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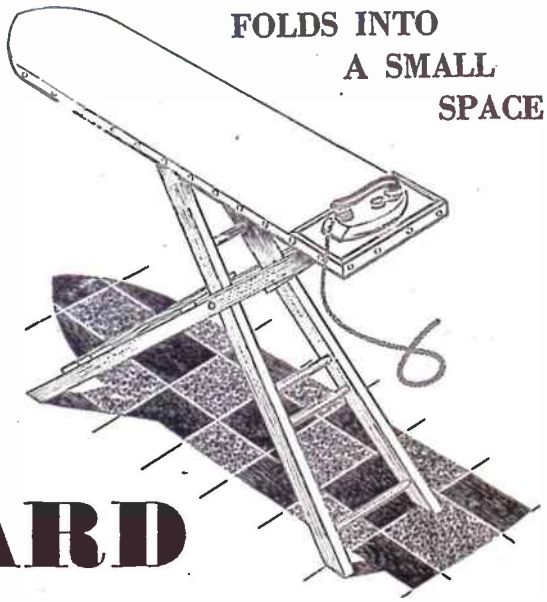
★ *FREE Design inside*

to make this kitchen necessity

STRONG AND STURDY

FOLDS INTO A SMALL SPACE



IRONING BOARD

THIS ironing board has been designed for strength and sturdiness. The housewife will appreciate its substantial ironing area of approximately 3ft. by 1 ft. which enables the larger articles such as sheets etc. to be finished much more quickly, and makes the task much easier.

This is a project which can be undertaken with confidence by anyone — even an amateur woodworker — who has a few standard tools or who can obtain the loan of them for a few hours. He or she should be able to produce a really substantial article which will give years of use. One leg of the board folds into the other, which makes it easily portable and the board can thus be stored in a small space after use. The working height from the ground, of approximately 32ins., gives a most comfortable position for ironing.

From the outset the worker is advised to spend a few minutes going carefully through the diagrams, measurements and joints on the design sheet to get a complete picture of the job in hand. It will be seen that all the necessary measurements are detailed on each section of the work on the design sheet, and cutting of the timber required can be made from these.

The top consists of two 6in. wide boards $\frac{3}{4}$in. thick, which are shaped at one end as shown. These boards are glued together and secured by three battens, the positions of which are shown on the underneath view of the board on the design sheet. Before

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For Modellers, Fretworkers and Home Craftsmen

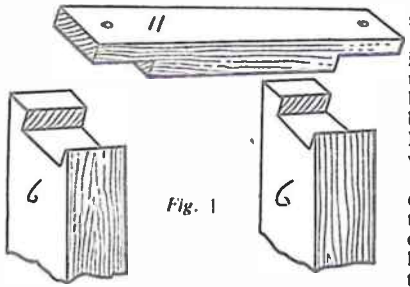
4½D

screwing in position shorten the battens to within ¼in. of the edges of the board and round off or chamfer the ends. Battens are fixed to the board with four screws countersunk into each. Note also the toe piece, which is screwed under the shaped end of the board to give rigidity here. This battening will ensure a sturdy top. The two stops in between which one of the legs is held, can now be glued and screwed in the positions shown.

The making of the hinged leg can now be undertaken. Cut all parts to the measurements shown, and then assemble them temporarily to check alignment. Note that pieces 4 are halved and glued together to ensure a rigid assembly, and it will be seen that piece 5 is fixed on the underside of the leg.

The second leg is made up on a different principle, using round dowelling instead of square sectioned timber for the cross pieces. When cutting the legs, allow spare wood on the ends, across which should be nailed temporarily spare pieces of wood to ensure that the legs are at the correct angle while boring the holes for the dowels. Incidentally, to serve as a guide it should be noted that this leg will fit inside the hinged leg already made up with just a small gap for the washers.

To ensure straight boring, mark the dowel centres on both sides of the leg and it will be seen that the inside marks on the opposite leg will serve as an aiming point.



The top of this leg is constructed as shown in detail on the design sheet, piece 11 being let into the tops of the legs as shown in Fig. 1. This piece 11 fits into the stops under the top when the board is erected.

Pivot the legs together by means of two round-head screws inserted into piece 6. Holes to take the screws should be drilled in pieces 2, making a loose fit, and the screws then will be fixed into pieces 6.

The long leg is now hinged to the batten by means of two skew hinges which allow for the angle of opening.

Trim the legs for steadiness. If there is any 'rocking', open up the board, stand three legs on a table and turn round until the longest leg is overhanging an edge. Mark this off and trim the waste, and the ironing board should now stand level.

A piece of asbestos 11¼ins. by 6¾ins. is required for standing the hot iron upon, and this is held in place by special beading supplied in the kit, which can be obtained separately from Hobbies Ltd. Small screws will hold the beading, which is mitred at the corners.

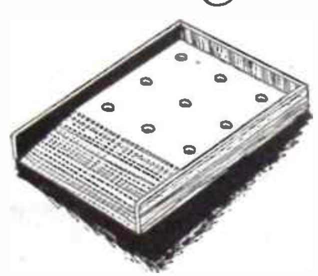
Two thicknesses of old blanket will do admirably for padding the top of the board. This padding is finally covered with a piece of white cotton or linen material. Stretch this tightly over the board and lightly tack round the edges. Glue a length of gimp all round and finish off with ornamental upholsterer's tacks.

The ironing board can be left in its natural state, but two or three coats of brush polish, glasspapered between coats, will give a good finish and facilitate wiping down.

Make it with a Kit

Kit No. 3194 contains all the wood, hinges, etc., necessary for making the Ironing Board. From branches etc., or post free from Hobbies Ltd., Dereham, Norfolk, price 27/6

Exciting Marble Board



THE marble board is not new by any means — it is a very old game but one which remains ever popular and which can provide many hours of entertainment. Marble boards can be any size and the holes can be numbered to suit oneself.

The suggested board can be made in half-an-hour and the cost is negligible. All that is required is a piece of wood 9ins. by 6ins. by ¾in. and a strip of thin plywood or hardboard 2ft. by 1in.

Fig. 1 shows how the piece of wood should be marked out after planing up the edges and ends perfectly rectangular. Three ins. from one end square across the wood and join up this point to the end as shown. Plane off this bevel and then mark out the nine centres as shown. They are based on a square marked ⅞in. inside the outside edges of the remainder of the wood. These centres are best hollowed out with a ½in. drill in a power drill but if this is unavailable, a ½in. twist bit in an ordinary brace will suffice. The depths of each hollow can best be obtained by trial and error until a marble fits snugly.

The piece of wood should now be glasspapered until perfectly smooth. Cut the strip of ply or hardboard to the required lengths. Remove all sharp edges with glasspaper and then nail in position with ⅝in. oval nails.

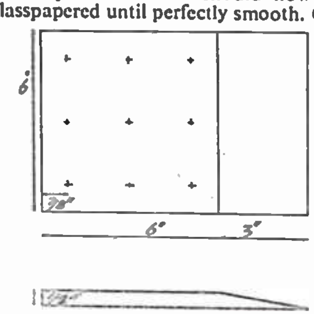


Fig. 1

A coat of paint should now be applied, and when dry, this should be rubbed down smooth. The gloss coat is then applied and when this is dry, the numbers should be marked on each hole. The centre row of holes (running from back to front) are the most difficult to 'capture', so these should receive higher markings.

Many variations of the game are possible and individual preferences can be observed. (K.J.)

Three-valve radiogram

THE RECEIVER CIRCUIT

THE circuit described here is particularly intended for the radiogram cabinet dealt with last week, though it can, of course, be used separately. Only three valves (plus rectifier) are employed, and as a result even a beginner should find the construction perfectly straightforward.

Reasons for choosing this kind of circuit may be mentioned. First, the normal type of mains superhet tends to grow rather complicated. This increases cost and the chance of wiring errors, so that the less experienced constructor may well feel that the whole thing is too difficult. With a superhet circuit, only two stages of audio amplification exist, the other valves not filling any useful purpose when records are played. Two such audio stages are also present in the three-valve circuit here, so record reproduction is just as good.

COMPONENTS FOR RECEIVER

Fixed condensers: ·0002μF, ·0003μF, two of ·01μF, two of ·1μF, 25μF, 25V., 50μF 50V., 2-gang ·0005μF. tuning condenser two of 50pF trimmers, 8 plus 16μF 350V.
Resistors: 300 ohm, 4,000 ohm, 6,000 ohm 50,000 ohm, 150,000 ohm, and ½ megohm all ½-watt, 270 ohm 1-watt. 25,000 ohm potentiometer with switch.
6K7, 6J5 and 6V6 valves. Three octal valveholders.
5-pole, 3-way switch.
Dial, chassis, knobs, aerial, earth and P.U. sockets, etc.
Aerial and detector coils for L.W. and M.W.

The second favourable point lies in the great simplicity of wiring in the remainder of the circuit. There are no intermediate-frequency transformers to trim, and much fewer components, so that good results are easy to obtain.

Against this is the fact that such a simplified circuit does not have the high selectivity and sensitivity of the superhet. Nevertheless, results are adequate for ordinary purposes. With a few feet of wire as aerial, volume from the local stations can be too loud for comfort. With a slightly better indoor aerial, such stations as Radio Luxembourg can be heard at ample volume, unless local conditions are poor. It will thus be seen that the receiver can provide all that many listeners would require.

This is the second article in the series on making a radiogram. Next week F. G. Rayer will describe the power pack.

Construction is further simplified by pair of long-wave coils can be wired to the spare switch contacts. Best results will be had from dust-cored coils, though air-cored coils will be satisfactory.

The 25K control regulates amplification in the first valve, and also the strength of the signal in the coils. As the potentiometer has an internal switch, breaking the mains circuit, it provides On/Off and Volume Control.

A triode is used as a biased detector, this being simple, efficient, and more free from hum than alternatives. As the best bias for radio is not suitable for gram, the 6K resistor is shorted out when the pick-up is in use. A power output stage follows, and will give ample volume.

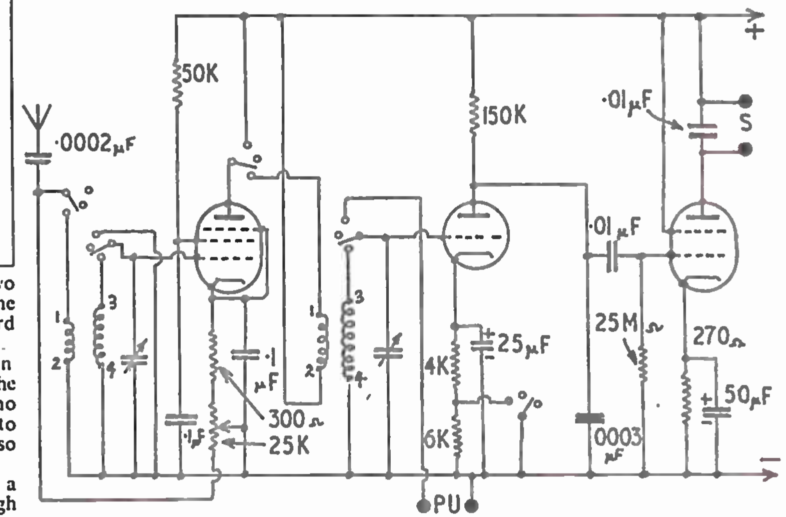


Fig. 1—Receiver circuit

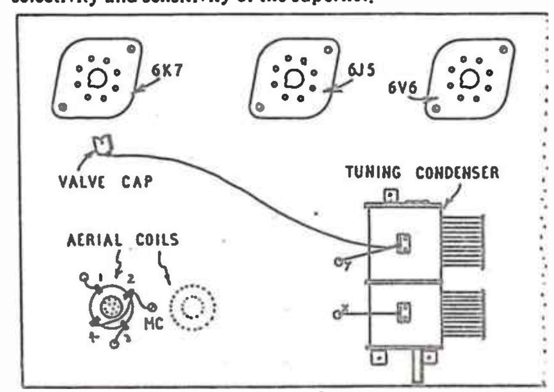


Fig. 2—Top of chassis

The circuit appears in Fig. 1, and a few details need mention. Separate 'unit' coils are used, two for each waveband. These are most efficient and easy to wire in. The set can be used, at first, with medium-wave coils only, and this pair is shown. This helps to avoid any incorrect wiring which might arise if all the coils are used at once. When the set has been found to operate properly, the looking upon the power-supply section as separate. It will be described later, and gives 6·3 V for the valve heaters, with 250 V at 60mA for the H.T. line.

Chassis construction

A metal chassis is required, and a very small one is best avoided as it only makes wiring difficult. It can be made by bending two 2in. runners on a sheet of aluminium 10ins. by 12ins. to form a chassis 6ins. by 12ins. by 2ins. deep, or it can be purchased ready-made at low cost. A modification in size of an inch or so either way will make no difference whatever.

The top view of the chassis, in Fig. 2, only shows the left-hand end and centre, since the power pack will be built on

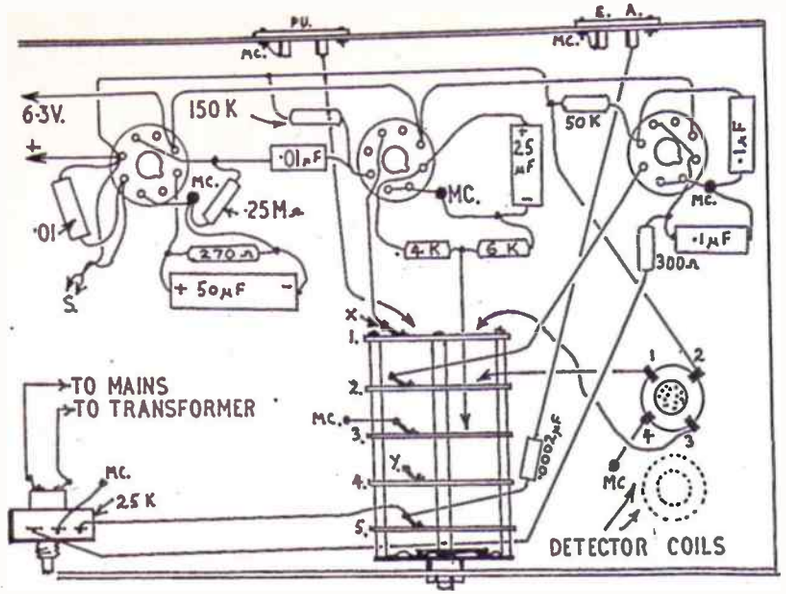


Fig. 3—Receiver wiring plan

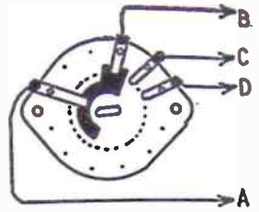


Fig. 4—Switch connections

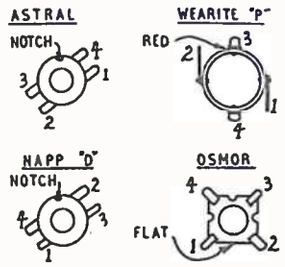


Fig. 5—Coil connections

the right-hand part. The tuning condenser is so placed that its spindle is central along the chassis, and it is bolted here. If it has rubber mounting bushes, a lead must be connected from condenser frame to chassis. The exact position in which the condenser is fitted will depend on the tuning dial, as some require the spindle to be a little back from the front edge of the chassis.

A cord-drive dial is simple and of low cost. Parts for these may easily be purchased. A large drum fits the condenser spindle, and a cord passes down through two holes to a small driving wheel below, fitted on a spindle carrying the control knob. A dial and 'airplane' pointer can then be fitted. Many coil manufacturers can supply ready printed dials, with wavelengths and stations marked, and this will give the completed receiver a professional appearance. For these, it is necessary to use maker's coils and dial, with the tuning condenser they supply or recommend — without this being done, stations will not tune in at the places actually marked.

Holes are cut for the valveholders, as shown in Fig. 2, and must be large enough to clear the tags. A washer-cutter can be used, or one of the screw punch devices available for the purpose. Failing this, a ring of small holes may be drilled, the piece broken out, and the edges filed smooth. It is essential that the key-ways be placed as in Figs. 2 and 3, if the wiring plan is to be followed.

Since it is recommended only the M.W. coils be wired in first, only one coil is fitted above the chassis. (It must not be below chassis, or stray coupling will cause whistles).

Most of the wiring is below the chassis, so that the latter has to be upside-down. This can be done by placing a box or other support under each end of the chassis. Alternatively, the coil and tuning condenser can be left off until all underneath wiring is completed, so that the chassis will lie flat. This avoids possible damage to coil, condenser or drive and dial.

Wiring

Fig. 3 shows parts and leads underneath. Tinned copper wire of about 20 S.W.G., with lengths of insulated sleeving, will prove quickest to use. The wavechange switch and coils can be left until other wiring is finished.

All the points marked 'MC' are wired to the metal chassis. To do this, bolt a tag in place, and solder the lead to this. In three cases the tags are held by bolts securing the valveholders.

The twin-socket strips used for aerial, earth and pick-up project through ¼in. holes in the rear runner of the chassis. The 6·3 V heater wiring is kept right against the chassis, but other leads, etc., are lifted up a little from it. The heater circuit is completed through the chassis itself.

The 25K potentiometer is away towards the other end of the chassis, to balance with the wavechange switch control knob. The switch tags on the potentiometer are subsequently wired to mains and mains transformer primary. This will be clear when the power pack is constructed.

Two leads (X) and (Y) in Fig. 2, pass through holes in the chassis, going to tags (X) and (Y) respectively on the wavechange switch. With the coils shown, (1) and (2) go to primary, and (3) and (4) to secondary. Referring to the aerial coil (Fig. 2), tags (2) and (4) thus go to chassis. Tag (1) goes to aerial (via switch) and tag (3) to 6K7 grid (also via switch.) With the detector coil, (1) goes to 6K7 anode (via switch) and (2) to H.T. positive line. Tag (3) goes to 6J5 grid (again via switch) and tag 4 goes to chassis.

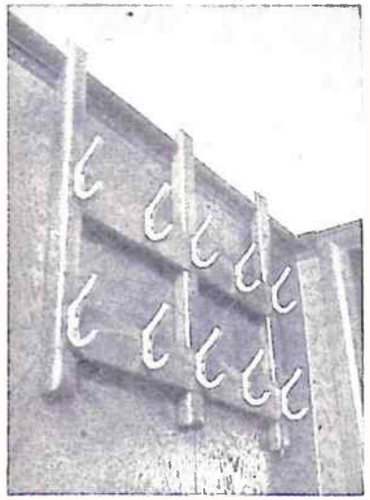
The ·01μF condenser between 6J5 and 6V6 valves is best of the mica type as leakage will spoil results. Polarity only has to be observed with the two large condensers — 25μF and 50μF. With these, negative goes to chassis.

Switch wiring

Though a multi-contact switch sometimes confuses beginners, this need not be so. The switch has five wafers, each as shown in Fig. 4. Referring to Fig. 4, it will be seen that the circuit goes to the switch contact from lead (A). In the diagram, (A) is shown switched to (B). As the switch is turned, the contact moves round. In the second position, (A) is switched to (C). Finally in the last position, (A) is switched to (D).

When wiring, the coils are taken to contacts (B). This gives medium wave reception. For long waves, it is only necessary to wire up the L.W. coils in exactly the same way, but to contacts (C). In the last position, the switch gives pick-up operation.

● **Continued on page 261**



ATTRACTIVE COAT RACK

TAKING up little room and requiring a small amount of timber to make it, this is an economical proposition for a small hall.

Three uprights to the dimensions given on the drawing are cut from good quality hard timber. Their front edges are rounded off and smoothed to a ¼in. radius. Also on the front faces recesses 3ins. wide and ¼in. deep are saw-marked at the positions shown and then they are chiselled neatly.

On the back faces at the top cut-outs are made to suit the picture rail to which the rack will be fitted eventually. If the rack is to be fitted directly to a wall then these cut-outs can, of course, be eliminated. The screw holes alone will suffice.

Two cross members are cut from ¼in. ply (seven ply for preference) and sanded quite smooth. These are screwed into the recesses in the uprights, the latter being positioned as shown. The screws must have countersunk heads. The ends of the cross members are then rounded off flush with the two end uprights.

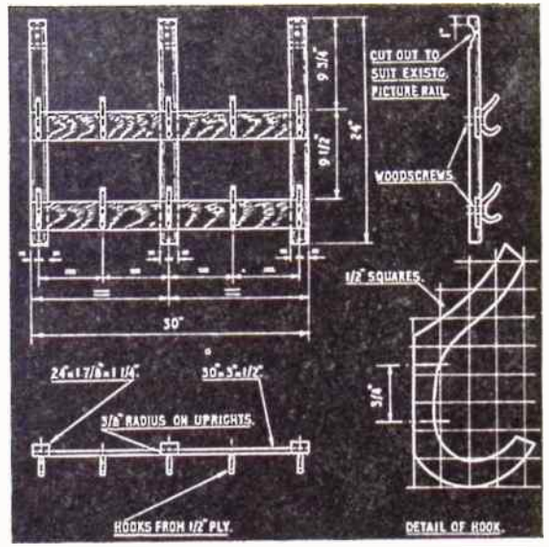
Ten hooks are cut from ¼in. ply. Their shapes can be drawn, with the aid of the drawing, directly on the surface of the ply. A coarse fretsaw is then used for the cutting.

Two countersunk headed screws are used to fix each hook in the positions indicated.

The complete rack can be finished either with a good quality stain or with varnish.

If the rack is to be fitted direct to a wall then it will be necessary to mark the wall through the top screw holes and to drill and plug the wall in the appropriate positions.

(G.A.)



● **Continued from page 260**

Gram. Receiver Circuit

Referring to Figs. (3) and (4), wafer (1) can first be connected. (A) goes to 6J5 and tuning condenser, being the point (X) in Fig. 3. (B) goes to secondary of M.W. detector coil. (C) will go to secondary of L.W. detector coil. (D) goes to pick-up socket.

With wafer (2), (A) goes to 6K7 anode. (B) goes to detector-coil primary, for the M.W. band, and (C) to L.W. coil primary. (D) goes to H.T. positive.

Wafer (3) merely switches out the 6K resistor. (A) goes to chassis, and (D) to junction of 4K and 6K resistors.

Wafer (4) has tag (A), or point (Y) in Fig. 3, taken to tuning condenser and 6K7 valve top cap. Leads (B) and (C) Pass through the chassis to M.W. and L.W. aerial-coil secondaries, and (D) goes to chassis.

Finally, wafer (5), near the front of the set, is wired to aerial and 25K potentiometer circuits. (B) goes to M.W. aerial-coil primary. (C) goes to L.W. aerial-coil primary. (D) is not used.

Having a separate wafer for each position simplifies wiring, but is not essential. However, if a different type of switch is used, care is necessary to keep aerial-coil and detector coil wiring well apart, or whistling may arise towards maximum settings of the volume control.

It is essential to remember that no standard method of locating coil tags exists, so that various makers place their tags in different positions, or use them for connections in a different way. The leaflet provided by the coil maker with the coils, will show the tag connections, and this must be followed when the tags are differently used. This, of course, will not cause any changes to other wiring. Some other coils are shown in Fig. 5, with tags numbered to agree with the wiring instructions given.

The twin leads marked (S) in Fig. 3 are for speaker. A short length of twin flex is suitable. The two leads go to the primary of the speaker matching transformer, which is normally mounted on the loudspeaker frame. The best anode load for the 6V6 is 5,000 ohms. With a 2/3 ohm speaker the transformer will thus require to have a ratio of about 45:1. With a 15 ohm speaker, a ratio of about 18:1 is necessary. Small battery-radio transformers or speakers are not suitable, as they will not be able to handle the power available. A fairly large speaker is thus required, and the transformer primary should be rated to carry at least 50mA.

Expert information

USING A MICROMETER

THE micrometer is an instrument which allows very precise measurements to be made, and as such it has a considerable field of utility in mechanical and engineering work. A typical micrometer is illustrated in Fig. 1, and this will clarify the manner in which the instrument functions, besides showing the various parts.

By F. G. Rayer

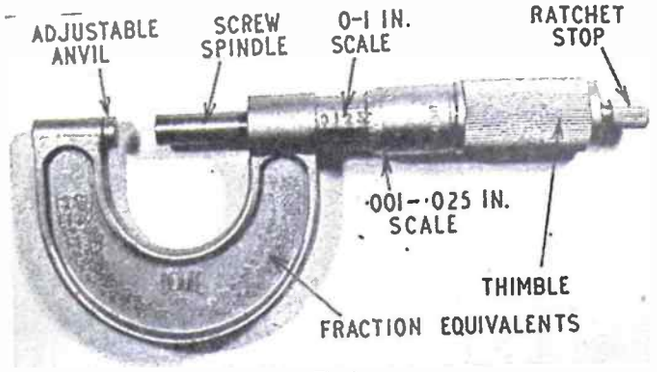


Fig. 1

The thimble and screw spindle rotate together, the latter passing through the U-shaped frame. As the thimble is turned, the end of the spindle thus moves in or out, modifying the distance between spindle end and anvil. It is in this gap that measurements are made. The screw is usually threaded with 40 turns per inch, so that it will move 1/40th in., or ·025in., for each complete revolution of the thimble. The 0–1in. scale is divided into 40, each 4th mark being numbered. These particular numbers will thus show tenths of an inch. The 40th of an inch can be read off by reference to the intermediate markings on the scale.

As one rotation of the thimble moves the spindle ·025in., it will be realised that 1/25th of a rotation would move the spindle ·001in., or 1/1000th of an inch. This scale is, therefore, marked round the thimble circumference, and indicates thousandths, from 0 to 25.

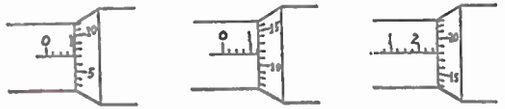


Fig. 2

So that the instrument may be set exactly to zero, for use, the anvil is adjustable, by means of a screw. To set, the thimble is rotated until both scales show zero, and the anvil screw is then tightened carefully until anvil and spindle meet.

If much force were used in rotating the thimble, the screw would exert considerable pressure, flattening the object to be measured, or even distorting the U-shaped member. To avoid this, and secure a standard pressure, the more expensive type of micrometer has a ratchet stop. This is simply a spring-loaded ratchet device which begins to slip when the spindle end presses upon the object measured. In use, the thimble is rotated by means of this small milled projection, and it is then impossible to exert too much pressure on the object measured, as the ratchet stop simply commences to slip.

In cheaper instruments, no ratchet stop is fitted, the small milled knob being solid with the thimble, or omitted altogether. When present in this form, it is useful for rapid unwinding of the spindle. A person with a heavy touch can also use it for screwing the spindle into contact with the object measured.

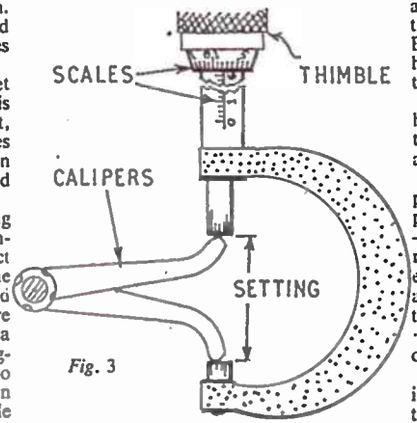


Fig. 3

Though the actual thimble scale only reads in ·001in. steps, it is easy to judge when the line on the 0–1in. scale falls exactly between two lines on the ·001–·025in. scale, thereby giving measurements to ·0005 of an inch. With a little practice, even smaller intervals can be judged with sufficient accuracy to avoid any error in reading greater than ·00025.

Since measurements, as read off the scales, are decimal, a list of decimal equivalents for vulgar fractions is normally engraved upon each side of the U-member, for reference.

Manipulation

When a micrometer has been obtained, it is well worth while measuring everything to hand, to gain practice in reading off the scales. If the object to be measured is fixed or supported, two hands can be used. The U-member is then held near the anvil with one hand, and the other employed to screw up the thimble until the object is lightly held. Pressure is never used, rotation being halted immediately the thimble ceases to move freely.

If an object is to be held with one hand, one or two fingers are passed through the U-shaped member. Thumb and finger can then rotate the thimble.

For the very first trials it is a sound plan to set the gap as accurately as possible to fractions marked on a ruler — $\frac{1}{10}$in., $\frac{1}{20}$in., $\frac{3}{40}$in., etc., and check the readings obtained against the fraction equivalents. This will at once show if any grave error is being made in reading the scales, such as mistaking ·025 for ·25, or omitting to count each 1/40th, or ·025in. on the 0–1in. scale.

It is best to think of all measurements in decimals. One full rotation of the thimble will bring both scales to ·025. A second revolution will give ·05in., a third ·075in., and a fourth ·1in., zero on the thimble then being opposite the 1 on the 0–1in. scale, which indicates 1/10th in.

Reference to Fig. 2, showing some settings of the two scales, will make the method of reading clear, especially if used in conjunction with actual manipulation of the micrometer.

A few simple exercises can be tried when the scales are fully understood. *Example:* Measure a thin postcard. Result is ·0095. Postcard doubled should thus be ·019. Check by measurement. *Example:* Measure single page of a book. Result is ·0028. Ten pages should thus be ·028. Count ten pages and check by measurement. Take a few pages at random. Measure. Result is, say, ·014. This divided by ·0028 gives 5 pages. Check by counting. Take a large number of pages at random. Say, total ·16in. Calculated to nearest 4th decimal place, 57 pages. Check by counting.

Such exercises will soon give confidence in reading and working with the instrument. An *exact* result will not always be obtained with paper, due to varying thickness, but a magazine or book printed on good quality paper will usually give results accurate to 1 leaf in 50, at least.

WIRE DIAMETER TABLE

Dia.	S.W.G.	Dia.	S.W.G.
·104	12	·0124	30
·08	14	·0108	32
·064	16	·0092	34
·048	18	·0076	36
·036	20	·006	38
·028	22	·0048	40
·022	24	·004	42
·018	26	·0032	44
·0148	28	·0024	46

The micrometer is exceedingly useful in any instance where the desired information can be obtained by measurement. For example, in checking drill sizes, the thickness of metal sheets, or the diameter or size of work in hand.

The more the instrument is employed, the more will its degree of utility be realised. Turned rods or spindles can easily be checked for taper or oval shape. Inside measurements of a bore or bearing can also be made, by transferring the setting obtained with a pair of inside calipers, as shown in Fig. 3. This allows matching bearing holes to be drilled by taking a suitable drill, or allows a spindle to be obtained or made which is a running fit, or a pin made which will be a driving fit. Holes and bearings can similarly be checked for oval shape or taper.

Among other applications which will prove useful from time to time is the determination of wire gauges. For this purpose a small piece of the wire is carefully cleaned of insulation and its diameter measured. Reference to a table such as that appended will then give the S.W.G., allowing replacement wire to be obtained. Or the diameter measurement alone will show how many turns of a wire may be wound to an inch, when making coils, etc. Or a check on the gauge of wire to hand will show whether it is suitable for a winding or wiring job in view.

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HARDWOOD STANDS

ANTIQUE and foreign vases and other ornaments can be made to look even better by setting them on black hardwood stands. The black seems to enhance their appearance and assist in making the features of the ornament stand out more sharply.

The stands are quite easy to make by anyone possessing a lathe and a few small chisels (Fig. 1). The stands usually finish about ⅝in. thick for the smaller diameters up to about 1¼ins. thick for diameters up to 6ins. or even 8ins. They may be made of beech, walnut or in fact any close-grained timber available.

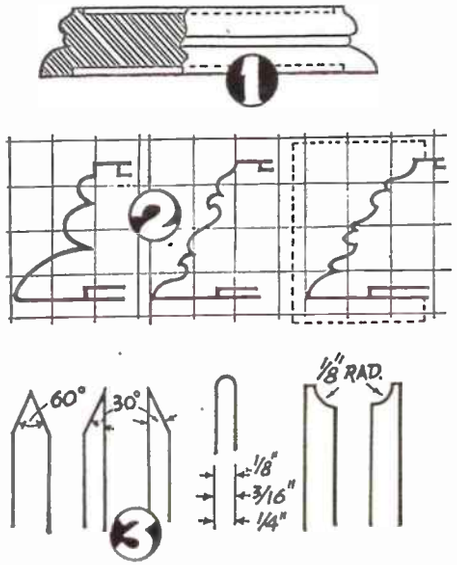
The first operation after cutting the rough block is to grip in the chuck and true up the base and cut the recess in the bottom. Then screw a block of wood to the face plate, true up on the face and turn the outside diameter an easy fit for the recess in the base of the stand. Now glue a piece of brown paper to the face of the pad and glue the base of the stand to the paper. Thus you have the stand glued to the face plate of the lathe via a sheet of brown paper. It is now easy to finish the turning.

Glasspaper thoroughly and remove the stand from the face plate.

To finish, the stand must be given two coats of good black wood dye and one coat of shellac or notting. Use wood dye and not wood stain as the dye gives a better finish and a very much better black.

If several stands are required to the same design it is preferable to make first a template. The actual shape is a matter of personal choice but several designs are shown in Fig. 2. They are drawn upon ¼in. squares.

Again, a few specially made chisels will facilitate turning if several stands have to be made. They may be made from old or scrapped engineer's files which have been heated to a dull red and allowed to cool slowly. This will leave enough temper in the steel to make quite good woodturning tools. Several shapes are shown in Fig. 3. (T.H.M.)



Novel use of screens gives

UNUSUAL PRINTING EFFECTS

AS soon as the amateur photographer becomes engrossed in his hobby he turns to the development and printing of his own films — and this leads almost inevitably to the possession of an enlarger for large sized prints.

He soon learns to match the printing qualities of his negatives to the grades of printing paper — normal, hard or soft. He finds his way through the wide range of surface coatings to the one of his own individual preference — glossy, matt, semi-matt, velvet, white base, cream

No. 1. The 'straight' print

base, rough textured, etc. He experiments with bromide and chloro-bromide papers and developers and printing technique to give a cold blue-black image or warm-black to brown image. He will generally settle on one main surface, type of paper and image colour. Having reached that stage, he may like to experiment further — securing special and unusual effects on whatever type of paper he prefers.

There are printing screens on the market, obtainable from photographic dealers, which are placed on top of the printing paper on the enlarger easel. An exposure is made in the usual way, but the image is printed on to the paper THROUGH these textured screens. The effect varies with the type of screen used — to give an etching effect to the final image, a close-weave or canvas effect, etc. These screens can be very effective when matched with a negative subject that lends itself to these special effects — and most dealers can supply samples to show the effect to be obtained by their use.

The experimenting amateur can have instructive enlarging sessions without going to the expense of buying ready-made screens — in fact he has a very wide range of special effects generally to hand.

The principle of all such screens is that they do not impede the main image-exposure to the printing paper, but super-impose upon it their own texture. It follows that any screen which is transparent or non-image-blocking can be used.

Print number one is a normal print, a straight print, with no screen interposed between enlarger lens and printing paper.

'Crinkly' effect

Print number two is interestingly 'different'. It was made with a sheet of crinkly glass placed upon the printing paper — the sort of glass one often finds in some lantern type lamp shades. Two things are noticed at once: the crinkly pattern and grain lines of the glass are super-imposed upon the whole image — and there is distortion of all straight lines (note how the chimney and rain-piping lines have been given a wobbly, antique effect).

Such a finish could be very effective if used on a print of oldtime buildings for a calendar or a greetings-card. It is unusual.

Note, too, how the pattern effect is most noticeable in the shadow areas of the print where more light passed through the thinner parts of the negative to increase the screen's effect — and note how in number two the increase of pattern effect in these shadows throws the highlights into bolder relief because, with less light effectively reaching the screen, they are lacking more in pattern effect.

And other effects? Why not try a piece of thin muslin, such as butter-muslin, stretched on a light frame and laid on the printing paper? A 'weave' pattern would be produced. Tissue paper laid on the easel will produce its own paper-grain effect; cellophane crinkled and then smoothed out, another totally different effect.

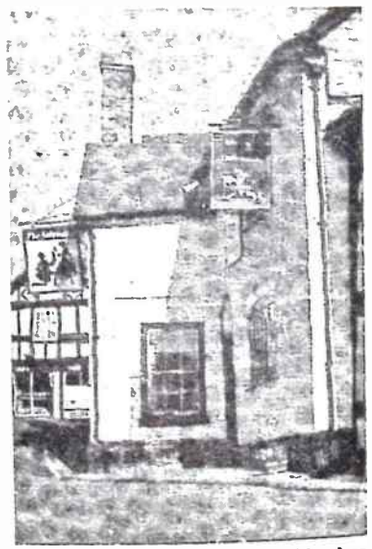
Home-made screens to impart unusual texture and pattern effects are limited only by ingenuity and the urge to 'try them out'.

Exposures will, in general, be a little longer than with a straight print. The effect can be varied again by using the screen for only part of the exposure — a temporary use will soften its effect.

Experiments are not confined to enlarging. Similar try-outs can be made with contact printers, though here the normal design of these printers will limit experiments to wafer-thin screens that can be inserted between the negative and paper.

By E. G. Gaze

So far, screens are mentioned for use upon the printing paper itself. Another whole series of effects can be had in an enlarger by sandwiching the thin screen material with the negative in the enlarger negative-stage. Remember, however, that the screen pattern is itself projected enlarged, with the negative image and the effect, therefore, will be coarser and harder, but it can sometimes be very effective.



No. 2. Print made through crinkly glass screen

Very unusual effects can be had cheaply at home with home-made screens. These effects are not necessarily more attractive than a clean, straight print — but they do add an occasional print to the album which is very 'different'; and they can prove invaluable in the making of home-made calendars or greetings-cards — which often gain by having that extra 'something'.

Playing at 'Cowboys and Indians' has always been a favourite pursuit of youngsters. This Indian Stockade will bring realism to battles involving Davy Crockett—'King of the Wild Frontier'

DAVY CROCKETT INDIAN STOCKADE

By T. S. Richmond

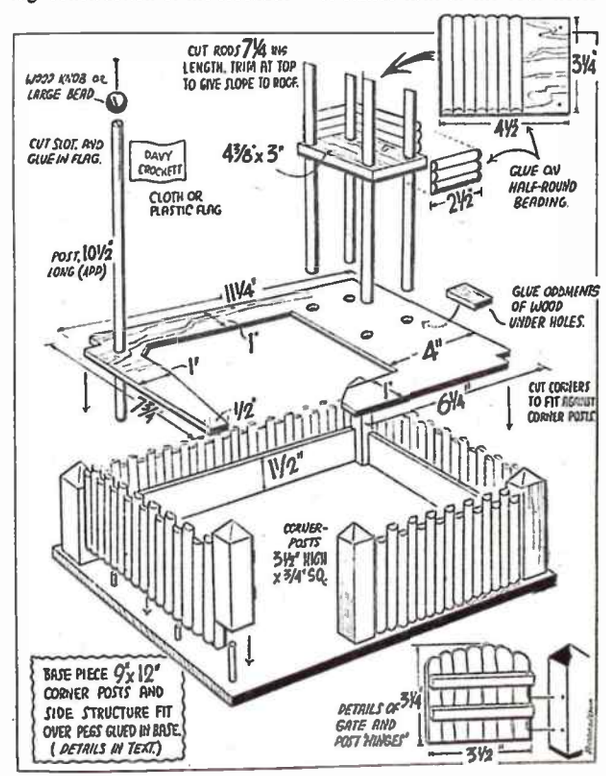
MANY a friendly 'battle' has been won with the ever-popular toy fort. The trend of young hearts today, however, is towards 'cowboys and injuns', and it is with this in mind that we describe here how a modern version of the old toy fort can easily be made by *Hobbies Weekly* readers. Made up of plywood and individual 'log' construction, it can be built up and dismantled, and will delight the youngster who is a 'Davy Crockett' fan.

The base, walls, 'galleries', gate, and tower pieces will all come from a 2ft. by 1ft. 4in. panel of ¼in. plywood. The five upright posts are cut and shaped from ¾in. square stripwood. The individual 'log' construction of the stockade and tower is made up from 97 strips cut to the required lengths from seven 6ft. lengths of half-round beading. Eighty pieces are needed for the stockade and are of alternate lengths, i.e., 3ins. and 3¼ins. The inside walls upon which the 'logs' are glued, measure 10¼ins. (back strip), 7¼ins. (two end strips), and 5¾ins. (front strip). Holes are drilled at carefully marked-out positions in which are glued suitable lengths of round rod.

The corner and front gate posts have holes drilled so that they can fit on to the five corresponding ¼in. dowel 'pegs'. The walls each have two holes drilled to correspond with the ¼in. thick pegs upon which they fit between the corner posts.

The diagram shows an exploded view of all parts in the order in which they are assembled. If the reader desires, the whole construction can be glued and nailed together. In any case, the tower is glued and pinned as a complete unit. It stands firm in the four holes drilled in the 'galleries'. An old knitting-needle could be utilized for the flag pole instead of the wood rod as in the sketch.

Paint all parts in a gay red or green enamel, with the exception of the dowels representing logs. Give a coat of clear varnish as a protection against young finger-marks.



● Continued from page 266

Making Acids

will know that this is the case. The quickest treatment is to evaporate the hydrogen sulphide treated mixture to dryness on a water-bath. On now warming the resultant black solid with water you will find the lead sulphide is easily filtered off and a clear brown filtrate of tannic acid solution obtained. You can then go ahead with evaporation on water-bath and glass sheet.

While you have the hydrogen sulphide generator in action you can also prepare dilute hydrobromic acid. It is only necessary to pass the gas through bromine water until the red-orange colour of the latter has disappeared. Sulphur is precipitated and this should be filtered off. The filtrate is dilute hydrobromic acid, but containing also dissolved hydrogen sulphide. To drive out the latter, pass a brisk current of carbon dioxide through the liquid until the smell of the hydrogen sulphide has gone. The carbon dioxide, of course, is generated as usual from marble chips and dilute hydrochloric acid.

Solution to Hobbies Crossword No 1 published last week

Across: 1 Befit. 4 Artist. 8. Lollop. 10 Educe. 12. Refer. 14. Swollen. 17. Neat. 19. Stand-by. 20. Hotspur. 22. Alas. 23. Measles. 26. Hosea. 28. Twirl. 29. Truism. 31. Nailed. 32. Widen.
Down: 1. Bills. 2. Folio. 3. Too. 5. Reef. 6. Inured. 7. Twenty. 9. Presume. 11. Dennis. 13. Entreat. 15. Wool. 16. Lessor. 18. Able. 20. Hasten. 21. Tahiti. 24. Laird. 25. Simon. 27. Sloe. 30. Row.

Another puzzle next month

CHEMISTRY IN THE HOME

Making Acids Part 2

THE unpleasant flavour of sour milk is due to an acid which has been formed by micro-organisms breaking up the milk sugar (lactose). The souring process only goes so far, because the acid kills the organisms when a certain quantity has formed.

This acid is lactic acid, and it can be extracted from sour milk. To obtain it in reasonable quantity we go one better than nature and neutralize the acid as it forms, so that the micro-organisms can continue their work until the lactose in the milk is all used up. Further, we can add ordinary sugar for the micro-organisms to work upon, for they act on this in the same way as they do upon lactose.

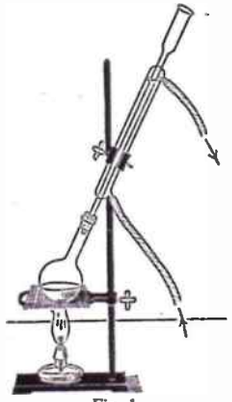


Fig. 1

Dissolve 40 grams of sugar in 215 c.c. of warm water and let the solution cool. Add 70 c.c. of milk and 25 grams of precipitated chalk (this neutralizes the lactic acid, forming calcium lactate). Two grams of rotten cheese crumbled into the mixture helps the growth of the micro-organisms.

Put the vessel containing the mixture in a warm place for a week. Stir the mixture every day. It becomes solid owing to separation of calcium lactate. Put this into a cloth and squeeze out as much liquid as you can. Then boil it up several times with fresh lots of water, until no more solid appears to dissolve. Filter the combined extracts through a cloth, boil down the filtrate to small bulk and let it cool and stand overnight.

The white mass of calcium lactate which separates should be squeezed on a porous tile, dissolved in the smallest possible quantity of hot water and left overnight again to crystallize out. Remove the crystals and press them on a tile once more. After this purification process we can proceed to prepare lactic acid.

Dissolve the calcium lactate in as small a quantity of lukewarm water as possible and then stir in oxalic acid solution little by little. Calcium oxalate precipitates and lactic acid is left in solution. When the oxalic acid just ceases to give a further precipitate, filter off the calcium oxalate. The filtrate consists of dilute lactic acid. It may be concentrated by evaporation on a water-bath until it becomes slightly syrupy.

Salicylic acid, whose derivatives have been so much used in medicine, is easily prepared from oil of wintergreen, which is principally methyl salicylate. By heating this with sodium hydroxide solution, sodium salicylate is formed, and when the solution is acidified with a mineral acid, sparingly soluble salicylic acid is precipitated.

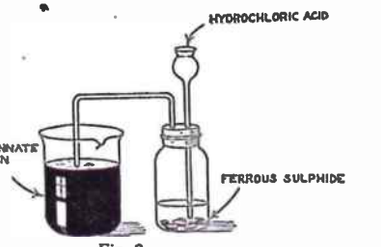


Fig. 2

Rig up a reflux apparatus as shown in Fig. 1. Dissolve 7 grams of sodium hydroxide in 50 c.c. of water and pour the solution into the flask. Add 14 c.c. of oil of wintergreen, reconnect the flask with the condenser and boil the mixture. The oil, which at first swims on the surface of the sodium hydroxide solution, gradually disappears. When it has all gone, stop heating, dilute the liquid with an equal bulk of water, and when cold, add dilute sulphuric acid until no more precipitate forms. Filter off the white precipitate of salicylic acid and purify it by dissolving it in the smallest possible quantity of boiling water. On cooling, nearly pure salicylic acid crystallizes out in long needles. Filter these off and let them dry on a porous tile or brick.

Oak apples, or gall-nuts, contain tannic acid — more precisely called gallo-tannic acid. By adding lead acetate to an aqueous extract of oak apples we get a precipitate of lead gallo-tannate, and when this is suspended in water and decomposed with hydrogen sulphide, insoluble lead sulphide is formed and soluble tannic acid. Filtration gives us a solution of the acid and evaporation the solid acid.

Crush oak apples

Crush about 4 ounces of oak apples and boil them for half an hour with 3 pints of water. Filter the extract through a loose plug of cotton wool in a funnel. Make up the volume of the brown filtrate to 1 litre by adding water. Take 100 c.c. of this and stir in a little at a time a 10 per cent solution of lead acetate from a burette, or from a pipette. A brown precipitate of lead gallo-tannate appears. When no more precipitate forms and a clear colourless solution is seen above the precipitate, note the volume of lead acetate used. You now know that the rest of the extract will need nine times this amount for complete precipitation.

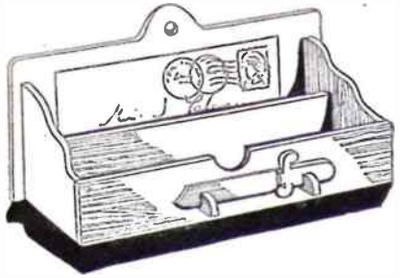
The precipitate which forms at the beginning of the lead acetate addition contains impurities, however, and it is as well to reject this (also reject the 100 c.c. test portion). So first add one third of the calculated amount of lead acetate, filter off and reject the precipitate, and add the rest of the lead acetate to the filtrate. Wash this precipitate until the wash waters are no longer acid — that is, no longer turn blue litmus paper red.

Transfer the lead gallo-tannate to a beaker, stir with enough water to make a very thin cream and pass in hydrogen sulphide until the lead gallo-tannate has completely blackened. You can generate hydrogen sulphide in the apparatus shown in Fig. 2, using ferrous sulphide and hydrochloric acid diluted with an equal volume of water. Owing to the bad smell of the gas this part of the experiment should be done in the open air.

Filter off the black lead sulphide and evaporate the filtrate on the water-bath until it is syrupy. Spread the syrupy solution of tannic acid on a sheet of glass and leave it in a warm place. Tannic results as a film when the remaining water has all evaporated and may be scraped off for your specimen collection.

It sometimes happens that the lead sulphide is produced in so finely divided a form that it cannot be filtered out satisfactorily. If, on filtering a sample of the hydrogen sulphide treated mixture, you obtain a turbid, very dark brown filtrate instead of a clear brown one, you

● Continued on page 265



LETTER RACK AND KNIFE

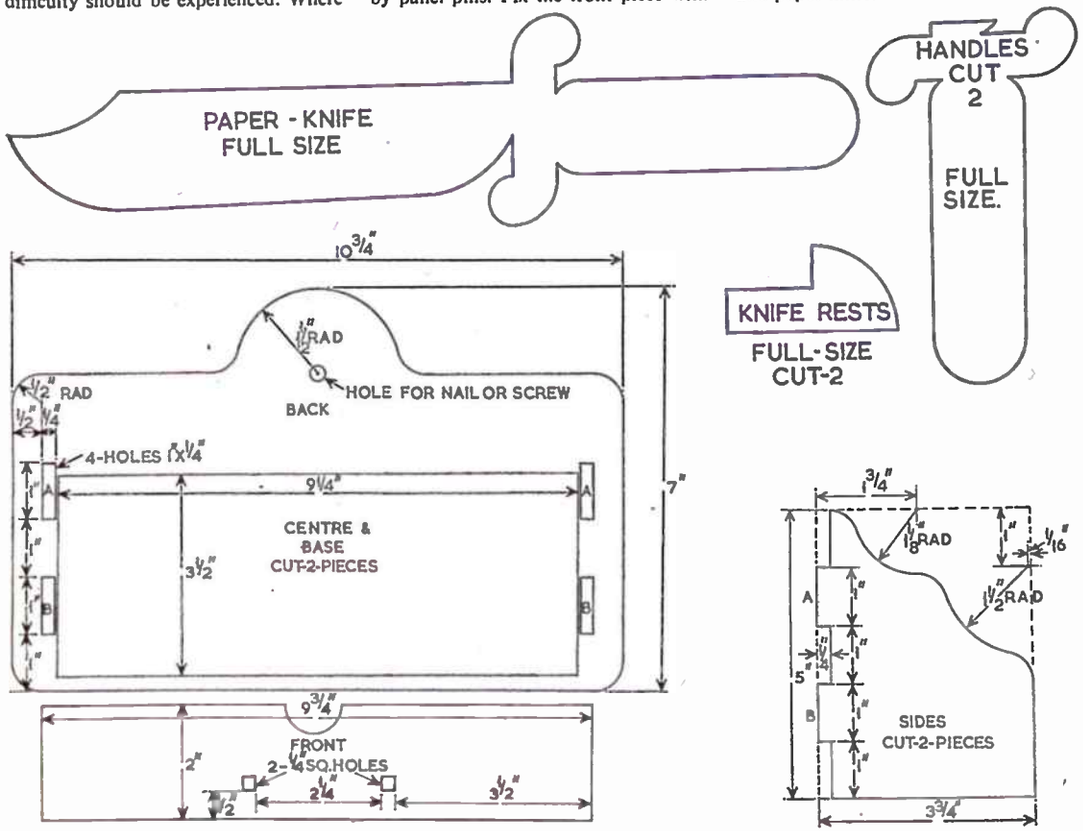
Make this attractive article described by *V.G.S.*

TO make this useful letter rack all that is needed are two Hobbies J.4 ¼in. panels and one Hobbies G.2 ¼in. panel. By using these three panels the total cost of construction will be about 7/6.

The first thing to do is to trace out all the pieces required for the rack on the two J.4 panels and the pieces for the paper knife on the G.2 panel. Before cutting out the pieces it is a good plan to cut out all internal holes before tackling the outlines. All measurements required are given in the diagram and no difficulty should be experienced. Where the radius of any circle or arc is not shown, it can be assumed to be ¼in. After all cutting out is completed, clean down with glasspaper and proceed with the assembly. This is quite a simple step and is self-explanatory from the diagram. The flanges (A) and (B) on the two sides connect into the corresponding slots (A) and (B) on each side of the back piece. They should be glued into position. Next fix the knife rests into the holes in the front piece, strengthening the joints by gluing. Fix the centre piece by gluing into position and strengthen by panel pins. Fix the front piece with glue and panel pins, and, finally, glue the base into position and panel pin to strengthen the fixing. Wipe off all surplus glue before it dries.

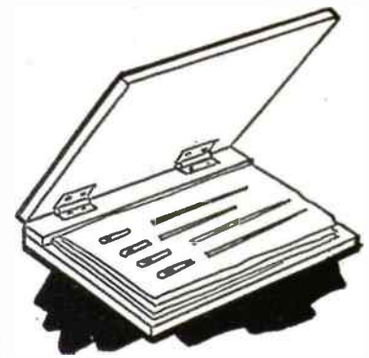
The paper knife is assembled by gluing one handle cut-out on each side of the knife handle. Wipe off surplus glue, weight down, and leave overnight to dry. When thoroughly set and dry, file the blade of the knife to provide the paper-cutting edge required and finally rub down the knife and rack with fine glasspaper.

The finish is a matter of personal choice. Wood dye followed by french polish will give a pleasing effect, whereas if an enamelled finish is preferred a most attractive result can be obtained by using contrasting colours for the rack and paper knife.



Job for the fretsaw

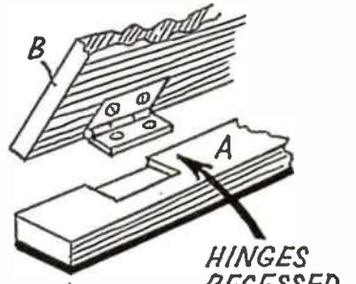
A USEFUL NEEDLE CASE

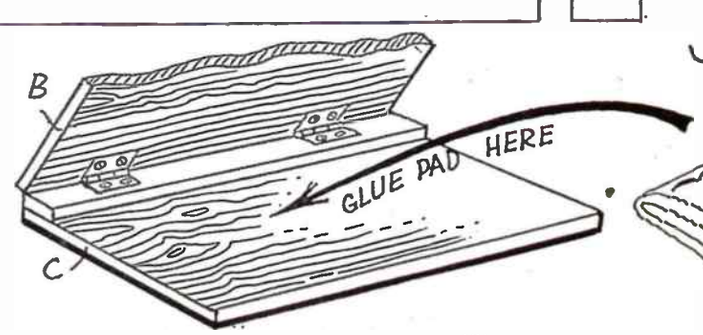


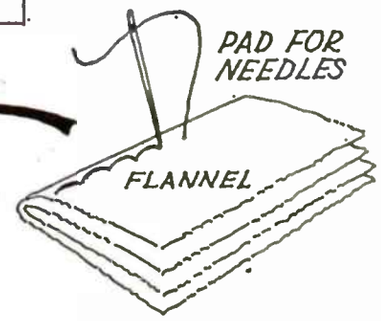
MAKE IT FOR MUM

PIECES (B), (C) and the animal overlay are cut from ¼in. wood, and piece (A) from 3/16in. The hinges are let in as shown in the diagram. Use countersunk screws for fixing.

The needles are held in the flannel 'leaves' which are first sewn together and glued in position. Finish off the case by painting or polishing. (M.p.)







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