wire is about 1¼ins. When the iron bar of the hammer stem is touching the magnets the hammer head should just touch the breach end of the barrel. The distance that it springs back can be adjusted by the contact-breaker screw.

The entire gun is mounted on a board 6ins. long, 3ins. wide and ½in. thick. Two slots are cut to take the rounded ends of the baseboard and lid of the magnet case. These are about 2ins. long and the width is ⅜in. or whatever the thickness of the case may be. The trunnions are held in position with a block of wood on either side, fixed with two screws. Make a semi-circular sink in both the baseboard and the blocks to fit the dowel rod trunnions. This should be a fairly tight fit so the gun can be elevated and then stays in position.



Back view of model

We are now ready to fix the electrical switching gear and make the necessary connections. On the front of the magnet casing is a two-way switch for altering the power of the gun, which we will call the range switch. When it is on the first stud one battery only is used, but when switched over to the other stud two batteries are in operation, thereby making the magnets exert more pull on the hammer, which gives the match shell more speed.

Firing Switch

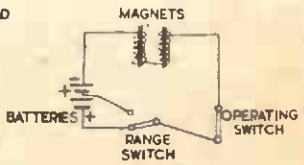
On the opposite side of the casing at the back, is a press switch which closes the circuit and fires the gun—this we will call the operating switch. Both switches are easily made from pieces of springy sheet brass about 2ins. long and ⅜in. wide. A hole is drilled in one end of each to take a round-head screw for fixing them on the case. A bolt on the inside will hold them secure, at the same time making a point on which to connect the wires.

The back switch must be screwed up tight, but the other one should be left free to move from stud to stud. These studs are also round-head screws. If the end of the front switch is turned up at right angles it forms a handle to make switching easier. A small hole about ¼in. is drilled in the bottom of the magnet case for the three wires leading to the battery.

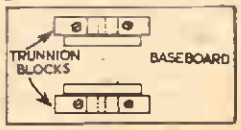
Magnets Connected

The ordinary bell connections are not used, as the contact breaker is out of operation. The two magnets are left connected together, leaving one wire from the other end of each magnet bobbin free. One of these wires is connected to the stud of the operating switch, while the top of the switch goes to the top of the range switch.

A piece of twin flex is connected to the two studs of this range switch and leads through the hole in the casing to the positives of the two batteries; one being fixed to each. One more piece of single flex is needed, connecting the remaining magnet wire to the negative of one of the batteries. The negative of the second battery is joined to the positive of the first.



The wiring circuit



Plan of baseboard

Flash-Lamp Battery

Ordinary 4½ volt flash-lamp batteries will be found just right for the purpose. The base of the gun could be made into a box to house the batteries, thus creating a certain amount of mystery as to how the gun works.

A very pleasing finish is obtained by giving the model a coat of grey paint, with the various lines or panel effects drawn on in Indian ink. Draw on carefully, straight and even in thickness.

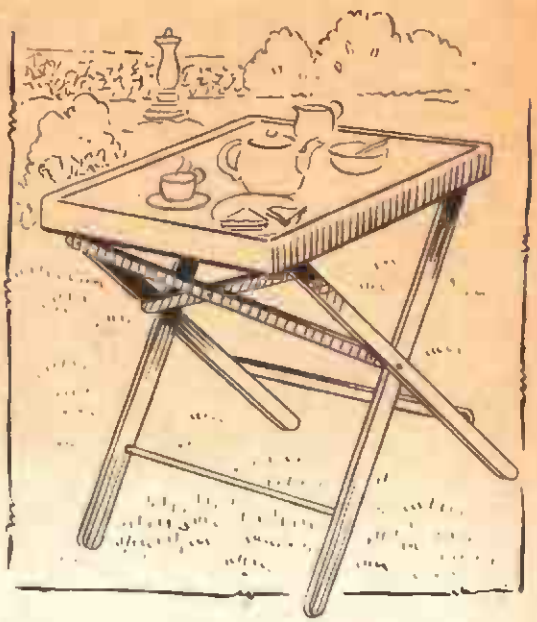
The handyman will find it worth while to make this

GARDEN FOLDING TABLE

WHY not try your hand at making the simple little Garden Table illustrated here? It is an easy job of light carpentry and you will find that the work involved is interesting and the cost quite reasonable. The table folds up neatly when not in use and when stored away will take up surprisingly little room.

Although principally designed for use in the garden, for those who like an afternoon cup of tea in the fresh air, it has its useful place indoors as well. It serves as a card table or even as an extra "place" when your visiting friends cause an overflow from the dining table.

It is usual to make the top of plywood, but owing to the difficulty of supply we suggest that you obtain a sheet of aluminium (about 22 G) costing approx. 9d. per sq. ft. This will serve the purpose well and can be left in its original polished state. It can be kept bright by an occasional rub with metal-polish.



The Table Top

Work could be commenced by making the table top. This, as can be seen by the details in Figs. 1 and 2, is made up of a frame covered with plywood or the sheet metal.

The main frame consists of four strips of 1in. by ¾in. material, two pieces 18ins. and two 16¼ins. long. The shorter pieces are first nailed between the other lengths and then the plywood or metal top, 18ins. square, is attached. If plywood is used it should be ¼in. thick and held in place with glue and fine fret-work nails.

The metal can also be held by small nails if the holes are first punched in the metal, but you will probably find that it is difficult to regulate the size of the holes, with the result that the small nails slip through. An alternative method of fixing is to punch slightly larger holes with a suitable nail filed flat at the end, and use small round-head screws in place of the nails.

When smoothed off with glasspaper and any protruding metal filed flush, the edging strips can be affixed; these being either butt jointed or mitred as preferred. Nails or small round-head iron screws could be used. Note that the top edges are slightly rounded.

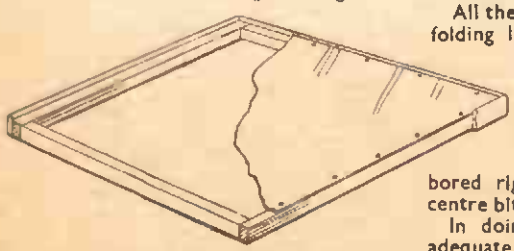


Fig. 1—The table top frame and cover piece

The Folding Legs

All the necessary dimensions of the folding leg frames can be gathered from the elevations shown in Fig. 2. The pieces should be planed, squared, and cut to 32½ins. long. The ¾in. dowel-rail holes, in two of the legs only, could be bored right through or as far as a centre bit would allow.

In doing so remember to make adequate allowance in the length of the dowel rails. With the previous method they should measure exactly 15ins. long, the overall size of the width. The other outside frame will thus be 16¼ins. overall.

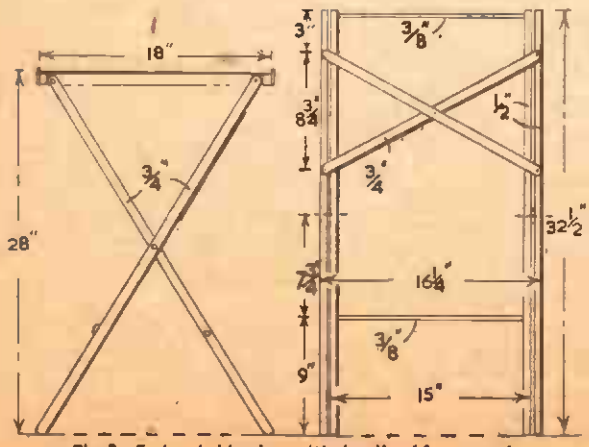


Fig. 2—End and side view with details of framework

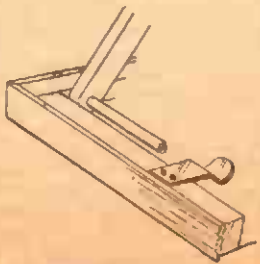


Fig. 3—Underview of clip

Therefore, respecting the latter, attach the lower rail (¾in. by ¼in.) first, using ½in. by 4 round-head screws.

The X shaped rails are cut from ¼in. by ¾in. material, approximately 19ins. long, and affixed with screws. Note that this is on the side opposite to the lower railing. It will not be necessary to halve these together at the centre. They can be bent over and a screw inserted to fix.

Assembling

At this point you will need four 1¼in. round-head screws and a few washers. Suitable holes are drilled in the centre of the outside frames and the screws put through, slipping a couple of thin washers between the frames, and the screws turned home into the inner frame.

The other holes are drilled into the ends of the outside frame, and screws, with washers between the frame and table top, inserted as before.

Making the Clip

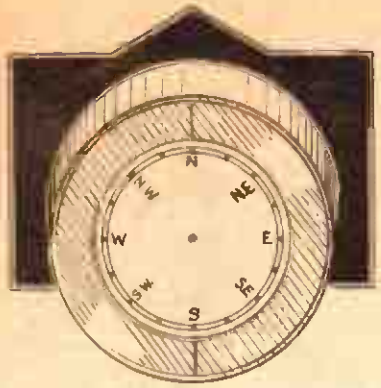
You will see in Fig. 3 that the clip is made from a piece of spring metal, possibly waste from the table top, and measures about 3ins. by 1in. or ¾in. It is bent as shown and screwed under the table so the top dowel rail slips over it as the table is opened.

Finishing

Many may prefer stain and polish as a suitable finish, but a brighter effect is obtained by using a good quick-drying enamel. The various parts should be quite smooth before the first coat is put on.

For hiking, holiday or home you should always carry

A POCKET COMPASS



A COMPASS is by no means a difficult thing to make, and has a hundred uses. One of a size to slip in the pocket is illustrated, and this would be especially suitable to those fond of country rambles, and to Scouts. Materials for making include a few pieces of fretwood, needles, and oddments. Not an expensive set-out.

The dial, A, in Fig. 1 should be set out on a piece of thin glazed card. Strike the diameter given, and from the same centre, strike two inner circles, 1/16in. apart and about ⅛in. in from the outer circle. Divide the inner circles into 16 equal parts and on each part ink in a mark as seen in the general view of the finished article. From each mark point the points of the compass. The N. can be made more prominent if in red ink.

From a second piece of card cut the disc shown at, B. A portion, like an elongated H is then pencilled on the disc and should be cleanly cut out. A sharp chisel would do this better than a penknife. The disc is then stuck to the dial, on its under side, with a little tube glue, and should be kept under pressure until the glue is hard.

Thimble Piece

The dial must be provided with a thimble (of brass) in its centre, which should fit over a pin so it can swing freely. Quite a good thimble can be made from one of those valve sockets used in wireless sets, and sketched at C, in Fig. 2. The socket part should be shortened to ⅜in., then the screwed portion is pressed through the exact centre of the dial, a thin brass washer slipped over and the nut tightened, to firmly fix it in position, as shown at, D.

The dial is made magnetic by four thin steel magnets, fixed in the long sides of the H under the dial. To balance matters, two such magnets are fixed each side. These magnets can be made from stout darning needles, broken to a suitable length. They must be magnetised though, and a simple method of carrying out the job is to stroke them with a bought magnet, preferably of the bar pattern.

Magnet Needed

A suitable magnet can generally be got from an electrical stores, and has many uses besides the present one. Lay the needles flat on a board, and draw the magnet down from end to end, and one way only. Several strokes are usually necessary, when the magnetised needles should be able to pick up a pin or small nail quickly.

Fix the needles in the disc, two each side, with a little tube glue, and leave undisturbed until the glue is quite set. They should be quite secure, but if any doubt occurs about their security, add a little more glue over them, embedding them in it. They should then be well secured against falling out.

A most important point, in fact a vital one here, is to see that all four needles point towards the N. point on the dial, and this can be assured if the disc is glued to the dial, with its N. exactly between the long sides of the H shaped cut out.

Care with Poles

Also, take care the N. poles of all the magnets point one way, and that to the N. on the dial. You can always identify the N. pole of a magnet, as it attracts, while the S. pole repels. The whole dial is shown in plan and side view, E, in Fig. 2, as it should appear at this stage—underside plan view, obviously.

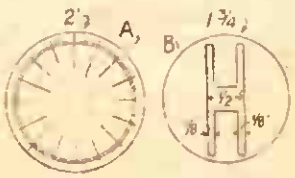


Fig. 1—The dial and second card

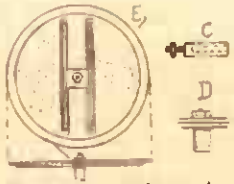


Fig. 2—Fitting the card in place

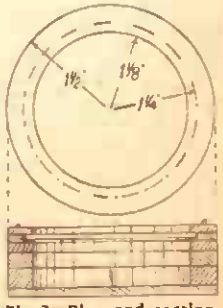


Fig. 3—Plan and section of case

A suitable case for the dial can be quite easily made from some pieces of fretwood of ⅛in. and ¼in. thickness, or such other thickness as can be utilised. A plan and section of the case is shown in Fig. 3, built on the layer principle. Two top layers, one of which forms the rim, can be cut from ⅛in. fretwood, the lower one being ¼in. more all round on the inside than the rim one.

The bottom of the case should also be cut from ⅛in. wood, if possible, to reduce the bulk, and make the compass an easy fit for the pocket. The remainder can be cut from ¼in. or other wood, as many as may be necessary to make a suitable depth for the case, enough for the dial to swing without contacting the glass cover. It will be seen that by making the top ring a little more inside, a rebate is left for the glass cover, mentioned above, to lie in.

In the centre of the bottom of the case drive in a pin or thin nail, allowing it to stick up inside enough for the dial to swing on. See, also, that when the dial is placed on it, there is enough room for the glass cover to go on without touching.

Swing and Tilt

All being satisfactory, the dial should promptly swing towards N., but will probably tilt a little to one side. This tendency to tilt must be corrected by dropping spots of melted sealing wax on the disc underneath, opposite the tilt, until the dial swings quite level.

A piece of glass can be used for a cover, if one can be cut to the correct size. In place of glass, if any difficulty over that arises, celluloid, rhodoid, or other transparent substance can well be employed. Should either not fill the depth of the rebate, a cardboard ring, or two, if necessary, could be laid below the cover, to bring it level with the top of the case.

The rim can then be fixed on top with three or four small brass round-headed screws. The outside of the case should be glasspapered smooth, and the sharp edges nicely rounded off to make the instrument comfortable to handle.

Black Inside

The inside of the case should be stained black, and the outside clear varnished, or stained black as well. Across the case mark a line as direction pointer. The whole instrument is now complete, and should prove a useful accessory at small expense. Take all possible care in making and finishing this article so you may be proud to show it to your friends when it is in use.

A practical combined piece of carpentry is this

CHILD'S PLAYBOX SEAT

HERE is a useful little piece of furniture where there are kiddies. Such an article as this would be just the thing to take out into the garden, as it affords both rest and amusement. A cheap wood such as deal should be finished in paint, but a harder wood, however, would be preferable.

The outstanding features of the design of the seat are simplicity and strength. The design in the sketch shows the seat with the little corner sketch revealing the ample space for the toys.

The seat box consists of two sides, a front and a back of similar size and shape, a seat, the front of which is hinged, and the floor inside. The whole thing is simple in construction as the details show. All the parts, with the exception of the floor are made from ½in. wood, and all the cutting can be done with the fretsaw.

General Construction

In Fig. 1 we give a section through the seat showing the general construction and position of each part. This detail, with the others shown in Fig. 2, should be found sufficient guide for making and cutting up the various pieces of wood.

The sides should first be made and Fig. 2 shows how to mark out. The actual piece of wood measures 12½ins. long by 9ins. at the base and tapering to 8ins. at the top. Measuring down from the top edge 9ins., we set in ½in. on each long edge and so form the recesses for the front and back members.

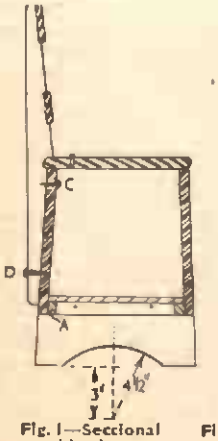


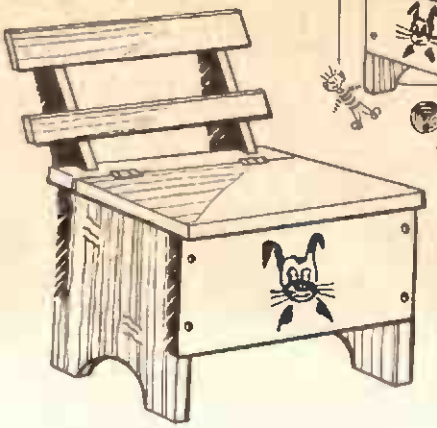
Fig. 1—Sectional side view

Fig. 4—Back supports

Fig. 2 Side shape

Foot Shape

The simple shaping at the foot of each side is got by setting out the radius as in Fig. 1. The centre line shown in this diagram should be continued up the whole length of the board to enable the measurements to be set off on each side to get the correct taper.



The shape of the front and back is given in Fig. 3, with dotted lines drawn across to give the correct position for marking and boring the holes for the nails or screws. These holes should be bored right through and the sides then held in place and the positions of the holes marked on them for ease and accuracy when assembling the parts.

Floor Support

Along the bottom edges of the front and back inside are glued and screwed the floor fillets, A, in Fig. 1. These are about ¾in. by ½in. in section and take the floor which may be of ¼in. plywood or plain wood. A few small screws will fix the floor to the fillets.

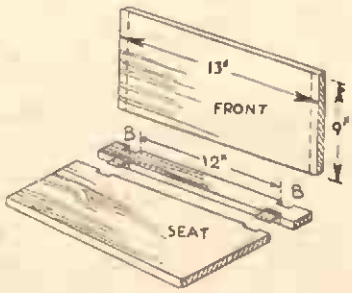
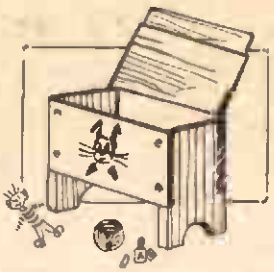


Fig. 3—Seat and front parts

The seat and back rail are cut from one piece, the back rail being set out 1½ins. wide. Shallow recesses 1in. long are cut in for the hinges in both pieces.

In the back rail, too, there must be notches cut as at, B, in Fig. 3, to receive the uprights for the back of the seat. Each notch will be ¾in. deep by ½in. wide.



All outside edges of the seat and its rail should be rounded off slightly and made smooth to handle. The back rail will be secured to the back of the box with 1in. countersunk screws.

The seat back consists of two shaped uprights with two rails attached, the uprights being securely screwed to the back of the box as shown in Fig. 1. The measurements for the uprights are given in Fig. 4, with the recesses shown cut in to receive the two cross rails. The recesses should be ¼in. deep.

Round off the top and the bottom of the uprights, and note in screwing them on that one screw in each is put through from inside the box as at, C, Fig. 1, and one from the outside, as at D. The edges, too, should be glued to give additional strength.

Back Rails

The two back rails must be rounded off on all front and end edges, and screwed to the uprights, the top rail being screwed from the back with two 1in. screws and two ¾in. screws. The lower rail can be screwed from the front with four 1in. screws.

The front of the box could be decorated with a suitable transfer or a simple picture painted on in oil colour, or, again a picture might be cut from a kiddies box and pasted on. Instead of filling the front screw holes with plastic wood or putty, they could be covered with small discs of wood, say, ¼in. thick, glued on before the painting is put in hand.

The inside of the box and the underside of the seat should be stained and varnished or paint could be used as on the rest of the work.

Some hints to remember so you can ensure delightful

ANIMAL PHOTOGRAPHS

SOONER or later every camera owner has the urge to try taking photographs of the family dog or cat. Sometimes these shots turn out to be lucky, but usually they are not too satisfactory. It is the old story of taking a chance and hoping something good will eventuate. We all know about 'beginner's luck' and we all should know that it does not always work as we should like it to.

A little experience and care, however, will prove invaluable. They will save films, time and many disappointments, so let us try to help one another by putting on record a few hints on what not to do and also what should be done.

The Domestic Pets

It is fairly correct to say that dogs and cats are the most popular animals to be photographed. It is also fairly correct to state that quite a large proportion of these snaps are failures if one has to consider them from the 'study' or artistic angle. Such a remark needs an explanation.

A snapshot of Prince asleep on the hearthrug or Puss lying in mother's lap or sitting on father's shoulder is really not a 'study'. It is simply a record of, perhaps, something interesting. But it is commonplace, and might just as easily be a snapshot of the hearthrug or of mother or father.

Now compare such a snap with one of the dog's head, taken as a close-up, with the head nicely raised looking beggingly up at his master as if asking to be taken for a run. But please do not include a portrait of his master, for that is quite immaterial for this study. If you can persuade the dog to look at you just when the exposure is being made, so much the better.

Look for Expression

It is this matter of, let us call it 'concentration of subject' which is of first importance in all animal studies, and unless it is practised your results are never likely to secure a prize in a competition or exhibition. A visit to an exhibition of paintings where there happens to be several animal subjects will prove this point beyond any further doubt.

A dog or horse, and many other animals for that matter, has intelligence and character and it is up to us all when photographing to try to depict this. It may require a good deal of patience on our part, but this will certainly be well repaid when we see the result.

Have you ever noticed the expression on the face of a cat when it is looking out of a window and sees another cat or a dog. Or when it is playing with a ball in the garden. It is all alert and ready to make a spring. That is the moment for the exposure to be made.

Horse Work

Some readers may be living near a riding school and have opportunities of making some very good studies of the horses. Your first approach is to make contact with the owner of the school and ask permission to take the photographs. This is often readily accorded as any owner of a horse likes to feel that other people have an interest in animals. He might even suggest buying one or two prints if you succeed.

A fine bear study from the Zoo

There are one or two hints which should help in your first attempts. The exposures should be outdoors and, of course, fairly fast. At this time of year 1/100th at F8 should be about right—at midday with sun shining and with a fast film. Much depends, however, on the surroundings, for if these happen to be heavy or dark, then longer time is required.

General Animals

A pleasing setting is the half-door of the stable and if the horse can be tempted to come to this and place his head well out of the door you can be sure of a good snap. Two other suggestions are—to take the creature complete with bridle and saddle and with the ostler at his head, and another of just the head and shoulders—not that the shoulders help, except to give the arched neck which in a fine specimen horse is usually the making of a good study.

Rabbits, chickens, pigeons and similar pets are best taken standing on a table, bench or perch so that they can be snapped on a level with the camera. If these smaller creatures are on the ground, then the tendency is to tilt the camera and this means snapping at an awkward angle. Therefore, it is well worth while spending a little time in the necessary preparation of coaxing the pet to stand quiet on a pedestal.

Making animal studies obviously means that sooner or later a visit must be paid to a local or National Zoological Gardens and spending a whole day there. Before going, however, do make an overhaul of the camera. Remove all dust and fragments of any paper or tiny pieces of wood that may have been left over from the last holiday. Very gently test the shutter, iris diaphragm and the focussing scale. Treat the apparatus as you would a watch, for no force is needed.

You will have a busy day, so take a spare spool of film in your pocket. If the day is sunny and the film a fast brand, then you should be able to secure some indoor subjects by using a large stop and giving exposures ranging from 1/25th to 1/100th of a second, according to the time of day and the light in the building.

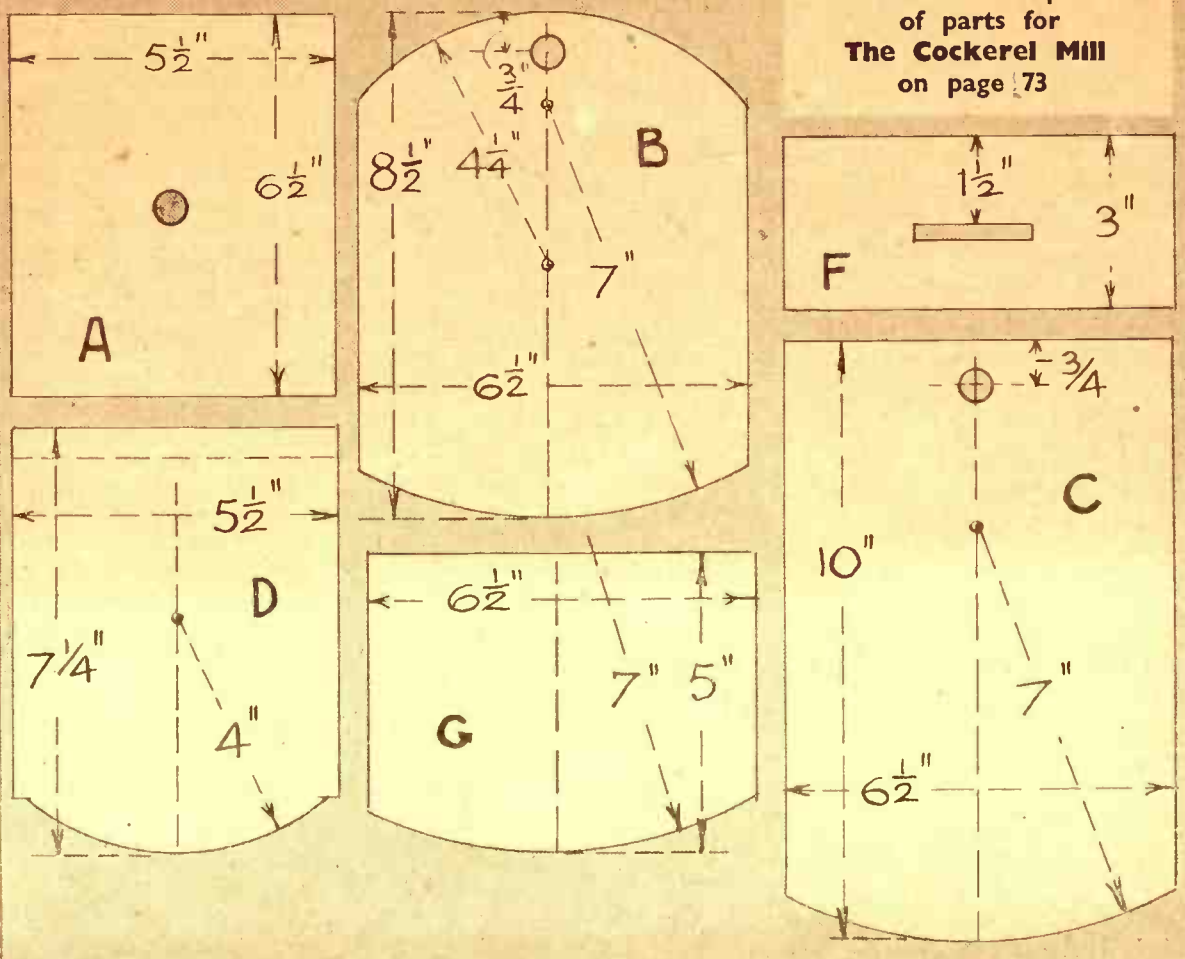
Zoo Subjects

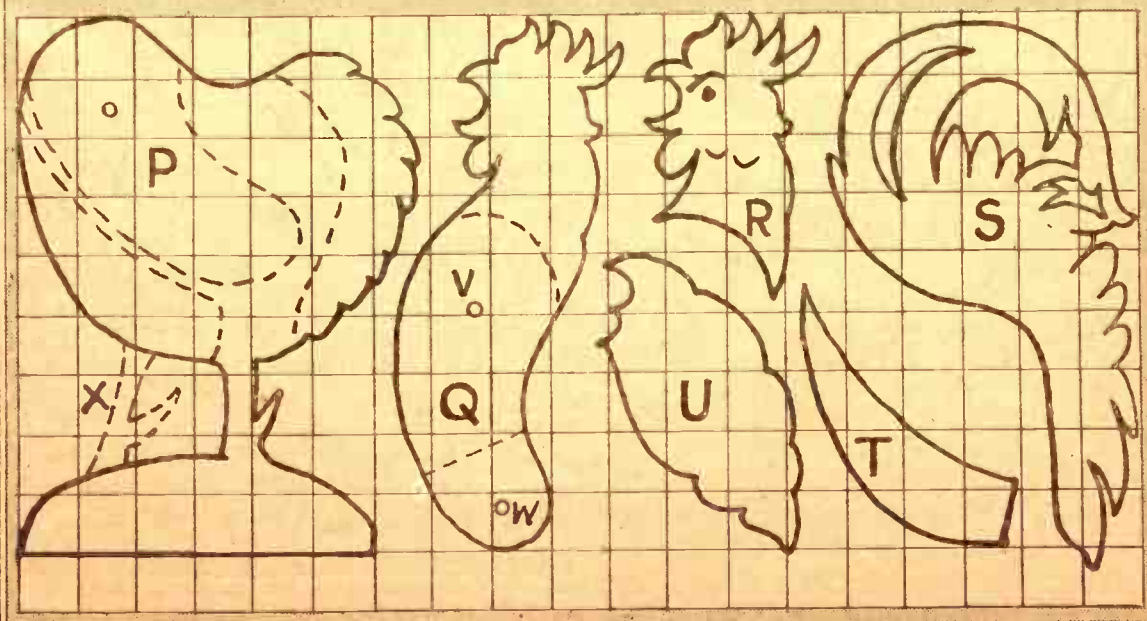
Outdoor subjects are the most popular and usually the difficulty is to get close enough to the cages, because of the number of people already there. The only thing to do is to wait until it is your turn to shift up to a spot near enough to snap the lion or tiger or whatever animal it is you wish to 'shoot'. Do not worry about the bars of the cage being in the result. Everyone knows that wild beasts are kept behind bars and not allowed to walk about the grounds. Wait for the animal to stand up, a lion lying down and with eyes closed is on a par with the cat asleep on the hearthrug. So get life and action into the study.

Elephants, camels and any of the creatures used for giving children rides can be taken quite freely and in various positions. Some keepers are very willing to help if you ask them. The bears in their imitation arctic surroundings are always most interesting but, unfortunately, are at most times receiving quite a lot of attention from visitors. But be patient; have the camera ready and watch your opportunity.

Some animals and also some of the bigger birds that are out-of-doors at the Zoo seem to understand what is required of them when they see a person with a camera standing near them.

Sizes and shapes of parts for **The Cockerel Mill** on page 73





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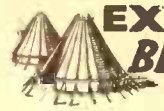

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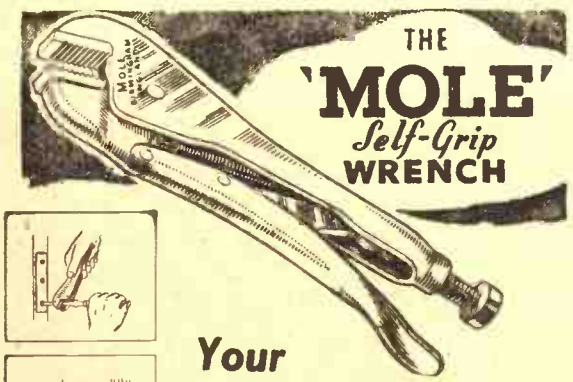

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A multi-purpose tool that will lock on to the work and *stay* there as long as you want it! — how often have you wished for just that? Over half a million are already in use. You can use it as a vice, clamp, wrench and pliers. No Tool kit is complete without it.

Reduced Prices

7" **10/6**

10" **12/6**

Obtainable from your local

IRONMONGER OR TOOL DEALER

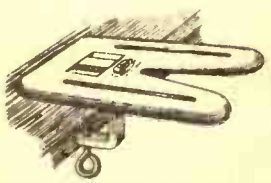
Sole Manufacturer : **H. MOLE & SON LTD., BIRMINGHAM 3**

TOOLS FOR THE HANDYMAN

TOOL CLIP

For holding any handled tool. Spring steel. Holed for hanging.

6½d. Post 2½d.



BENCH STOP

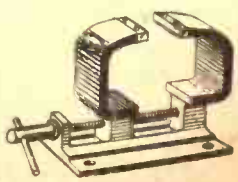
3¼ins. by 2ins. — Spring loaded top. Price **5/6** Post **3d.**

STEEL CUTTING TABLE

With cramp for easy fixing to bench. 6ins. by 4ins., strong and light, **3/-.** Postage **4d.**

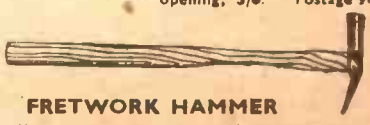
SINGLE HANDED SCREWDRIVER

5ins. long. Ideal for small work, **1/9.** Postage 2½d.



MODEL MAKER'S BENCH VICE

Strong, light and rigid, ¾in. opening, **5/6.** Postage **9d.**



FRETWORK HAMMER

8ins. long. Strong and light for small work. **1/3.** Postage **3d.**

Obtainable from Hobbies Branches in London, Glasgow, Manchester, Birmingham, Leeds, Sheffield, Hull, Southampton and ironmongers everywhere. Orders by post to Hobbies Ltd., Dereham, Norfolk.

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CENTRE LINE

HANDLE GLUED ON HERE

PIECE ON TOP OF LID. HALF ONLY SHOWN. CUT ONE.

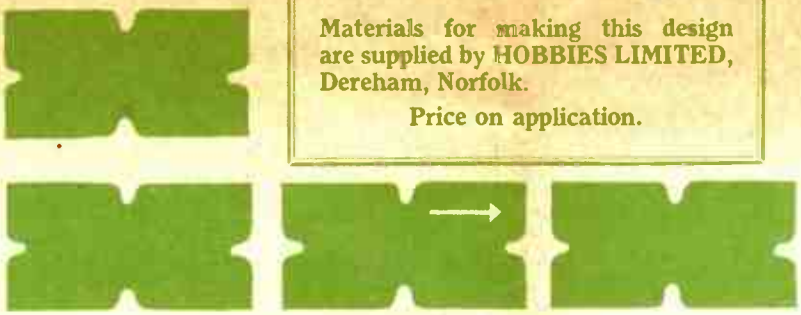
THE ARROWS INDICATE THE DIRECTION OF GRAIN OF WOOD.

PANELS OF WOOD REQUIRED FOR THIS DESIGN

SEVEN G3

Materials for making this design are supplied by HOBBIES LIMITED, Dereham, Norfolk.

Price on application.



CUT ONE OF EACH AND GLUE ON.

CENTRE LINE

NOTE.—This design sheet is only presented free with the current issue of Hobbies and not with back numbers. Further copies may be obtained.

FLOOR. HALF ONLY SHOWN. CUT ONE FULL LENGTH.

CENTRE LINE

TOP FRAME. HALF ONLY SHOWN. CUT ONE. THE PIECE CUT OUT FROM MIDDLE WILL BE GLUED TO UNDERSIDE OF LID.

TOP FRAME

END

END

SCREW

FLOOR

SCREW

SIDE. CUT ONE.

TOP FRAME

ED ON HERE

ON TOP OF
ALF ONLY
CUT ONE.

THE ARROWS INDICATE THE DIRECTION OF GRAIN OF WOOD.

PANELS OF WOOD REQUIRED FOR THIS DESIGN

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GLUED TO UNDERSIDE
OF LID.

TOP FRAME

Hobbies DESIGN

No. 2794
18-5-49

SUPPLEMENT TO HOBBIES No. 2794.

DRESSING TABLE TRINKET BOX

SIZE—8¼ins. LONG, 4ins. WIDE, 4¼ins. HIGH. THE INSIDE OF THE BOX SHOULD BE LINED WITH COLOURED SILK OR COLOURED BOOKBINDERS' CLOTH.

CENTRE LINE

LID.
HALF ONLY SHOWN.
CUT ONE.
DOTTED LINES SHOW
POSITION OF PIECE
ON TOP. THE PIECE
CUT OUT FROM TOP
FRAME TO BE GLUED
ON UNDERSIDE.

SIDE. CUT ONE.

NOTE :—
3/16 in. WOOD
IS USED
THROUGHOUT.

SIDE. CUT ONE.

SIZE—8½ins. LONG, 4ins. WIDE, 4½ins. HIGH. THE INSIDE OF THE BOX SHOULD BE LINED WITH COLOURED SILK OR COLOURED BOOK-BINDERS' CLOTH.

TOP FRAME.
HALF ONLY SHOWN.
CUT ONE. THE PIECE CUT OUT FROM MIDDLE WILL BE GLUED TO UNDERSIDE OF LID.

CENTRE LINE

LID.
HALF ONLY SHOWN.
CUT ONE.
DOTTED LINES SHOW POSITION OF PIECE ON TOP. THE PIECE CUT OUT FROM TOP FRAME TO BE GLUED ON UNDERSIDE.

END

SCREW

NOTE :—
3/16 in. WOOD IS USED THROUGHOUT.

E.

END.
CUT ONE.

THE TOP AND BOTTOM EDGES WILL BE SLIGHTLY CHAMFERED AS SECTION.

END

SCREW

E.

END.
CUT ONE.

PRINTED IN ENGLAND

A TRINKET BOX

THIS piece of work is completed from the full size patterns shown. Where the patterns include any fretted portions, they must be pasted to the wood, but if ordinary plain rectangles, they can be marked out in pencil direct on the board. When the fretted parts are cut, note the dotted lines indicating positions, and mark these off on the reverse side of the wood. They will then be visible after the remains of the paper pattern have been cleaned away with glasspaper.

General Assembly

The parts can all be cut first, and cleaned ready for construction. Check out the parts as you go along so that they may fit correctly when put together. For instance, the two ends must be exactly the same, or the box will not fit true. The construction is quite straightforward. The floor is glued between the two sides so that its under-surface is in line with the side itself. 3/16in. inwards from each end, the actual ends of the box are raised to slope outwards.

Strengthen the floor by adding two screws towards each end as indicated. Flat-headed screws will be used, and the heads covered later with the rectangular decoration glued over.

Note the angle of the ends indicated by the dotted lines on the pattern of the sides. To ensure a comfortable fit between floor and top, these edges have to be planed or filed to a chamfer, the angle of which is shown by the shaded portion on the pattern itself.

Backing the Frets

The ends are glued to the floor and between the sides, and if you wish, can be stiffened with tiny fillet pieces on the interior. If you are proposing to back the fretted portions with fancy paper or linen cloth, add it now before the top is put on. If, too, you are going to stain and polish the box, this also should be done before the lining material is put in.

The top is first cut as a complete rectangle 3⅝ins. wide and 8ins. long. Then an interior piece is cut from it, leaving a rim top only. This rim is slightly rounded at each end, and then the whole thing glued between the sides and to the top of the ends. The piece which came out of this rim top is glued on the underside of the lid piece, and so helps to hold that in place.

Lid

The lid itself is 6½ins. long, 2½ins. wide with rounded edges. Underneath it is glued the piece previously mentioned, and on top is glued the upright handle shape where indicated. The addition of the four decorative rectangular pieces at the side corners is the final piece of work.