

HOBBIES WEEKLY

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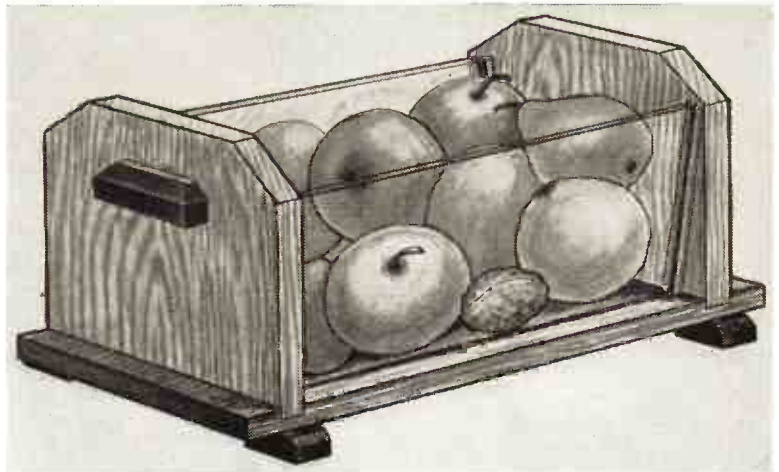
NUMBER 3185

Charming for the Sideboard

THIS fruit or nut trough will be welcome in the home as a decorative feature as well as for its utility. Although quite easy to make, it has a first rate appearance if care is taken in its construction.

Two panels of wood 11ins. by 5ins. by $\frac{1}{2}$ in. (No. ND8) are used for the base and ends. The feet and handles are cut from $\frac{1}{2}$ in. by $\frac{3}{4}$ in. stripwood, while the $\frac{3}{8}$ in. perspex panels slide into pieces of Hobbies No. 48b grooved moulding.

Dimensions are shown in Fig. 1. The panels are cut to size, and the edges



A FRUIT TROUGH

trimmed with a small plane. All edges should be square, of course, but it is particularly important at the lower edges of the ends. The top corners of the ends are now sawn off and trimmed with the plane.

The next operation is the cutting of the joints, details of which are given at Fig. 1. They are marked out carefully across the face of the wood with a pencil and try square, and the lines scored with a knife. In the same way the marks are continued on the edges to a

half way mark which should be set out with a marking gauge. With a tenon saw, a cut is made just inside each line, and the waste wood cut out with a

By H. C. King

chisel. The groove should be of even depth throughout its length.

As it is more difficult to polish the trough after it has been assembled, it

should be done now. As the panels are smoothly planed, the grain filler may be applied straight away. It should be rubbed well in across the grain and left to set.

While the grain filler is drying, the feet and handles can be made. Both are made from $\frac{1}{2}$ in. by $\frac{3}{4}$ in. stripwood as shown at Fig. 2. When completed, they should be stained either black or a very dark colour, and the wood filler rubbed in.

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All correspondence should be addressed to The Editor, Hobbies Weekly, Dereham, Norfolk

For Modellers, Fretworkers
and Home Craftsmen

4½^D

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World Radio History

HOUSEHOLD IMPROVEMENTS

THERE is no doubt that an ordinary handyman can make a vast improvement to the general appearance, comfort and well-being of a home if he has the inclination and the imagination. So we give here a few suggestions to start him on the way.

Such jobs as these described are small and require very little manual labour or head work. They do not take long to do and yet it is just such jobs which added together can make such a vast difference to the amenities of a household. These examples given may stimulate the reader to think out other small but beneficial jobs of a similar type.

Modernising a bed

The first little task is the modernisation of an old-fashioned bed. There will be many homes which possess beds which are still perfectly sound and made of first-class wood — in fact, nothing the least wrong with them except their old-fashioned appearance. With a little

dismantle the bedstead and deal with the head of the bed. Shorten the legs by sawing off a portion that will bring the bed the requisite height from the ground more in keeping with modern ideas. Where the legs cannot be sawn off because the vertical rails reach almost to the ground, then the height can be lowered by lowering the positions of the iron sockets on the posts.

Where the legs are sawn off, use a chisel to bevel off the ends for the sake of appearance.

Next, the post and rails must be sawn off to the required height. 1ft. or 18ins. at the most will do. This should be measured from the iron sockets on the posts and a line drawn across to mark off the positions on the vertical rails.

It must be noted that the posts themselves are sawn off lower than this, in order to allow for the fall of the curved head of the new style. This particular height must be determined from the actual curve of the head board. This should be sawn out of $\frac{1}{4}$ in.

Having cut off the posts and rails to the correct height, it is then necessary to cut back the front and back of each post to give room for the boards to sit in. (The vertical rails are narrower and do not need this treatment.) Fig. 3 will make things clear. Here, the boards are shown about to be fitted to the post.

Naturally, the piece taken out of the post, both back and front, should be the depth of the plywood in order to make things flush.

The boards should be fixed with glue and countersunk screws (the holes being filled up with plastic wood).

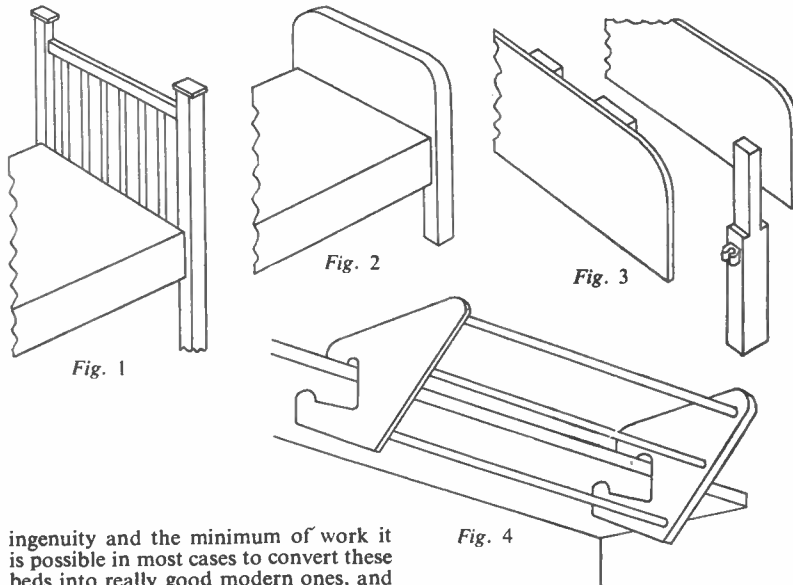
Blocks should be cut from the odd bits of wood sawn off the bed to make spacers holding the head boards apart the correct distance. This is especially necessary midway between the posts. (See Fig. 3.) Glue is sufficient to fix these between the top and bottom edges of the boards.

After the boards and blocks are fixed, a strip of veneer is run round the top edge of the head, right round the curves to the bottom of the legs. Glue is used here, and the outside of the legs should have the varnish or polish glass-papered off first to give the glue a chance to grip.

When dry, the veneer is trimmed off with a sharp knife or razor blade and the whole job glasspapered thoroughly.

The bottom end of the bed is treated similarly, only in this case the boards are made much lower — just high enough to come level with the mattress.

Finally, stain and polish the new woodwork to accord with the existing wood.



ingenuity and the minimum of work it is possible in most cases to convert these beds into really good modern ones, and at very little expense, into the bargain.

Fig. 1 shows a type of bedstead which one comes across everywhere. It has high legs and head posts, which are now out of date, and often as well some kind of decorative piece attached to the top of the post. Fig. 2 shows a modern style bedstead to which this old-fashioned type can be converted. One must admit the worthwhile improvement.

To set about the conversion, first

or $\frac{1}{8}$ in. plywood, its width being the distance from post to post (inclusive) and its height that already fixed upon. Saw the curves with a fretsaw. When the board is finished hold it against the bed head and mark off where the posts should be sawn.

If the expense can be borne, another, similar, plywood head board can be made to cover the back.

Clothes Drying Rack

Another useful project to improve the household is to make a clothes drying rack. The one described is especially useful for those with little space to spare in a small house. In winter time in a small home the drying of clothes after washing day is a real problem. An easy means of providing more hanging space, without having to rig up clothes lines across the kitchen is seen in this easily made rack. Nearly all kitchens have shelves on the walls, and this rack simply perches on the shelf (as shown in Fig. 4) and allows clothes, etc., to be hung on the rails.

The two end pieces can be of $\frac{1}{4}$ in. or $\frac{1}{2}$ in. plywood, sawn to the shape seen in Fig. 5, with holes bored to take the rails. These latter are dowel rod of any useful thickness, say, $\frac{1}{2}$ in. or $\frac{3}{4}$ in. The size of the ends can be made to suit one's convenience — 18ins. wide is handy.

The length can be as much as desired. With very long racks, it is advisable to use a middle piece similar to the ends, to sustain the rails.

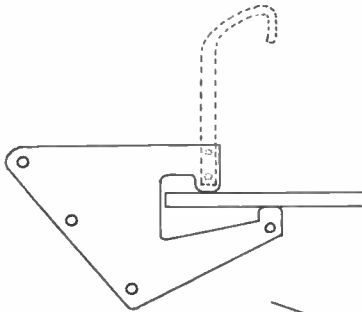


Fig. 5

end plate as shown in the dotted part of Fig. 5. The end of the strip is twisted round and down, as seen, to form a hook which fits on to the picture rail. Two strips will be needed, one to each end.

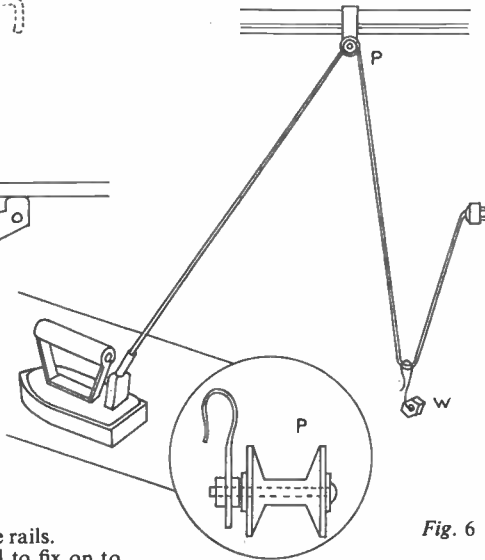


Fig. 6

Glue is sufficient to fix the rails.

The rack can be modified to fix on to picture rails or doors when necessary. Some metal strip about 1in. or 1½ins. wide is all that is necessary. This should be about 9ins. long, of aluminium, and is fixed with screws to the top part of the

Ironing Aid

The final household improvement is a device to help in the ironing of clothes.

Everyone who has ironed knows that the lead from the iron to the plug has a habit of getting in the way of both arm and clothes — which can be extremely annoying. The device shown here obviates all such annoyance by automatically keeping the lead out of the way whatever the movement of the iron.

It consists merely of a pulley (P in Fig. 6 and inset) and a weight (W) hooked on the lead between pulley and plug.

The pulley is easily made from a cotton reel or bobbin of the type seen in the drawing. (The ordinary thick cored bobbin is no good.) This rotates on a bolt (B) which is fixed by two nuts to a piece of aluminium or brass strip (C). A washer on either side of the bobbin is advantageous, and the bobbin should run quite freely.

The strip (C) is shaped to form a hook or clip which will fix tightly to the picture rail.

The weight (W) is made from a piece of wire formed into a hook and weighted with, perhaps, a couple of thick nuts.

The amount of weight required is best ascertained by actual experiment. It should be sufficiently light to allow easy forward movement of the iron, yet heavy enough to pull the flex back round the pulley when the iron moves back.

The pulley should be so placed that the angle of the flex lead from the iron is about 60°.

Continued from page 113

Making a Fruit Trough

When all the filler has thoroughly hardened, the work should be cleaned up with fine glasspaper. The appearance of the work will be spoiled if the edges are rounded off, but this can be avoided by using a glasspaper block for the job. Unless the reader has had considerable experience of french polishing he is strongly advised to use Reward New Process Polish, obtainable from Hobbies Ltd. and branches. This will ensure an excellent finish with ease.

The ends are glued into the grooves in the base and panel pins driven in from the underside. The ends must, of course, be perfectly upright. Any excess glue should be wiped off straight away with a rag wrung out in hot water. The feet are screwed on from underneath, so that they are exactly under the ends and with equal amounts showing at each side of the base. The handles are also screwed on, from the inside, using very fine ¼in. screws, well countersunk into the wood.

Reference to Fig. 1 will show how

each piece of grooved moulding is cut off at an angle at the bottom, so as to fit snugly to the base. They are then cut off at the other end, so that the longest edge is 4¼ins. long. After filling and polishing, the moulding is fixed to the ends by nailing through the base of the grooves.

Perspex Panels

These are cut to size with a fine toothed saw and the edges rubbed on a sheet of glasspaper placed face up on a flat surface. The top edges are rounded

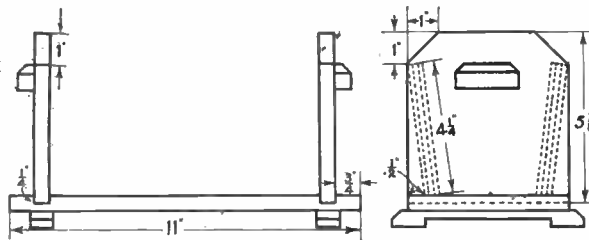


Fig. 1—Front and end view



FOR MUM

and finished off with perspex polish. As an alternative, a glass merchant will supply ⅜in. plate glass cut to size and with the edges finished.

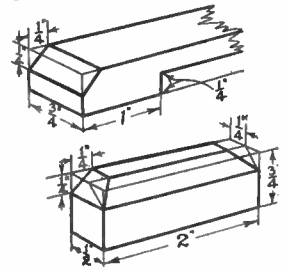
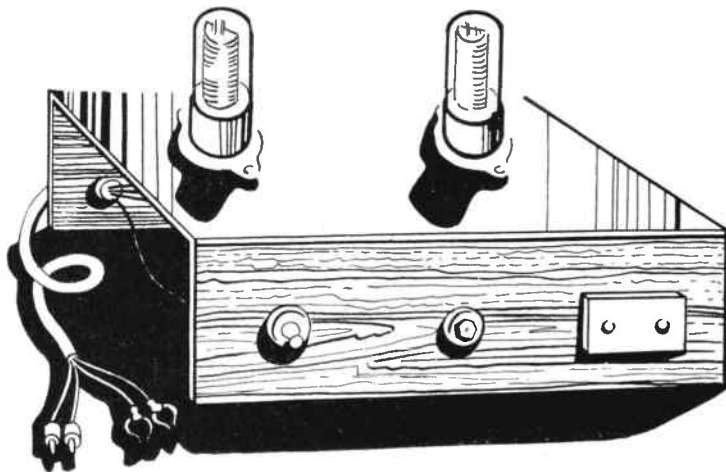


Fig. 2—One end of a foot and a handle

For model control

A TWO-VALVE TRANSMITTER



THE Model Control equipment previously described in *Hobbies Weekly* included a 1-valve transmitter which had ample power to guide a boat upon an average pond. When greater range is required, a 2-valve transmitter will provide this, and that described here will appeal to the home- constructor because of its simplicity. The range obtainable is up to a maximum of half-a-mile to a mile, according to receiver, which makes it useful for distant work or a model plane. It will operate with any 27 mc/s carrier-wave receiver, such as that in the June 27th, 1956 issue, or with the ready-made receivers sold for use in boats and model aircraft. The total cost of construction is much smaller than the cost of a comparable ready-made transmitter.

Self-excited Oscillator

The circuit is shown in Fig. 1, and uses a standard self-excited oscillator, each valve driving the other. This circuit is a very powerful oscillator, and can, in fact, be made to radiate as much power as G.P.O. regulations permit for Model Control. It also works well with any type of power pentode or triode. For 'All-Dry' use, two 3D6 valves are recommended. If an accumulator L.T. supply is preferred, 2-volt power pentodes, in 5-pin holders, will function excellently, and are cheaply obtainable from ex-service valve stockists.

In addition to the two valves and holders, two 50pF mica fixed condensers are wanted, and two 1-watt resistors of approximately 10K (10,000 ohms). An ordinary condenser of about .01 μ F is used for by-pass purposes, with a 30pF air-spaced trimmer for tuning. A switch

is necessary to break the filament circuit, and a 2-way socket (or two terminals on an insulated strip) for the control key connections.

Chassis Construction

The transmitter is most easily built on a metal chassis about 6 $\frac{1}{2}$ ins. long by 4 $\frac{1}{2}$ ins. from back to front, and 2ins. deep. This can be made by taking a piece of 18 SWG aluminium 6 $\frac{1}{2}$ ins. by 8 $\frac{1}{2}$ ins. and bending two 2in. runners at right-angles. If the metal is marked out, then clamped between two stout pieces of wood in a vice, a straight bend all along will be easy.

For the octal holders shown, clearance holes 1 $\frac{1}{4}$ ins. in diameter are necessary. These can be made with a 'washer cutter', or by drilling a ring of small holes, and clearing up with a half-round file. A metal-cutting fretsaw will also deal easily with aluminium. The holes are most conveniently made before bending the metal into chassis form.

A single hole is provided in the rear runner, for the battery leads. Switch and key socket strip are mounted on the front runner, care being taken that no short circuit arises between sockets and chassis. In the centre of the front runner a hole about $\frac{1}{4}$ in. in diameter is drilled, to permit adjustment of the trimmer with an insulated tool, for tuning.

All connections (excluding aerial) are shown in Fig. 2, which should be followed when wiring up. The octal holders have keys, and these must be positioned as indicated. The 3D6 valves have centre-tapped filaments, for 2.8 V or 1.4 V. Here, the filament sections are wired in parallel, for 1.4 V use. This can be obtained from any so-called 1 $\frac{1}{2}$ V dry

battery, of fairly large size, or from a number of dry cells wired in parallel. A very small dry cell is not satisfactory, as the two valves draw nearly $\frac{1}{2}$ amp.

If other valves are to be used, holder wiring will have to be adjusted to suit. Referring to Fig. 2, and counting clockwise from the key-way, socket connections are as follows:—1 and 8, Filament. 2, Anode. 3, Screen Grid. 4 and 5, unused. 6, Control Grid. 7, Filament Centre-Tap. By keeping these connections in mind, other valves can be used.

By F. G. Rayer

All connections should be short and direct, and run approximately as in Fig. 2. The 50pF condensers, 10K resistors, and grid and anode wires are kept well clear of the chassis. Any ordinary connecting wire of at least 20 SWG is suitable, with insulated sleeving where necessary. If the holder tags are clean, and cored solder used with a really hot iron, good joints can be made with very little difficulty.

To begin with, all the connections in Fig. 2 can be made, except for the coil and trimmer.

The Tuning Coil

The diameter and length of this item is not very important, provided it can be tuned to 27 mc/s. If the Frequency Meter described in the June 20th, 1956 issue has been made up, this will soon show if a coil employed is suitable, or needs modification to reach the correct frequency.

If a coil is to be wound, then 7 turns on a 1 $\frac{1}{4}$ in. diameter ribbed former, of 20 SWG wire, and occupying 1 $\frac{1}{2}$ ins. winding length, will be satisfactory. With a $\frac{1}{2}$ in. diameter former, 9 turns will be suitable. In each case a centre tap is soldered on, to go to the .01 μ F fixed condenser. Each end of the coil goes to one valve anode, as in Fig. 2. The trimmer is wired across the whole coil.

If a coil is made with dimensions other than those above, the frequency of output should be tested with the Frequency Meter. If the frequency is too high, even with the trimmer fully closed, then another turn or so is required on the coil. If, however, the frequency is too low, even with the trimmer fully unscrewed, a turn or so needs to be removed. It is illegal to

radiate outside the 27 mc/s Model Control band.

The finished coil is fixed about $\frac{1}{2}$ in. to $\frac{3}{4}$ in. from the chassis (it must not be nearer) by two bolts with bushes, passed through the former and chassis. Very short, stiff leads to the trimmer will support it sufficiently. It must on no account come into contact with the chassis, or this will short the H.T. supply.

Initial Testing

When the transmitter has been completed to agree with Fig. 2, a test for oscillation can be made. To do this, a

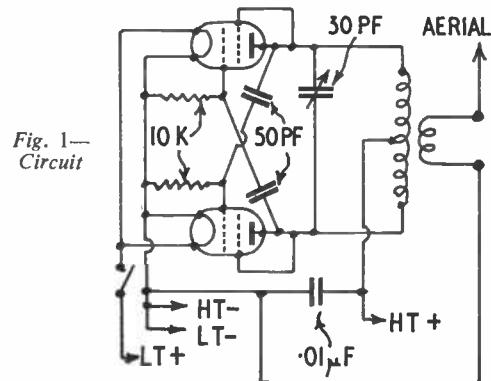


Fig. 1—
Circuit

.04 amp. type of bulb should be soldered to a loop of wire about 1 in. in diameter, and held in line with the tuning coil. The valves are inserted, Key Sockets shorted with a length of wire, batteries connected, and the transmitter switched on. The lamp-loop bulb should now light, its brilliance depending on the distance from it to the coil. (It must not be taken too near, or the bulb may fuse.)

Each valve, and its associated wiring and components, may be tested by removing one valve at a time. The remaining valve should continue to function, as shown by the lamp-loop bulb lighting, though much more weakly. If the bulb does not light, connections should be checked to find the fault.

It is not recommended that an aerial be added until it is found that the transmitter can be tuned into the band. For best results, this should happen with the 30pF trimmer approximately half closed. To adjust the trimmer, a length of ebonite tubing is cut to fit it, and inserted through the hole in the runner.

When setting up and adjusting the model indoors, or up to a range of, perhaps, 10yds. or so, no aerial will be required on the transmitter. Nor should it be used for such short range, as the very powerful signal may result in it being difficult to adjust the receiver to a sensitive condition.

The aerial, when necessary, is energised by a loop of about 2 turns wound round the centre of the coil. Insulated

wire or ordinary 5-amp. flex will be satisfactory for the loop. One end is taken to the H.T. negative line at the valveholder, and the other end to the aerial. For the latter, interlocking rods, of the kind obtainable from ex-service stockists, are convenient, as they will be self-supporting. For most purposes the aerial need only be 3ft. to 4ft. or so long, but it may be increased up to 8ft. 4ins. or so for maximum range. Whatever its length and type, it should be vertical.

When an aerial is added, very slight retuning will be necessary to get the transmitter back into the band. It must

The completed transmitter will slip into a containing case just high enough to clear the valves, and any slight adjustment to the trimmer can be made through the central hole in the front runner at all times.

The H.T. voltage can depend on the purpose in view. For local testing on a small pond, a 60 V or 90 V battery will be ample. A longer range will be achieved with a 120 V battery, and up to 150 V maximum is possible, 60 V and 90 V batteries in series providing this. But only in exceptional cases will more than 120 V be wanted.

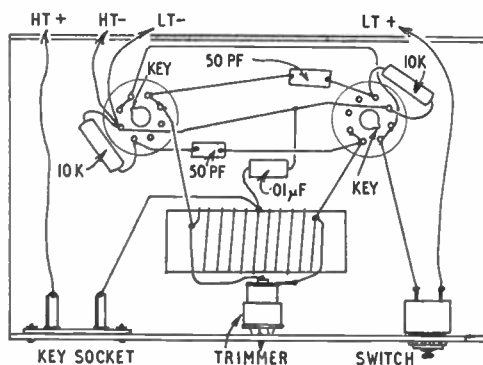


Fig. 2—
Complete
wiring
plan

be remembered that this is essential with any Model Control transmitter, as harmonics of the signal may cause T.V. interference over a radius of several miles, if the equipment is not in the permitted band.

If a key or keying switch with exposed metal parts is used, then it may be wired in the H.T. negative lead from the battery, to avoid any slight shocks which would result from touching the H.T. positive circuit.

Guide for Panel Pins

WHEN using panel or veneer pins to join an overlapping base or lid to a small box, much care is needed to position the pins correctly (Fig. A).

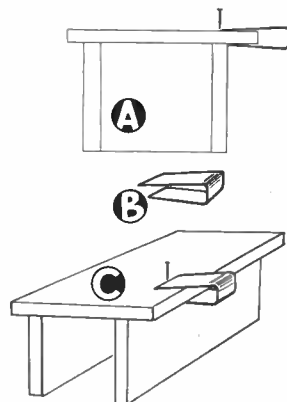
To save spoiling an otherwise neat job this guide, made from a $\frac{1}{4}$ in. wide strip of tin, will give the exact position every time for placing the pins.

Cut the tin about $2\frac{1}{2}$ ins. long and bend as in (Fig. B). For $\frac{1}{4}$ in. wood the bend should be at least $\frac{3}{8}$ in. deep and the top $\frac{1}{4}$ in. longer than the bottom. For $\frac{3}{8}$ in. wood — bend $\frac{1}{2}$ in. deep — top $\frac{1}{2}$ in. longer than bottom, and so on according to the wood used.

Squeeze the open ends of the guide slightly until it grips the wood.

Place the pin at the edge of the guide and squarely hammer home. (Fig. C).

Make sure the shorter end of the guide is firmly pushed up against the underneath panel of wood to be joined.



One or two guides of varying sizes kept in your panel pin box will prove very useful. (S.F.)



ADAPTABLE HANGING SHELVES

Described by W. J. B.

THIS set of shelves is very easy and quick to build and is a most useful accessory about the home.

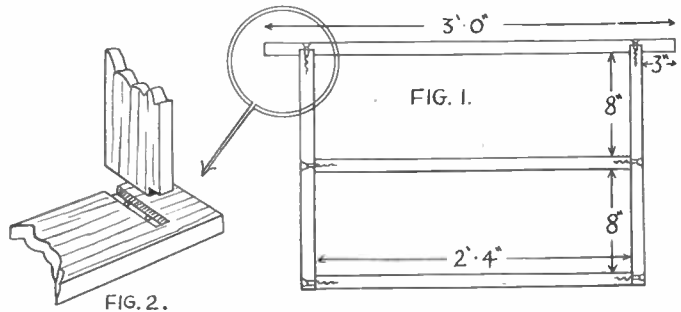
The construction is simple, and is of 1in. thick wood throughout. The two ends are shown in detail in Fig. 3. Cut these out first, not forgetting the small rebate in the top. The long shelf is a piece 7ins. by 36ins.; the stopped groove is 3ins. from each end and is 5½ins. long and ½in. deep. The middle shelf is also 7ins. wide and 28ins. long and the bottom shelf is 4ins. wide and 28ins. long.

Having made these parts, mark out the position of the shelves and drill and countersink holes in the sides to take 2in. brass screws. Glue sections together, and screw, checking carefully with try squares for alignment. Allow to dry and then fill screw holes with stopping and clean up the job with glasspaper. The finish will, of course, be dictated by where the shelves are to be finally situated, but paint, stain and varnish are all suitable. Four mirror plates are screwed on the back for attaching to a wall with Rawlplugs. If a small recess is made in the shelves for each mirror plate, the whole will fit flush against the wall.

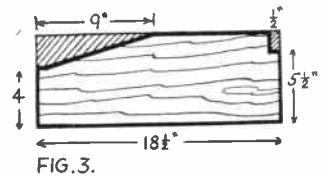
The utility of these shelves will be appreciated, especially in a small house or a flat. Besides holding books and

ornaments, one could be placed in the hallway to hold letters and a telephone. In the kitchen, if one of these fittings is hung on the wall over a small table, it will form a Welsh Dresser, cups being hung on hooks along the middle shelf

The author, by fitting a flap of this nature to the *bottom shelf*, together with two folding elbow stays, made a wall desk for a child's bedroom, and the handyman will be able to think of many more variations based on the original.



and plates being stood at the back of the shelves. In the garage or tool shed it will hold tools, jars of nuts and bolts, instruction books, maps and so on, and, of course, for this purpose second grade wood will serve very well. The top shelf might well be turned into a cupboard by the addition of two simple doors hinged at the ends or by a drop-down flap, hinged at the bottom to the middle shelf and provided with a lock or catch at the top.



Next week's issue will contain a free design for two working toys suitable for the youngster's Christmas stockings.

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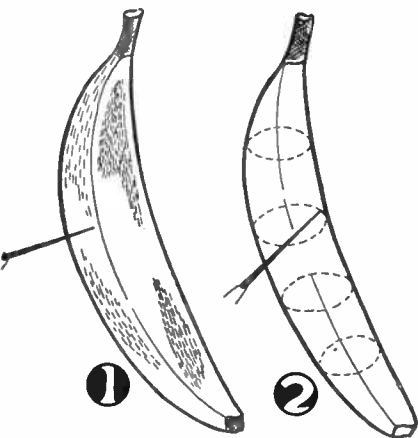
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TWO TRICKS WITH FRUIT



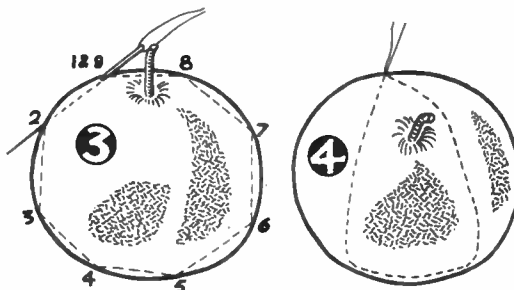
DO you like your bananas sliced. Then you can show your friends how to slice them before they are peeled. Or, perhaps, your apples quartered. Then read on for the secrets.

Taking the banana trick first, we will assume that you have selected a nice specimen and passed round to your friends for inspection to prove that it has not been opened. The fruit is laid flat on the table and an ordinary table knife produced. The knife is poised in the air, then brought swiftly down to the banana, but stopped before it actually touches the skin. You must explain to the audience that it is the speed that does the trick. The operation may be repeated for as many slices you may require, so that when the banana is peeled it is revealed as cleanly cut, yet without damage to the skin.

Some preparation is necessary as you will have guessed, but this is clearly shown in Figs. 1 and 2. Take a fine needle, inserting at some spot on the edge of the fruit where there is some disfigurement. This is shown in Fig. 1. Now push the needle well into the banana so that it reaches the opposite edge, turning the needle round, so that it cuts a slice inside only. You may easily gauge how far to insert the needle by measurement if necessary. In making the other slices take care to insert the needle on one of the other edges. Although a fine needle merely makes a fine puncture in the skin, yet a row of similar holes may make some observant friend suspicious. Moreover, take care not to push the needle right through the fruit. If the needle is inserted in many

different places, down the edges of a banana, usually it is quite impossible to detect preparation.

An apple may be cut in half or in quarters in almost a similar fashion, but being larger and harder, a little more patience is required in preparation. For this trick use a needle threaded with strong thread. The skin of the apple is



pierced at point 1, emerging at point 2, and the thread is pulled through, leaving a few inches of thread hanging from the point of entry. The needle is re-inserted at point 2 and pushed through to point 3, and so on until the full circumference of the apple has been completed, finally emerging with thread at the original point of entry, point 1. You will now be left with two ends of thread, as shown in Fig. 4. The dotted lines in the diagram indicate the path of the needle and thread underneath the skin.

To cut the apple, the two thread ends are gently but firmly pulled. In this way the apple is cut, like cheese at the grocer's. This one operation will cut the apple into halves and repetition is necessary to cut into quarters.

For quartering, the needle must be inserted at another point, and the thread worked round at right angles to the original direction. The points to watch in preparing the apple trick, are not to run the needle along too near to the skin and the pulling through of the thread carefully each time to leave a loose end at the top.

In presenting the apple trick do not offer the fruit to the audience for inspection for the punctures will show on a clear skin. It is better to have two apples. Ask the audience to select one and if the prepared one is selected so much the better. If not, say 'That leaves me with this' and proceed in the same way as before with a table knife. It will be appreciated, too, that it is a good plan to perform the two tricks in this order, demonstrating your powers of slicing fruit before peeling. If you bend or break the stalk of the prepared apple you should have no trouble in identifying it. (S.H.L.)

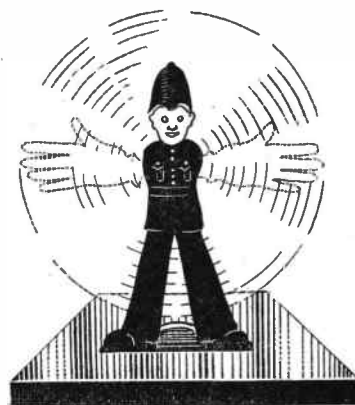
Toy 'Cop' Windmill

THIS amusing toy can be made from odd pieces of wood and put together in an evening. All the parts are shown full size on page 127 and should be traced and transferred to the wood before cutting out with a fretsaw.

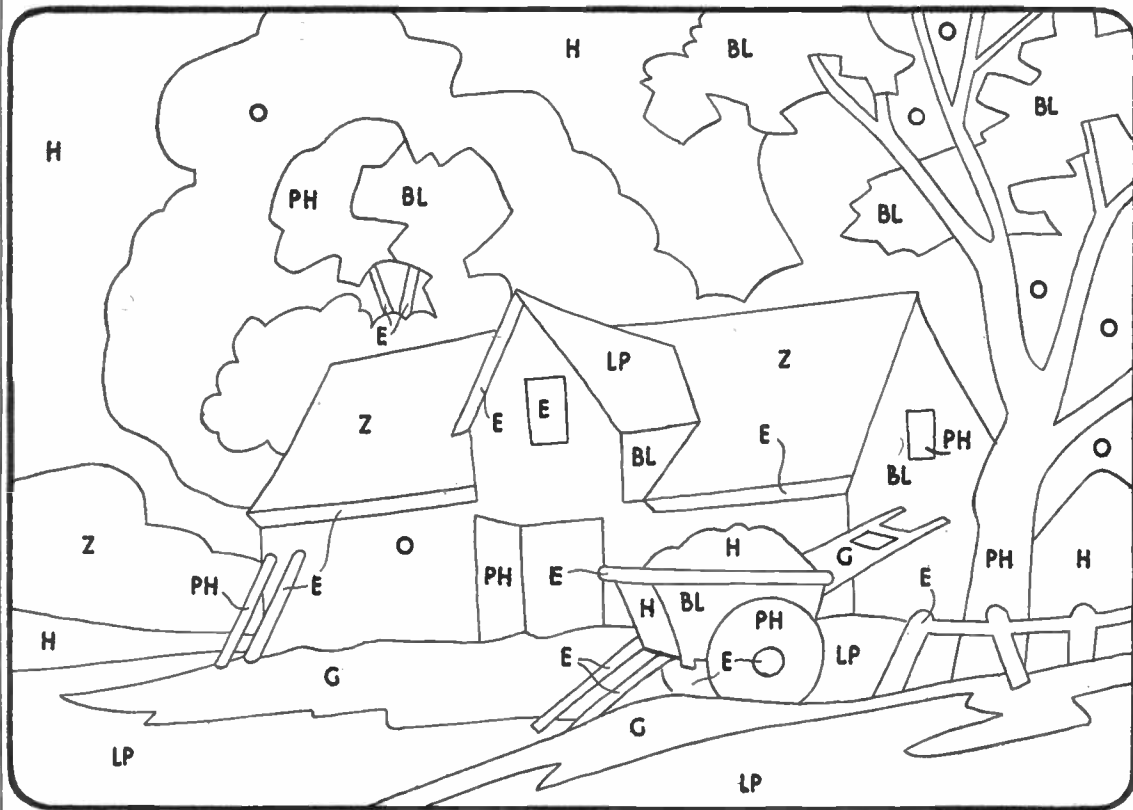
The base is cut from $\frac{1}{2}$ in. wood and has a mortise in the centre as shown. The tenon on the base of the policeman should fit tightly into this mortise.

The 'vanes' of the windmill are formed by the hands which should be adjusted to balance. The correct pitch is obtained by shaping the $\frac{1}{2}$ in. block to which they are glued.

Attach the block to the policeman by means of a long screw driven in at the back. The vanes should revolve freely on the shank of the screw. Do not forget to put washers between the vane and the policeman. They should be thick enough to prevent the hands from fouling as they go round.



Paint the policeman dark blue and the hands white. The base should be bright red or jet black. (M.p.)

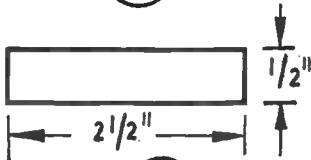


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PIECE **B** CUT ONE 1/4 IN.



PIECES TWO **C** CUT 1/4 IN.

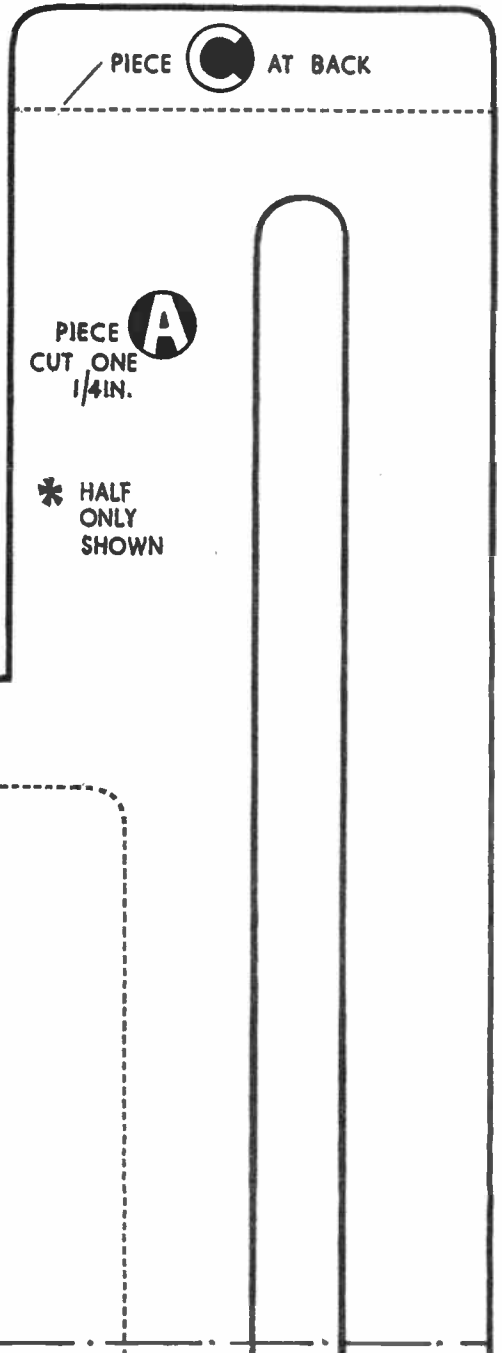
BRACKET EYE NO. 120



TIE RACK



AMOUNT OF WOOD NEEDED. ONE HOBBIES H4



PIECE **B** AT BACK

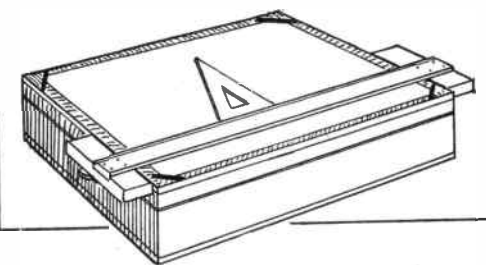
PIECE **A**
CUT ONE
1/4 IN.

* HALF
ONLY
SHOWN

MARQUETRY PICTURE

W. J. Ellson describes

A USEFUL DRAWING AID



SOME aid to drawing seems essential to every craft, and especially woodwork. The reproduction of squared designs, for example, is frequently required, and plans for woodwork articles must be made when prepared ones are not already available. The cost of a drawing board and T-square is rather high nowadays, and the simple device here described, which includes both these implements, can be made without a lot of trouble and at little expense and will be found invaluable to most craftsmen.

CUTTING LIST

Board.	18ins. by 14ins. by $\frac{3}{4}$ in.
Under strips.	(2). 18ins. by 2ins. by $\frac{3}{4}$ in.
Under strips.	(2). 14ins. by 2ins. by $\frac{3}{4}$ in.
Box sides.	(2). 18ins. by 2ins. by $\frac{3}{4}$ in.
Box sides.	(2). 14ins. by 2ins. by $\frac{3}{4}$ in.
Box bottom.	18ins. by 14ins. by $\frac{3}{4}$ in. ply.
Crossbar.	22ins. by 1 $\frac{1}{2}$ ins. by $\frac{3}{4}$ in.
Ends.	(2). 6ins. by 2ins. by $\frac{3}{4}$ in.

METAL PARTS

- 1 pair 1in. solid brass butt-hinges.
- 1 doz. $\frac{3}{4}$ in. screws.
- 8— $\frac{3}{4}$ in. screws, flat heads.
- 2— $\frac{3}{4}$ in. round-headed screws.

The combination is comprised of a drawing board and movable crossbar, which when slid across it, answers the same purpose as the common T-square. A box below the board is included to hold such drawing implements as may be required. A feature of the movable crossbar is the locking arrangement fixing the bar in any position on the board to make manipulation of the set-squares a simpler matter.

Fig. 1 shows a plan view of the board, which also acts as lid to the box underneath. The board is cut from $\frac{3}{4}$ in. plywood to the dimensions given, and is thickened at its edges with strips of $\frac{3}{4}$ in. by 2in. deal beneath. These are, for the sake of neatness, mitred at the corners. It is essential that the side edges of the board form true right angles with the bottom edge, so pencil out accurately with T-square each side, and saw true to

the lines. The thickening strips beneath are cut to lengths required and accurately mitred at their ends. Glue these in position, making sure their outer edges come level with those of the board. After gluing weight down with a heavy box, and when the glue is dry, drive in a few screws into the strips. Clean up with glasspaper all over.

No drawing is given for the box, as this merely needs sides and ends of $\frac{3}{4}$ in. by 2in. wood, glued and nailed together with a bottom of plywood. Its dimensions are the same as those of the board. Fix the board to the box with a pair of 1 $\frac{1}{2}$ in. solid brass butt-hinges in the usual manner. Clean up with glasspaper, and if a finish is desired, a coat or two of varnish (including a stain desired) will serve quite well. As the box is intended to hold such drawing imple-

corner. When dry, place into position on the board, with the end piece pressed hard against it, then with the opposite end piece, also pressed against its side of the board, screw that also to the bar. Test for accuracy. If correctly fitted, the crossbar should slide smoothly up and down the board, with reasonable ease and no side play. A slight further glasspapering of the edges may be found necessary.

The final task is making the locking device. This consists of a wooden cam, fitted to the underside of each end piece of the crossbar, as shown in Fig. 3 (B). The position given, with the edge nearly touching the board is just right, as it will not interfere with the movement of the crossbar, but when the finger moves the cam downwards it should jam against the edge of the board and keep the crossbar in place. Fretwood, $\frac{3}{4}$ in.

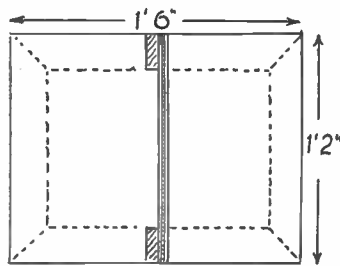


Fig. 1

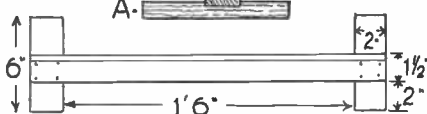


Fig. 2

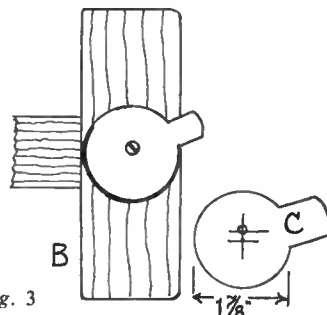
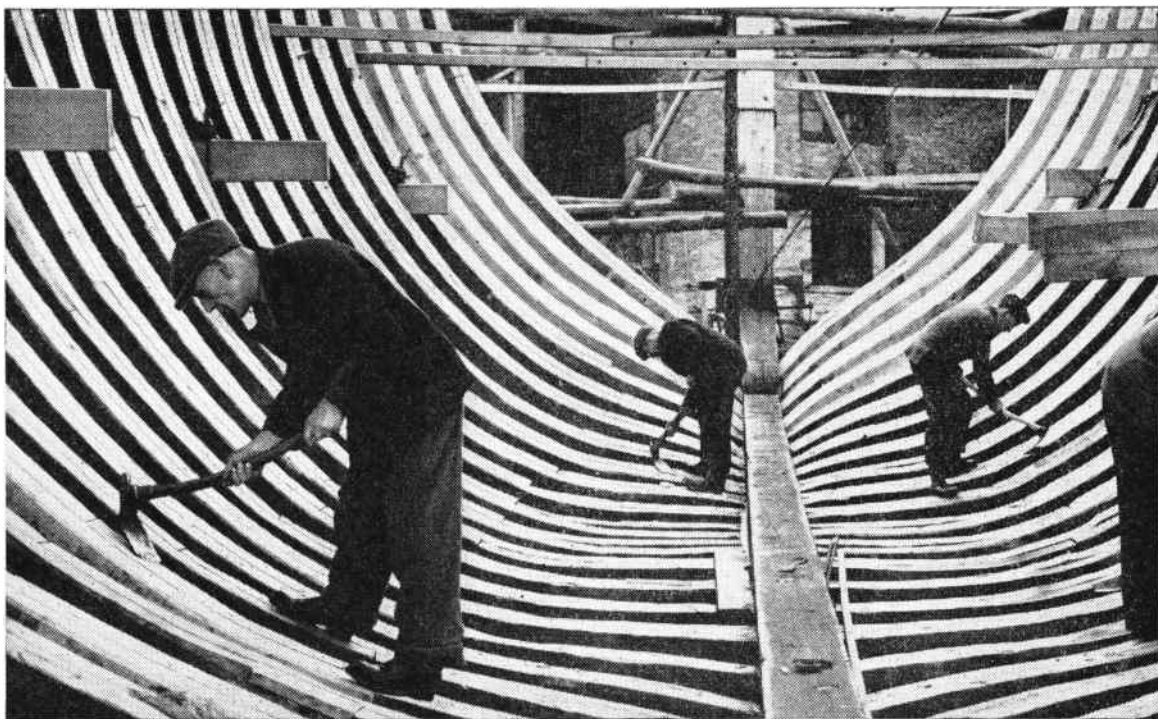


Fig. 3

thick is used for these cams, and to set them out on the wood, first strike a circle of the diameter given at (C), and at $\frac{1}{8}$ in. distance from the centre of the circle, bore a hole for a stout round-headed screw, which will form the pivot on which the cam turns.

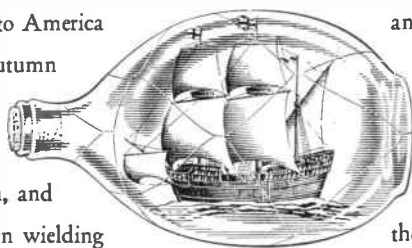
Pencil in the lug and carefully saw out the cams. Glasspaper the edges of these cams. Turn the crossbar over and make a small hole in the end pieces about central. Fig. 3 (B) shows the spot, and the cams should be fitted on with screws, but not too tightly.

For work on the board a pair of set-squares, preferably of celluloid (as being transparent) 30 and 45 degrees respectively, with a celluloid protractor will be really necessary. A compass, suitable for pencil and ink, should be added. Buy one with a lengthening bar, as it is most useful when a large circle is required. With these, many ordinary jobs of drawing can be accomplished with comparative ease. Other implements such as spring bow compass for small circles, and scales, etc., can always be bought when the necessity arises.



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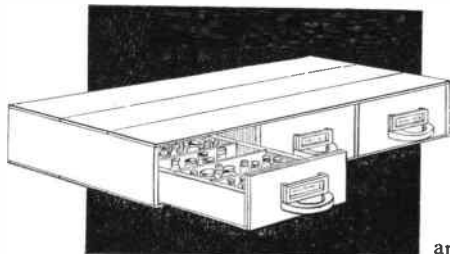
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Laboratory fitments

A CABINET FOR SPECIMENS



HERE comes a time when the home chemist finds difficulty in providing shelf room for the many chemical specimens he has prepared. Only in large laboratories is it possible to continue adding shelves to take these. The answer in the home laboratory is to use cabinet units. The three-drawer cabinet shown above will hold at least one hundred small bottles and specimen tubes. It is strong, convenient in size, can be added to by placing others on top and is cheap to make. Furthermore, bottle dusting and label replacement is eliminated.

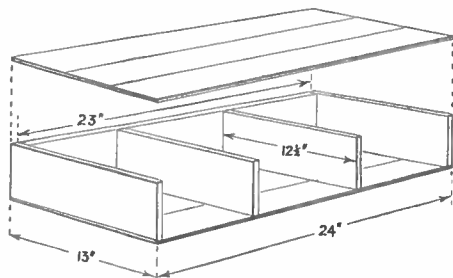


Fig. 1

Apart from one board, onion or orange boxes provide all the wood needed. The timber in these will be found to be approximately $\frac{1}{2}$ in. and $\frac{1}{4}$ in. thick. Slight variations in the thickness should be allowed for in following the dimensions given in the diagrams.

The drawer compartments

Having carefully dismantled the boxes and removed the nails, a start can be made on the drawer compartments (Fig. 1). Six $\frac{1}{2}$ in. boards, each 24 ins. long make up the top and bottom. It will be seen from the diagram that the total width of these boards for both top and bottom must be 13 ins. This is easily achieved by sawing or planing the edge of one board.

The end uprights and two middle partitions are cut from the $\frac{1}{2}$ in. timber and are each $4\frac{1}{2}$ ins. wide. Note that the middle partitions are $\frac{1}{2}$ in. shorter than the end uprights. The item of timber not supplied by the boxes is the 23 in. back board. This is $\frac{1}{2}$ in. thick and $4\frac{1}{2}$ ins. wide. Having cut this, the ends

and back board may be nailed to the bottom.

The middle partitions should be positioned and fixed when the drawers have been made, owing to variations in wood thickness from box to box. The top boards can then be nailed down.

The drawers

An exploded view of the drawer is shown in Fig. 2. First cut the two $12\frac{1}{2}$ in. bottom boards from $\frac{1}{2}$ in. timber. The two $4\frac{1}{2}$ in. by $7\frac{1}{2}$ in. end uprights are also of $\frac{1}{2}$ in. stuff. The sides are $\frac{1}{2}$ in. thick and three equidistant $\frac{1}{2}$ in. deep and wide grooves are tenon-sawed and chiselled in. These grooves are to

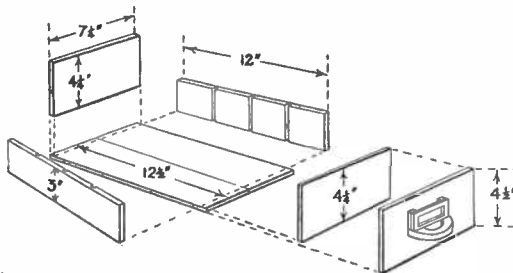


Fig. 2

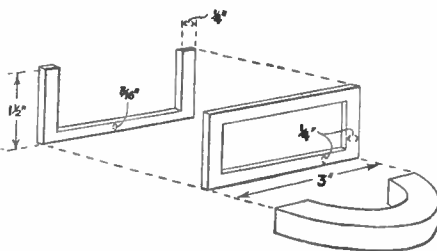


Fig. 3

take the drop-in partitions and serve to classify the chemicals by initial letters or by definite chemical groups, such as salts of one metal. Nail the sides on the bottom boards from below, allowing $\frac{1}{2}$ in. at each end to take the two end uprights. The back end upright may then be nailed in position. This, too, is nailed on to the bottom and also to the sides. The front $4\frac{1}{2}$ in. by $7\frac{1}{2}$ in. end upright is left until the larger end upright (of $\frac{1}{2}$ in. wood) and the handle are made.

The handle is $\frac{1}{2}$ in. thick. Scribe concentric semicircles on the wood of $\frac{1}{2}$ in. and $1\frac{1}{2}$ in. radii, and cut out with a fretsaw. The two front end uprights are now fixed together by inserting small screws from the rear, one at each

corner. Note that the two top edges are flush, the lower edges having a $\frac{1}{2}$ in. step at the back. The latter is to seat the upright neatly and so hide the front edge of the bottom boards. The handle should now be fixed $1\frac{1}{2}$ ins. up from the bottom, using screws inserted from behind the combination front upright.

For the label holder thin scrapwood of about $\frac{1}{2}$ in. thickness is needed. Glue these flush above the handle. As the rear piece has a slightly narrower bottom strip, a lip is formed at the front piece. This prevents the card labels slipping out.

The completed front unit is now nailed in position, that is, to the ends of

the sides and to the bottom from below — only the stepped rear upright being nailed to the bottom from below, as shown in the illustration.

The partitions are cut 3 ins. wide and $6\frac{1}{2}$ ins. long from $\frac{1}{2}$ in. wood. These may be glued in if desired. It is better to have them removable, for should you make more of one group of chemicals than will fit in one compartment, the removal of a partition will keep them all together in a larger compartment. The handle assembly is seen in Fig. 3.

Finish is, of course, optional. Actually the bare wood does not look out of place in the laboratory. If a finish is desired, glasspapering, staining and varnishing are suitable.

The most convenient place to have the cabinet and subsequent units is on the end of a bench, or on a waist-high apparatus cupboard. There will then be no stooping. As the cabinet units are only 5 ins. high, a good number may be stacked upon each other, providing accommodation for several hundred specimens. (L.A.F.)

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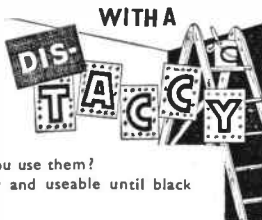
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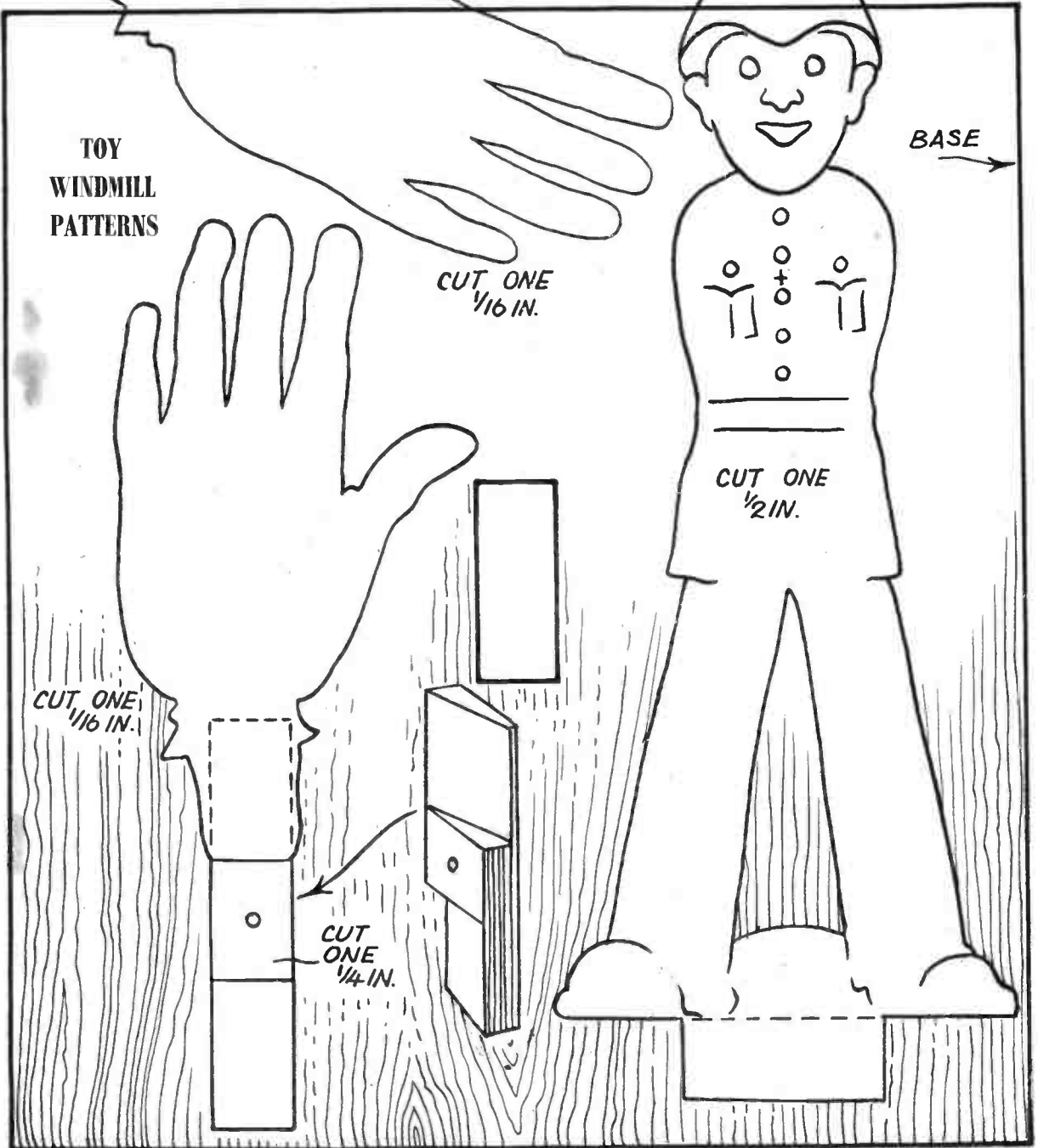
BASE
→

CUT ONE
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CUT ONE
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CUT ONE
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CUT ONE
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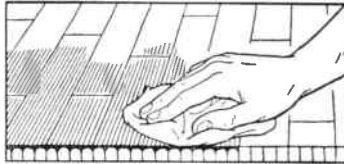
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