

HOBBIES WEEKLY

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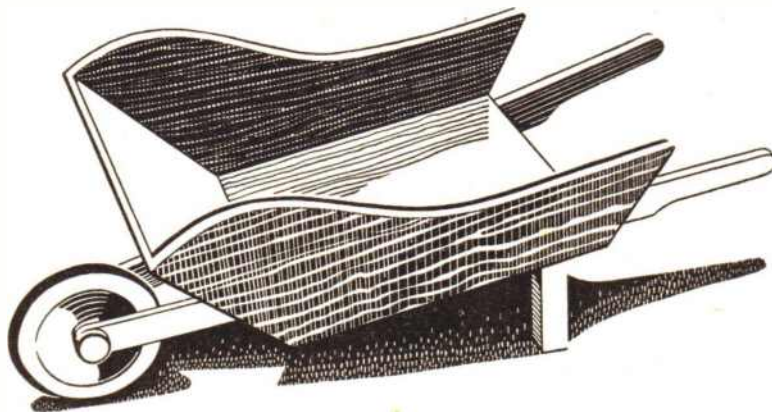
SEPTEMBER 26th 1956

VOL. 122

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An Ideal
Present
for a
Youngster

*FREE Design
inside for*



TOY WHEELBARROW

WITH an overall length of 28ins. and a height of 11ins., this wheelbarrow is a handy size and makes an ideal toy for youngsters, being an excellent idea for a Christmas gift.

There is nothing difficult in its make-up, and it can be undertaken by the average handyman with confidence. There is no intricate cutting or detail work, and the expending of a few hours on marking out, cutting out and assembly, will provide a toy to gladden the heart of any youngster — and what youngster does not love trundling things about the garden in his or her

own little barrow? Of sturdy construction, the shafts and legs are of stripwood and the whole assembly is very simple.

Another important point to bear in mind is the fact that this useful toy can be made up for much less than the cost of a similar bought article, and given careful workmanship, it will prove much more lasting.

Enlarge the squares

The first stage is the making up of the container. Mark out one side in 1in. squares as indicated on the design sheet (piece 1). One side can be cut to size and shape and used as a template for the

other identical side. The front (2) is marked out to the measurements shown, and cut out. To complete the body, the bottom (3) is cut from $\frac{3}{8}$ in. plywood also to the measurements given.

After chamfering pieces 1 and 2 to the sections shown on the design sheet to allow for the splay of the sides and front, this part of the work can now be assembled. Firstly glue and pin the sides to the base and add the front in between the two sides, again by gluing and pinning.

The shafts (pieces 4) are cut from $1\frac{1}{2}$ ins. by $\frac{3}{4}$ in. stripwood to the handle

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

For Modellers, Fretworkers
and Home Craftsmen

World Radio History

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THE DOVETAIL PUZZLE

WOODWORK puzzles are always very popular with craftsmen of that material, and the one described here is no exception. It is not difficult to make and will cause much amusement to all who try to solve it. Anyone who has not seen the puzzle before will doubtless think it impossible to solve, but once you know the secret, nothing could be easier.

By A. F. Taylor

The dovetail is probably one of the nicest of all the woodwork joints, but one that needs careful measurement and correct setting out in order to obtain a perfect fit. Setting out and making the puzzle provides excellent practise for the handyman and is time well spent.

Fig. 1 shows the complete puzzle in which it appears that there is a perfect dovetail on each of the four sides. The solution is clearly indicated in Fig. 2, with the top part slid back slightly, which reveals the dovetails going in a diagonal direction or from corner to corner.

The wood used should have a smooth even texture such as mahogany, walnut or a similar grained hardwood. The size of the finished puzzle when correctly assembled is 2½ ins. long and slightly less than 1½ ins. square, but these measurements may be altered to suit your particular requirements.

In order to produce a puzzle of this size you will need a piece of wood 4 ins. long and 2 ins. square. Make sure that it is perfectly square and take great care to mark it out exactly as shown in Fig. 3. The shaded parts indicate the wood to be cut away after the block has been sawn in half on the line marked 'cut here'. All the measurements are given in Figs. 4 and 5.

A good fit essential

With a fine tenon saw make the cuts just inside the lines and finish off with a sharp chisel. When put together the dovetail should be a really good fit, and not slide in easily nor should it be necessary to force the two parts apart. The success of the puzzle depends on a good fit and it will pay to spend some time on this. A file may be helpful for the finishing stages or a piece of glass-paper wrapped round a slip of wood is useful for getting an accurate fit.

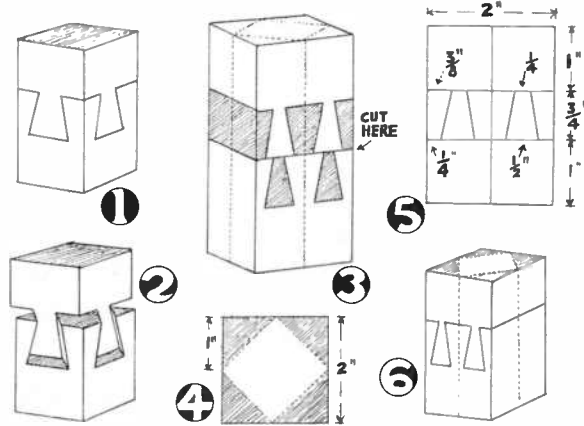
When you are satisfied that the two pieces fit snugly and do not slide out

easily, put them together as at Fig. 6. Mark each end (Fig. 4) and with a fine saw, cut very carefully on or near the dotted lines, which will remove the four corners and incidentally produce four more in another position.

This alters the position of the dovetails, so that instead of there being two on two sides and none on the other two,

there will appear to be one on all four sides (Fig. 1). With a piece of glasspaper wrapped round a block of wood, smooth all sides, making sure that they are nice and flat and square.

A rub over with a french polish rubber or with wax polish will put the finishing touch to a very attractive puzzle.



● Continued from page 401

Toy Wheelbarrow

sections smoothed with glasspaper. Next cut out the remaining pieces consisting of the legs (5) and pieces 6 and 7.

The legs should now be glued and screwed to the shafts in the positions shown by the detail on the design sheet and pieces 6 and 7 can next be added by gluing.

Fixing the wheel

Now slip the rubber-tyred wheel on to the steel axle provided in the kit, and insert the end of the axle into pieces 7. Hold the wheel lightly in position with a piece of string whilst screwing and gluing the shafts to the underside of the barrow. Screwing will be from the base into the shafts, the positioning of which is indicated by dotted lines on the design sheet.

After a thorough clean-up of the barrow, it can be finished as desired. A splash of bright colours here and there is indicated, as being particularly attractive to children, whilst some parts can be left in their natural state and merely varnished.



Many of our readers are now on the lookout for toys to make as Christmas gifts and we suggest that this wheelbarrow makes an excellent choice.

All the wood, rubber tyred wheel and steel axle rod etc., necessary for making the wheelbarrow are contained in Kit No. 3178 obtainable from branches etc., or post free from Hobbies Limited, Dereham, Norfolk, price 18/11d.

Using your 'failures'

SKETCHES from PHOTOGRAPHS

IF you can use a pen, you can make delightful pen and ink studies from any photograph. There is no tedious tracing of the picture, a direct process being used, combined with the chemical bleaching away of the original photographic image.

Although it has just been stated that any photograph may be used, it is wiser to make your first attempts with some architectural pictures which will make engraving-like sketches suitable for calendars, and pictures. Take care to select those where the perspective is reasonably true as in the example shown, for the average camera errs tremendously in this respect. Normally, you will find that street scenes and nearby pictures are just the thing. Another advantage is that it is un-

viting you to try somebody's wares, omit it in your sketch. Before proceeding to the actual process, perhaps it should be mentioned that you may also use prints which are failures as photographs owing to lack of contrast. You thus make a picture out of what is actually a photographic failure.

A lighter print

Having selected a suitable scene, prepare a new print, much lighter in tone, yet retaining sufficient detail to ink in. Pictures of extreme contrast, with heavy shadows, are best avoided, for the image may not fully bleach out. To produce your light toned print and have ample control in the development, all you need do is dilute the developer to about half the normal strength. A little

pared for the ink clogging your pen by having a spare rag handy for occasional cleaning.

Place the print on some suitable base and ink in the principal features. It is unnecessary at this stage to fill in everything, such as the tiny lines in the timbers on our specimen sketch. Concentrate mainly on the outlines, curves and positions, using a ruler if you cannot draw a good straight line freehand, although the freehand line is much to be preferred. When all this has been done the image may be bleached away by immersion in a bath of Farmer's Reducer, prepared as follows:—

Solution A	Water	10 ozs.
	Hypo Crystals	1½ ozs.
Solution B	Water	10 ozs.
	Pot. Ferricyanide	1 oz.



Left. The original photograph

Right. The resulting pen and ink sketch from the same print



necessary to include all the detail in your sketches, for much may be omitted to the improvement of the whole sketch. For example, it is unnecessary to show every leaf of a tree, foliage usually being represented by scroll-like pen strokes; or every blade of grass, shown generally as vertical dashes here and there. Brick and stonework are similarly treated, with lines here and there to give a *sketch* of the pointing in the true sense of the word. Reference to many of the line drawings used for illustrations in advertisements and magazines will quickly reveal the advantage of eliminating a great deal.

Any signboards, figures or vehicles may also be ignored if likely to prove troublesome, or if they interfere with the beauty of the scene. Although there may be a sign on an old building in-

experiment by testing will reveal the amount of exposure and development to be given for the production of a thin soft print. Rough surfaced papers will cause the nib to scratch, so a surface-like fine velvet lustre is recommended, preferably with an ivory tinted base.

Ink and nib

Waterproof indian ink is used in conjunction with steel nibs. Mapping pens are of no use, since they scratch and splutter and do not hold sufficient ink. Go to a good stationer's and for a matter of twopence each, you can get Gillott's nibs, asking for one each of number 170 and 303. Both these nibs will draw lines from fine to a fair thickness, according to the amount of pressure. If you happen to be fairly heavy handed, then, perhaps, nib 404 may suit you. Be pre-

To use, take 4 ozs. of solution (A) and 96 minims of solution (B) mixed in 4 ozs. of water. If you do not wish to make up these solutions, you can obtain small tubes of ferricyanide in pellet form, sold under the name of Tabloid. Two of these added to a small quantity of hypo and water make a suitable bleach.

Fill in detail

When the image has entirely disappeared, the print may be removed from the bath and rinsed in running water for about ten minutes, before drying. When dry, you may then proceed to fill in more of the detail omitted at the start. This was the method adopted for the sketch shown, all the woodwork being filled in after bleach-

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Signal Generator Applications

THOSE interested in radio know that the signal generator is used primarily as a means of aligning superhet sets. Many, however, think that its usefulness ends there. The fact is that it can be employed in various ways.

To illustrate the generator's versatility we shall describe three of its main uses. The first, as an alignment aid, the second as a test or service instrument, and the third as an inductance and condenser value indicator. Even a cheap, home-made generator will be found to give invaluable service in these three directions.

A trimming tool made from an old plastic knitting needle is suitable.

Start with the second transformer and work back to the primary of the first transformer. Then repeat the whole operation until no further improvement in output is forthcoming. As the loudspeaker note rises in volume, reduce the strength of the generator output, keeping it as low as possible.

The I.F.T.'s are now trimmed, so remove the 'hot' generator lead (after switching off both set and generator) and insert it (after replacing the .1 mfd. condenser with a .00025 mica condenser)

readjust the oscillator padder or slug. Repeat these operations until no further improvement is possible. Finally, trim the aerial coil for maximum volume.

A similar procedure is adopted with the long waves and short waves, choosing tuning points towards each end of the scale.

By A. Fraser

We now come to the signal generator's application as a test or service aid

We will assume that the set to be serviced fails to produce any sound from the loudspeaker, but that the valves light up and that the power supply is functioning satisfactorily. The task is to find out the 'dead' spot. The ordinary superhet can be divided into three sections for investigation. These are the A.F. or audio-frequency section, the I.F. or intermediate-frequency section, and the R.F. or radio-frequency section. The A.F. part starts from the detector valve, the I.F. from the converter, and the R.F. from the aerial coil.

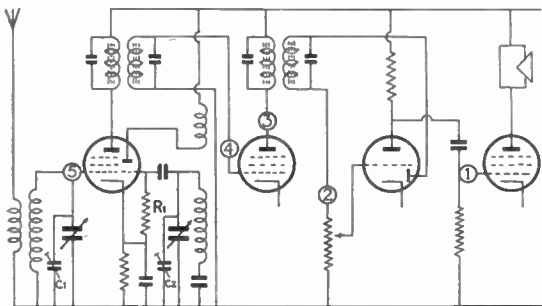


Fig. 1

Let us deal first with the process of alignment. With the superhet set, alignment is necessary in respect of the I.F. (or Intermediate Frequency) transformers, and the R.F. (or Radio Frequency) circuits.

The I.F. transformers must be aligned first, and the initial move is to incapacitate the oscillator section of the frequency changer. This can be done by connecting a .1 mfd. condenser across the resistor on the oscillator grid of the frequency changer valve. Alternatively, join the stator vanes of the oscillator section of the variable condenser to the chassis by means of a length of wire.

The resistor mentioned is R1 in Fig. 1.

Alignment process

The lead from the generator is usually a screened cable. The screen conductor is the earth lead and is connected to the chassis of the set. (In A.C./D.C. sets, through a .1 mfd. condenser. The centre wire of the cable is the 'hot' lead, and this is connected, through a .1 mfd. condenser, to the signal grid of the frequency changer valve. (Point 5 on the diagram.)

The set and generator are switched on and allowed to warm up for fifteen minutes. The generator is set to 465 kcs. and the volume control of the set turned full on.

The trimmers or slugs of the I.F. transformer are then adjusted until the audio content of the generator frequency is heard from the loudspeaker.

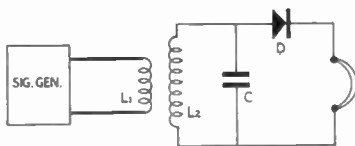


Fig. 2

into the aerial socket of the receiver. The earth lead of the generator is still left connected to the chassis.

Remove the shorting wire or capacitor from the oscillator section, switch the set to the medium waveband, and tune to 200 metres (1,500 kcs.). The generator is set to the same frequency. Then switch on.

The oscillator trimmer is now adjusted until the generator signal is heard at maximum in the loudspeaker. This trimmer is C2 in diagram. Trimmer C1 on the aerial coil is next adjusted to attain peak volume, reducing the generator output progressively to get the exact peak position.

Now tune both receiver and generator to 500 metres (600 kcs.) and adjust the padder condenser or slug on the oscillator coil to give maximum signal output, again keeping the generator output low for final adjustment. The generator and receiver must now be set again to 200 metres, as C2 and C1 will need further adjustment.

After that, retune to 500 metres and

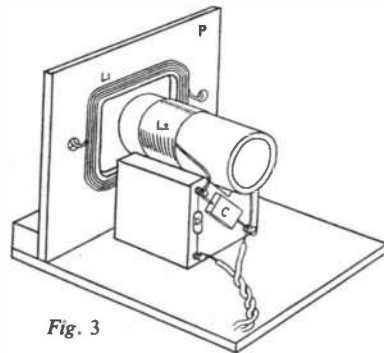


Fig. 3

The A.F. stage can be tested by the signal generator only if this latter has an A.F. output. If this is not so, there is an easy way out—by using the fifty-cycle frequency of a plugged-in soldering iron. The iron is applied to the signal grid pin (1) of the output valve. If there is a low growling sound from the speaker, then the output stage of the receiver is faultless. If there is no sound, this shows the stage is defective and so must be investigated, starting with the valve.

Assuming the growl is heard, so proving that the output stage is not at fault, the next move is to apply the soldering iron to the grid end of the volume control. (Point 2 in the diagram.) If there is no growl, then the stage is defective and should be examined for faults. Should the growl be heard,

then this clears the A.F. stages and we know that all parts from here up to the loudspeaker are satisfactory.

The detector is next tested by applying the signal generator lead to the anode pin of the I.F. valve. This is point 3 in diagram. A 465 kcs. signal is injected (or whatever is the I.F. of the set). If the familiar hum or whine of the generator audio-signal is heard, then the detector is not at fault.

The I.F. amplifier valve can then be tested. Remove the generator lead and attach it to the signal grid (4) pin of the I.F. valve. Inject a 465 kcs. signal (or whatever the particular I.F. of the set). If there is a response from the loudspeaker, this proves the I.F. valve is satisfactory and everything from its grid up to the loudspeaker is clear.

Next, apply the generator lead to the signal grid of the frequency changer valve (point 5) and inject the I.F. signal once again. If the note is heard, this shows the converter is functioning properly.

The oscillator section of the valve is tested by altering the signal from the I.F. to some R.F. signal that the set tunes to. If the oscillator is satisfactory, then the note in the loudspeaker should be heard.

Measuring inductances and condensers

The remaining R.F. test point is the aerial tuning coil. The signal generator lead is applied to the aerial terminal or socket and an R.F. signal injected. (The set, of course, must be tuned to this signal.) In a good set, the modulation note is heard clearly, while lack of response shows a defect in the coil or associated parts or wiring.

This completes the test procedure for superhet sets. With the straight T.R.F. set the operation is the same but simpler, as the I.F. tests are not necessary.

The process of signal generator testing is merely signal substitution to ascertain which stages are, or are not, functioning.

The signal generator can also be used as an instrument for measuring inductances and condensers. In both instances the apparatus set-up is as shown in the circuit drawing (Fig. 2). A practical arrangement is illustrated in Fig. 3.

The operation is quite simple. A modulated signal is fed from the signal generator through a coupling coil L_1 . This signal is picked up by the tuning system consisting of L^2 in parallel with C. The crystal diode, D, rectifies the signal and this results in an audio note in the headphones. The generator frequency is known, and so if C is known then inductance L^2 is ascertainable (and vice versa) from formulae that are available.

Supposing we have an unknown inductance. Connect this up with a

known condenser. Anything from .0001 to .0005 would suffice, but it should be a 1% capacitor. Any greater tolerance than this would lead to inaccuracy.

Switch on the generator and turn the control until the audio note is heard in the 'phones. Then read the frequency or wavelength indicated on the generator dial.

Working formulae

The inductance value is then obtained from the formula :

$$L = \frac{\lambda^2}{3.55 C} \times 10^{-6} \text{ microhenries}$$

where C is in microfarads and λ is wavelength in metres.

Another formula, using frequency, is as follows:

$$L = \frac{1,000,000}{4\pi^2 f^2 C}$$

where L is in microhenries, π^2 is 9.86, f is the frequency of generator in megacycles and C is in microfarads.

It must be noted that the results will not be strictly accurate unless the capacitance of the coil, phones, etc. are taken into account. However, where coils are being matched one with another, this is of no consequence.

If no condenser of known exact value is at hand, then it is possible to use any condenser and a known inductance. One can either wind one's own, or use a Wearite coil whose inductance is published. The method is then to connect each inductance (the known and the unknown) one at a time in the circuit and note the frequency or wavelength in each case.

The unknown inductance value can be ascertained from the following formula:

$$L = \left(\frac{\lambda}{\lambda_1}\right)^2 L_1$$

where L_1 is known inductance, λ_1 is the wavelength with known inductance, and λ is wavelength with unknown inductance.

The measurement of capacitance is

carried out by similar operations to the above. One can either use a common fixed value inductance, and find the resonant frequency or wavelength this produces with the unknown capacitance. Then use either of the two formulae mentioned earlier.

Or, alternatively, find the resonant frequency with the unknown capacitance, and then the frequency with a known capacitance.

$$\text{Then } C = \left(\frac{\lambda}{\lambda_1}\right)^2 C_1$$

where C_1 is known capacitance, and λ_1 is wavelength with known capacitance, and λ is wavelength with unknown capacitance.

To return now to the practical arrangement seen in Fig. 3. This can easily be assembled from spare pieces of wood. The actual dimensions will be to suit individual requirements in relation to the size and type of coils most frequently used.

It will be seen that a hole is cut out of the upright panel (P) so that, if necessary, the coil former can be moved forward, thus bringing the winding into closer proximity with the coupling coil.

The coupling coil

The coupling coil itself is made up of six turns of cotton- or enamel-covered wire. Anything up to 32 gauge is easily handled. The two ends are passed through the board to provide connections for the generator clips. These ends, of course, are bared. The coil is fixed in position by adhesive tape or Durofix.

The apparatus just described is also useful for another purpose — namely, in aligning sets provided with a frame aerial. The apparatus is placed about 2 ft. away from the receiver, so that the coupling coil on (P) is opposite and face to face with the frame aerial of the set. The generator leads are clipped on to the coupling coil and alignment of the radio-frequency stages of the set can then proceed.

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Sketches from Photographs

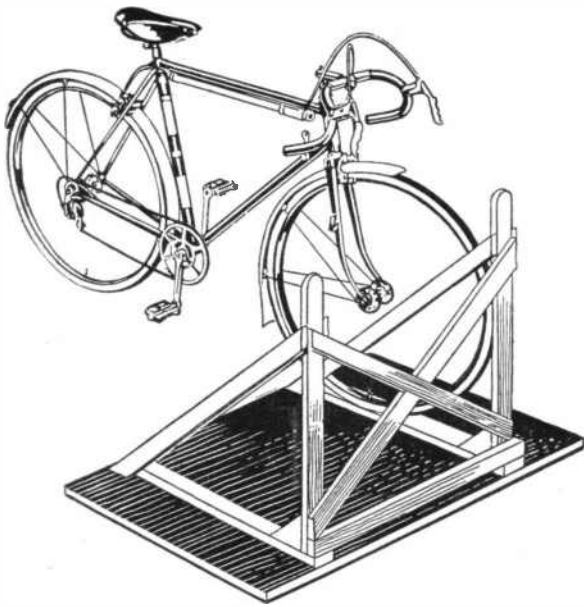
ing, besides the windows and light touches of shading, here and there. The main thing is to first produce the outlines in *thin* lines, they can always be thickened later, and the whole is composed of line work made by the nibs, although some parts may look solid in the reproduction.

At first you should be prepared for one or two mistakes, such as a bad line caused by a slip of the pen. Such errors should be carefully blotted and then removed with a swab of cotton wool saturated with methylated spirits. If the

ink dries you have the alternatives of scraping away with the edge of a sharp knife, covering with white ink, or a little modification in treatment by the addition of a few more strokes of the pen.

The process is far more fascinating to practise than to describe, interest growing as the picture gradually takes form. As already stated, the method also has the additional advantage of making a really bright pen study from a dismal photographic failure. And we all have our failures at times. (S.H.L.)

A DOUBLE RACK FOR BICYCLES

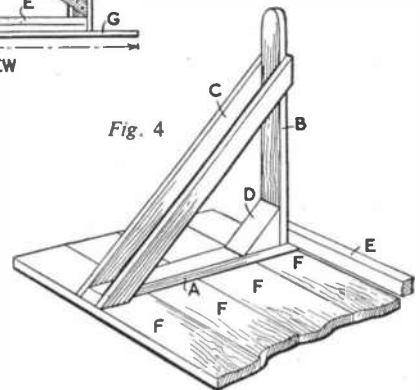
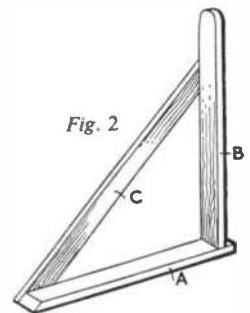
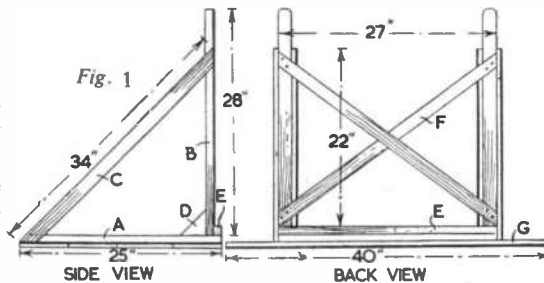


*Easy job
for the
handyman*

We have shown a rack for two bicycles in our illustration; but this can, of course, be increased as desired. In any event the racks will be made up separately as shown in Fig. 3, and then attached to the base and strengthened by stays at the back.

SAVE your bicycle from knocks and bumps and prevent it from falling over by putting it in a proper rack as shown in the illustration. It has been specially designed for simplicity, and you can easily make it in one evening.

The main measurements are shown in the side and back views in Fig. 1. The parts are all lettered and will be referred to as the various steps are explained.

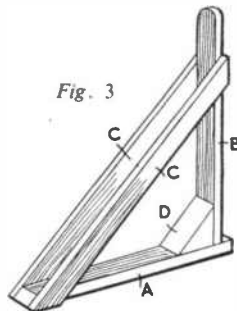


MENDING POTTERY

BEFORE attempting to repair pottery, it is essential that all the broken surfaces should be thoroughly cleaned. Warm the broken pieces slightly and apply thinly to the fracture any good brand of china cement or liquid glue. Press the pieces together very tightly in order to squeeze out superfluous cement or glue, which should then be carefully wiped off.

Where the nature of the fracture and shape of the repaired article permit, the latter can be held together with a piece of tape having a pencil tied in the knot. By turning the pencil round, the tape can be tightened as required. The article is thus held together until the glue or cement has dried.

For china, one of the best cements is white lead ground in linseed oil to a stiff paste. (R.L.C.)



Pieces (A), (B) and (C) are all cut from $\frac{3}{4}$ in. or 1 in. wood $1\frac{1}{2}$ ins. wide. The upright (B) is set back 1 in. to allow for the rail (C). The rail (C) is laid across and marked to get the correct angles for cutting. The end of (A) is chamfered to the same angle as (C). The first stage of the assembly is shown in Fig. 2.

Add the second rail (C) and then the block (D) as shown in Fig. 3. The size of the latter is not critical; it can be cut from an odd piece of wood, the sides measuring about 3 ins. Nail in from behind piece (B) and from under piece (A).

Make up the base from four $\frac{3}{4}$ in. boards (F) as shown in Fig. 4. Space the racks about 23 ins. to 24 ins. apart, and connect them with the back rail (E), cut from 1 in. square wood.

To prevent any play sideways, cross braces should be fixed as shown in Fig. 1, back view. These are cut from $1\frac{1}{2}$ ins. by 1 in. wood, and are halved together at the centre.

The whole rack assembly can now be cleaned up and given a coat of Cuprinol for protection against rot. Finish off with two or three coats of paint, preferably green or black. (M.h.)

LOOKING AFTER YOUR PETS

THE hedgehog is familiar to most folk, for he is conspicuous by his prickly jacket. He — or his wife and children — make jolly nice pets — bnt be careful how you look after them. If left loose in garden or enclosure, they will wander off if they get the chance. They will squeeze through railings, or dig beneath a fence.

Keeping a hedgehog as a pet is very cheap, for he or she will look after itself without much assistance from you. It must be remembered, however, that no hedgehog can be expected to live and thrive continually on a diet of cockroaches and beetles only.

Feeding a hedgehog will not cause much trouble for all that is needed, besides what it picks up when outdoors, is a little fresh bread and milk each morning, and some scraps of raw meat during the day. If permitted to roam in the garden it will pick up all sorts of vegetable food. A meat bone is also appreciated.

Safe Quarters

A hedgehog is better kept in an out-house or suitable shed. It should be provided with a heap of straw or hay in a corner where it can establish its own quarters. When allowed to roam in the garden see that there are no gaps in the fences through which it can walk, for hedgehogs are natural wanderers. You can bring the creature into the kitchen or scullery at night if troubled with beetles, and you will soon be free from them. Remember hedgehogs do practically all their foraging for food nocturnally.

When winter approaches, provide your prickly pet with a pile of old leaves, ferns or grass. The animal will cover itself with these materials and sleep soundly during the cold months. Do not disturb the sleeper. It will come forth when the spring sun warms the earth again.

As an alternative, you can let your pet burrow into a mound of earthy soil, or hide up in some convenient hole.

Tortoises

Now, here is a most interesting creature, which readily becomes a pet. It is very amusing to note how a tortoise gets to know you, and pops his head out of his shell on hearing your voice. He will live a long time, too, if you treat him properly, and is not expensive to keep.

If you have a garden all the better. I do think it is advisable, however, to net off a piece of turf for him. It is surprising how a tortoise will squeeze through a hole or even climb over a

sizeable obstruction! Although a tortoise appears to move slowly, he can cover amazing distances when he wants to. In case your hard-shelled pet does wander off and get lost, it is a good idea to scratch with indelible pen, or paint the name and your address on his shell.

Feed a tortoise on greens, lettuce, peas, beans, pods, dandelions, clover and similar greenstuff. Keep him in the garden but don't forget that he likes strawberries, and quickly finds them.

A tortoise in a garden with herbaceous borders can do a lot of harm during the summer, so it is essential to restrict his roaming. A small box in a corner of your plot, filled with leaves and grass, and a wire netting enclosure about 10ins. to 12ins. high will stop him from wandering. We always make a 'run' for ours on the small back lawn.

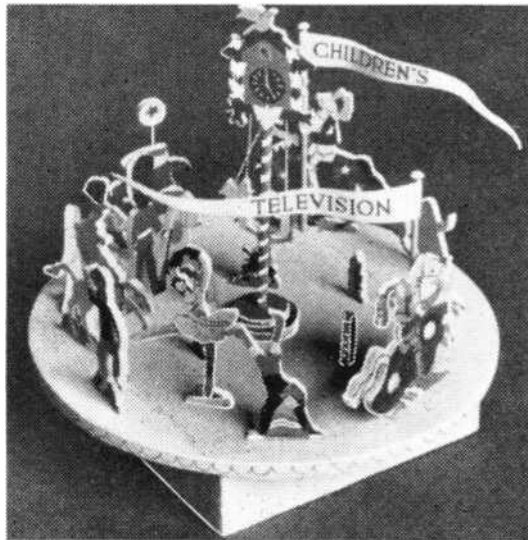
In the centre of the 'run' we place an enamelled soup plate and sink it in the ground to the rim. This we keep filled

with water. Keep a handful of his favourite garden stuff, or other ever-greens inside the place netted off. A little bread and milk won't do him any harm.

Tortoises do not like wet, so when rain is around, provide shelter for him. They like warmth in cold weather.

When winter comes your pet will seek a place for hibernation. You can construct an artificial burrow 1ft. or so deep, in a warmish sheltered corner of the garden, or if you have a cellar free from frosts you should place a handy wooden box filled with earth and covered with a layer of leaves. A greenhouse is another possible place to keep him. If your greenhouse is regularly heated throughout the winter, however, your tortoise won't want to hibernate, but will keep fully awake, in which case you will need to feed him and in very severe weather bring him indoors at night. (A.S.)

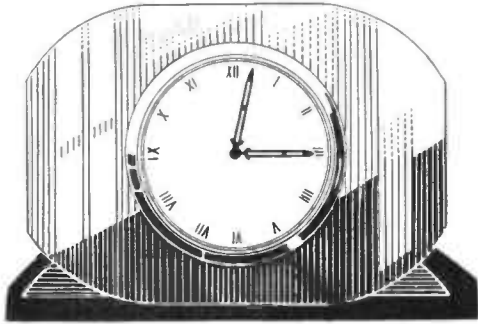
NEXT WEEK



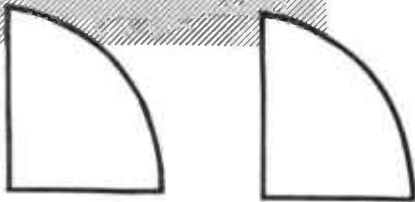
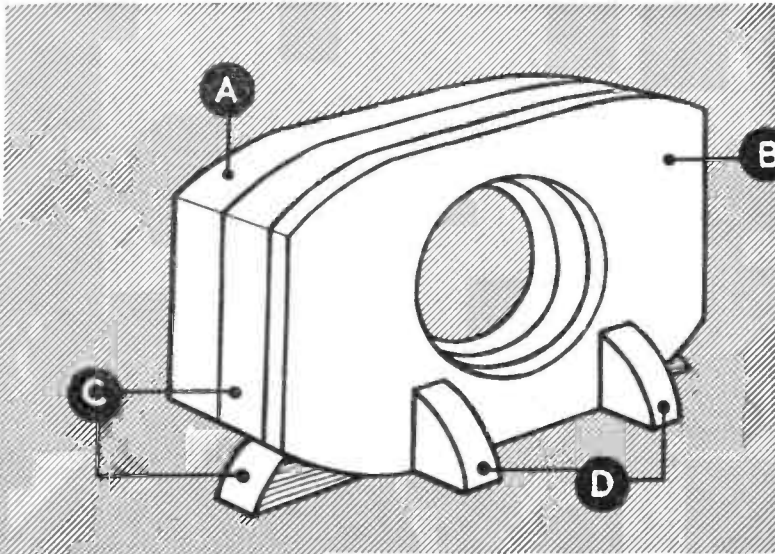
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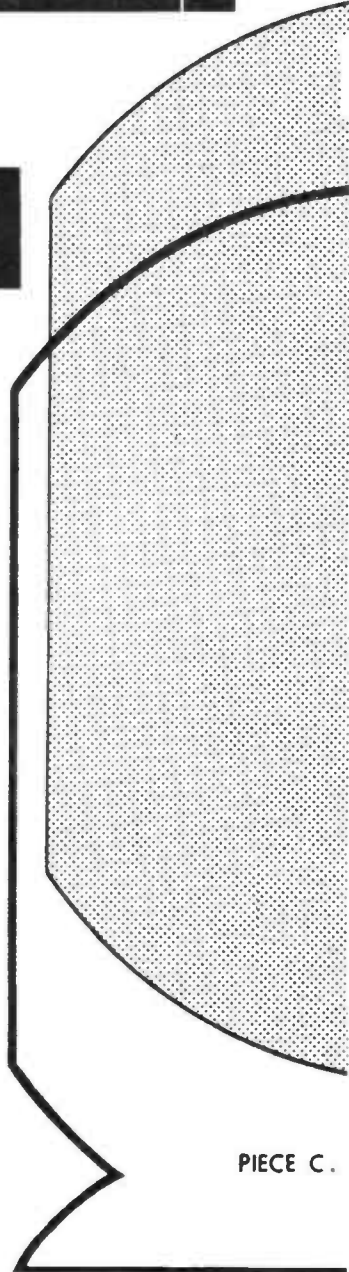


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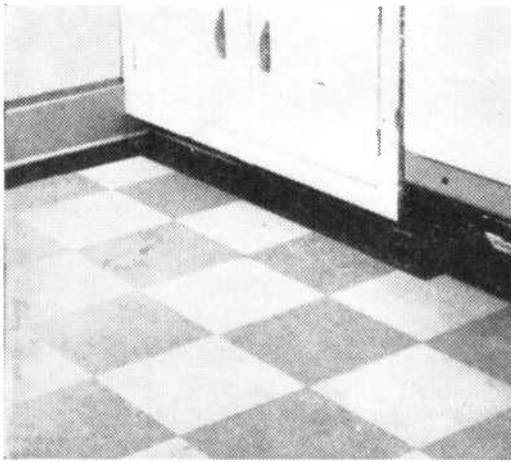
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TILING WITH LINOLEUM

*Described
By S. H. L.*

WHAT do housewives expect from a kitchen floor? It should be easy to clean. It must resist dirt, grease and stains. It should be easy on the feet, yet sufficiently hard to resist the heat of domestic cookers. It should wear well, yet be inexpensive in the provision of a colourful workshop for the housewife.

It is doubtful whether any material has yet been invented to satisfy all these conditions, but those contemplating the re-covering of the kitchen floor would

tile. A plan will act as a preliminary practice, test the design chosen, reveal the awkward fittings and the number of tiles required. Experts will say that the correct starting point is in the centre of a room, but observe there are two interpretations as shown in Figs. 1a and 1b.

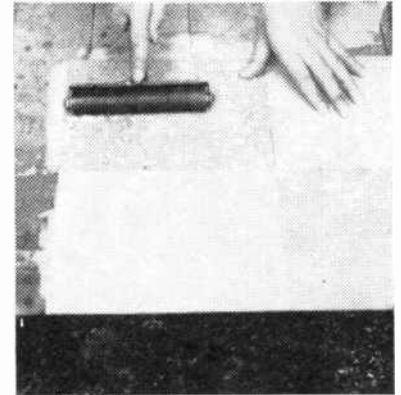
Using a diagonal from corner to corner, a tile may be centred as 1a, but if the four tiles are centred on the same spot it may avoid cutting the tiles in half at the outer edge. In practice it may be found that the builder has not been so accommodating to plan for your 9in. tiles and accurate centring may mean a lot of cutting. To avoid this, I planned out on paper as recommended, using the long visible side of the kitchen as the starting point for a line of tiles, but checking for centre by drawing in the diagonals. Since the margin of error was so slight, the tiles were laid accordingly. Even if a plan is not prepared, it is no difficult task to lay the loose tiles down as a trial before fixing.

Before laying the tiles, which are attached with special adhesive, the floor should be swept free of dust, or dirt. Any projecting nails should be removed or punched into the flooring, or they will eventually wear a hole into the tile.

Having decided on the design, a start can be made, not necessarily from the centre. Indeed, it is better to start alongside a wall where the tiles will remain firm against the pressure of adjoining ones when being laid. The glue is best applied to the floor with a triangular piece of pliable celluloid and a set-square will serve the purpose admirably. Only apply the glue to the area being laid, plastering in both directions with the celluloid until a thin even coating is achieved. The adhesive will ooze through the joints, sticking the edges, but surplus must be wiped away immediately with a damp cloth if you wish to save trouble later on when it has dried.

There is no difficulty whatever in laying the tiles, if the start is made as

directed. Take a tile, hold edgewise and push firmly against the adjoining partners, lowering down to the prepared surface. See that the joints are in perfect alignment, using a piece of wood for a straight edge if necessary. When the tile is in position, hold in place with one hand, rolling a squeegee over to remove any air bubbles underneath. If you do not possess a squeegee, you may smooth down with a clean dry duster. The important points to note in laying these tiles are that each must be pushed quite tightly against its partner, well hammered down, and surplus adhesive removed immediately.



Using a squeegee to set the tile and remove any underlying air bubbles

When you arrive at a corner, the tiles should be laid down loosely, placed in position although overlapping. Scribe a line on the underneath tile which can be removed for exact trimming, then proceed to apply adhesive. Where some really awkward shape is to fit, which cannot be tackled in this way, or by measuring, it is a good plan to prepare a paper template. A door jamb may be a case in point. Place the paper round the corner, tearing away as much of the surplus as is convenient. At the edge of the floor make a crease in the paper by running a pencil round, then cut out with scissors. This pattern may be fitted as a trial before trimming the linoleum to match.

No handyman should have any fears of attempting this job, and he will find the results are extremely gratifying, for a neat border and the touch of colour will transform the whole appearance of the kitchen. But do remember to get those few extra tiles for wear and tear, even if it is looking a long way ahead.

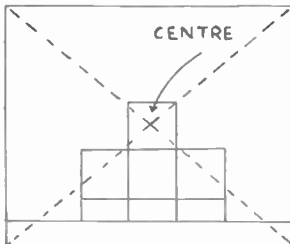


Fig. 1a

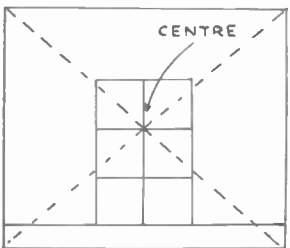


Fig. 1b

do well to consider the decided advantages of linoleum tiles. 9in. square, they are available in all colours, extremely easy to handle in the awkward corners, while the colour combinations are almost unlimited.

It is not essential, but most useful, to prepare a scaled plan of the room, say 1in. representing one foot, noting that 3/4in. represents the measurement of a

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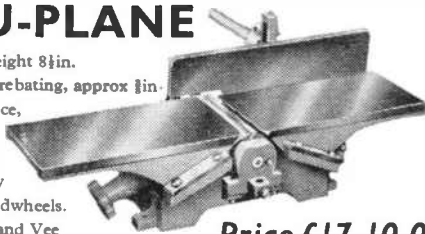
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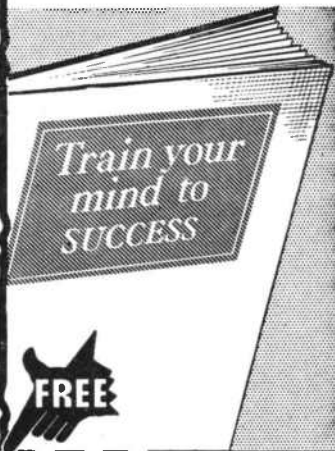
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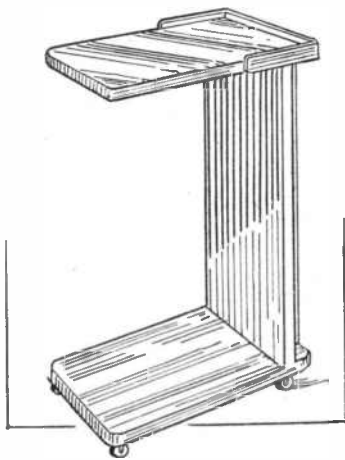
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A BEDSIDE TABLE



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A view of the framework is given in Fig. 1, showing the top and vertical stand. The bottom is not shown, as this is identical with the top. The vertical stand part consists of a frame of $\frac{3}{4}$ in. thick wood, sides and rails being 3in. wide timber. The top and bottom are similarly framed up with sides and front of 3in. wide wood and a rear rail 4ins. wide. A simple mortise and tenon joint, as detailed in Fig. 4, is employed

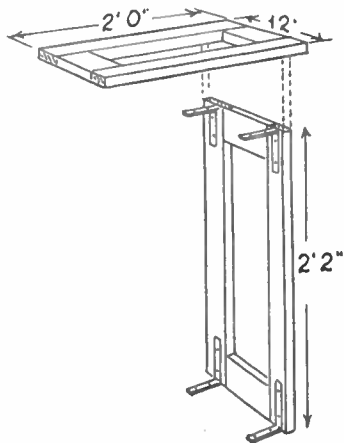


Fig. 1

throughout for joining these frames together. Dowel joints can be substituted if preferred, but whichever method is adopted, care must be taken in marking out and cutting the joints, in order to leave a flat and even surface over the whole frame to which a layer of plywood can subsequently be glued.

When the glue is hard, level off any slight inequalities of the surfaces with a finely set smoothing plane. Screw the top and bottom parts to the vertical stand, the latter being positioned 2ins. in from the rear of both frames, leaving a ledge to which stretcher pieces can afterwards be fixed.

Obtain two pairs of 6in. steel brackets and lay these in the inside angles, at top and bottom (see Fig. 1), running a pencil round them to mark their position. Take the frames apart, then recess them on the marks sufficiently deep to allow the brackets to lie in just below the surface, as in detail Fig. 3. Make sure you use the right screws, as no screw heads must project above the surface of the wood, remembering that plywood will cover the frames afterwards. Now re-screw all frames together, fit the steel brackets in their places, and screw down securely.

Cut a piece of $\frac{1}{2}$ in. plywood, large enough to cover the vertical stand on the outside. Fix this on with glue and panel pins. From 1in. thick wood, $1\frac{1}{2}$ ins. wide, cut two pieces long enough to extend from base to top. Screw these in place through the base and top frames, as at Fig. 2, and also through the vertical stand sides. Position at 2ins. in from each side edge, as shown in detail (A) Fig. 2.

From $\frac{1}{2}$ in. plywood, cover the top, both sides, then the upper surface of

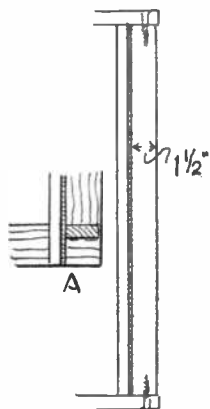


Fig. 2

CUTTING LIST	
Vertical stand sides.	(2). 2ft. 2ins. by 3ins. by $\frac{3}{4}$ in.
Vertical rails.	(2). 8ins. by 3ins. by $\frac{3}{4}$ in.
Top and bottom sides.	(4). 2ft. by 3ins. by $\frac{3}{4}$ in.
Top and front rails.	(2). 8ins. by 3ins. by $\frac{3}{4}$ in.
Top and rear rails.	(2). 8ins. by 4ins. by $\frac{3}{4}$ in.
Stretchers.	(2). 2ft. 2ins. by $1\frac{1}{2}$ ins. by 1in.
Plywood panels.	12ins. by 24ins. (1); 12ins. by 1ft. 9 $\frac{1}{2}$ ins. (2). 12ins. by 2ft. 2ins. (2).
FITTINGS	
4 steel brackets, 6ins. long, and 4 small furniture castors.	

the base, and finally the inside of the vertical stand. Let the glue harden, then with the smoothing plane level all the edges. The sharp corner angles should be rounded off a little at the front edges of top and bottom. The rear edge of the bottom can also be rounded off, but leave the rear corners of the top untouched, as a rim has yet to be fixed.

The rim portion is shown in the drawing of the finished article. Strips of $\frac{1}{2}$ in. fretwood will serve nicely for this, wide enough to stand up above the table top about $\frac{1}{2}$ in. and prevent, to some extent at least, cutlery and condiment vessels from being accidentally pushed off the table. The rim pieces cover the rear edge, and extend along the side edges for 9ins.

Considering the material employed to make the table (probably deal and plywood), a finish of enamel or lacquer is to be recommended. Give the whole a preliminary coat of priming, as plywood, in particular is very absorbent. Over this a coat or, perhaps, two will be necessary, of suitable undercoat. Follow on with enamel or lacquer, as preferred. To the bottom of the table it would be a good plan to fit small castors. (W.J.E.)

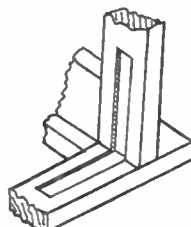


Fig. 3

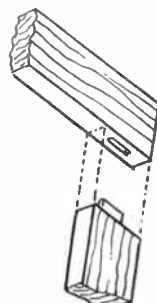


Fig. 4

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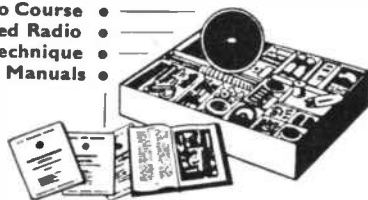
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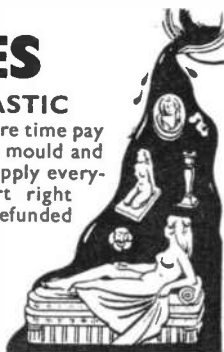
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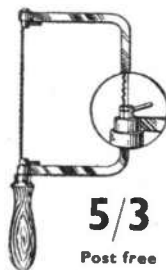
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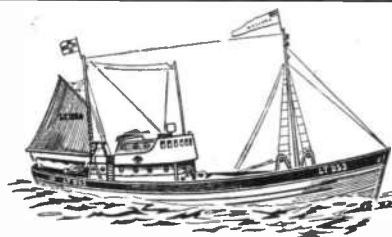
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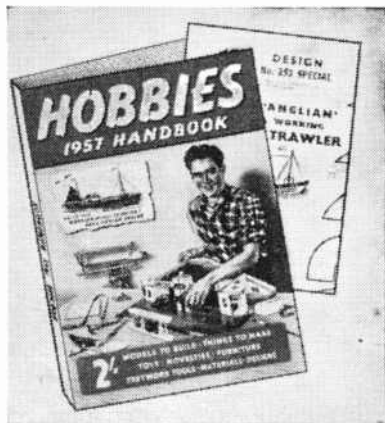
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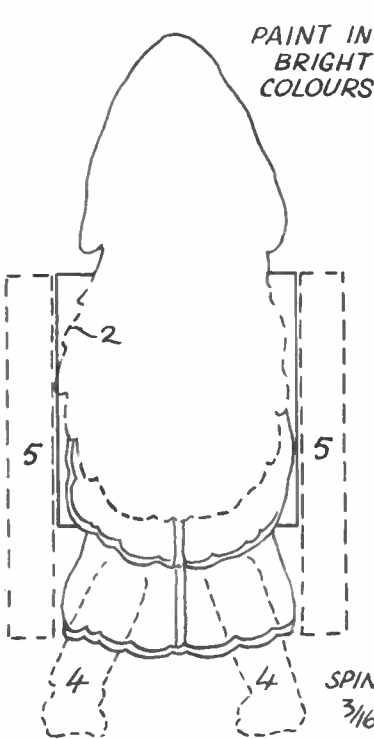
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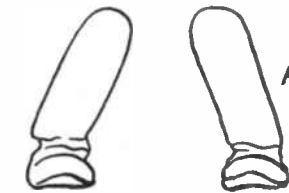


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CUT ONE $\frac{1}{8}$ IN.

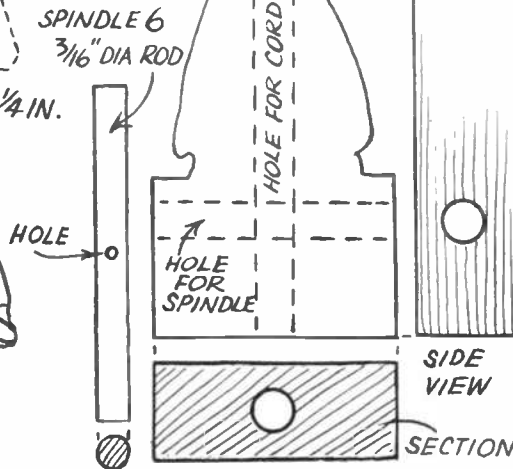


THIS little toy will slide down the cord and stop at your command. The detail in the cut-away side view reveals the secret. The arms (5) are attached to the ends of spindle (6). A hole bored in the centre of the spindle allows the cord to pass through. When the arms hang down movement is restricted, but when the cord is pulled tight the toy slides down. (M.p)

PIECE 1. CUT ONE $\frac{1}{4}$ IN.



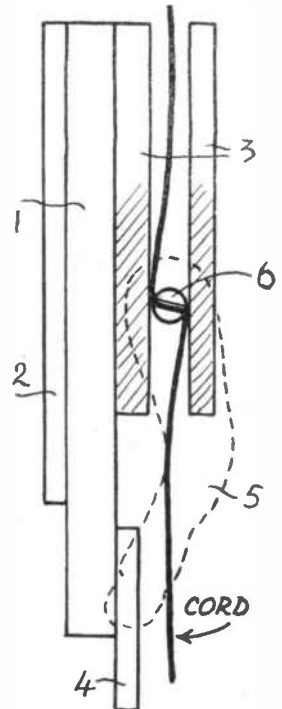
LEGS 4 CUT ONE
OF EACH $\frac{1}{8}$ IN.



BLOCK 3. CUT ONE
FROM BALS

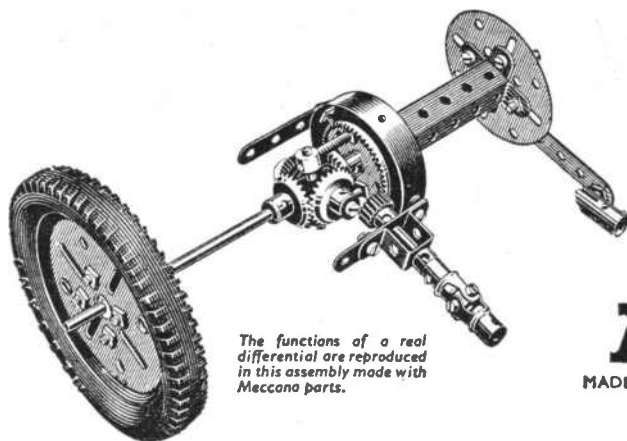
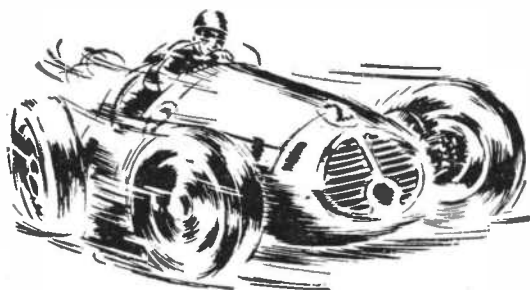


ARMS 5 CUT ONE OF EACH $\frac{1}{4}$ IN.



SIDE VIEW
(CUT AWAY)

What happens when a car turns a corner?



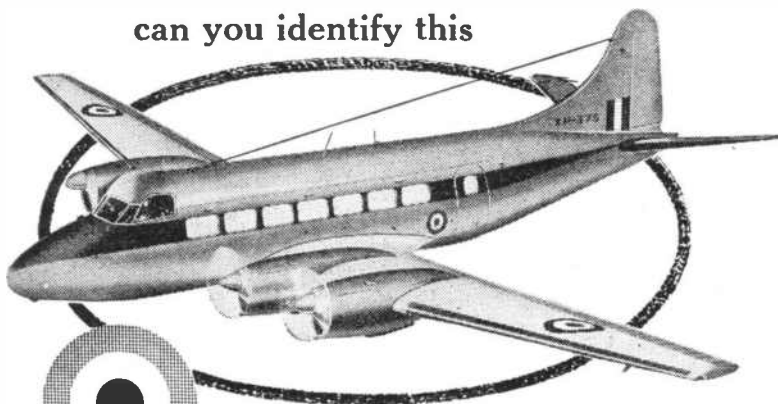
The functions of a real differential are reproduced in this assembly made with Meccano parts.

When turning a corner, the inner driving wheel of a car turns slowly while the outer wheel travels faster to negotiate the greater radius of the outer sweep. This difference in wheel speeds is automatic and made possible by a mechanism called a 'differential.' Meccano boys know all about this, because they build models of differentials and many other ingenious mechanisms with Meccano.

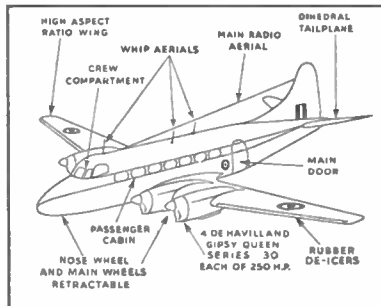
MECCANO

MADE IN ENGLAND BY MECCANO LTD., BINNS RD., LIVERPOOL 13

can you identify this



* Max. cruising speed 177 m.p.h. Initial climb 1,060 ft/min. The de Havilland Heron has a maximum range of 1,250 miles and a loaded weight of 12,500 lb.



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It's in service with the Queen's Flight of the Royal Air Force. Keeping this fine aircraft tuned up for its V.I.P. flights is one of the jobs you could do in the R.A.F. Join as an Apprentice (age 15-17). Training pay has nearly doubled under the new R.A.F. scale. For details of an exciting career with a great future, post the coupon now!

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TO: ROYAL AIR FORCE (H.S.249),
 VICTORY HOUSE, LONDON, W.C.2
 I am over 14. Please send me details of entry for:

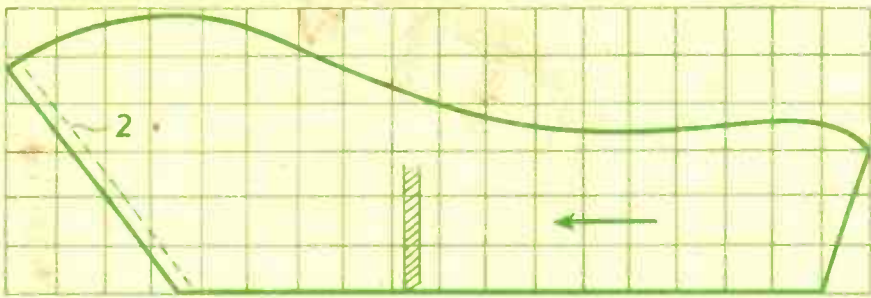
(A) Apprentices | (B) the A.T.C. |
 (Tick which you require)

NAME

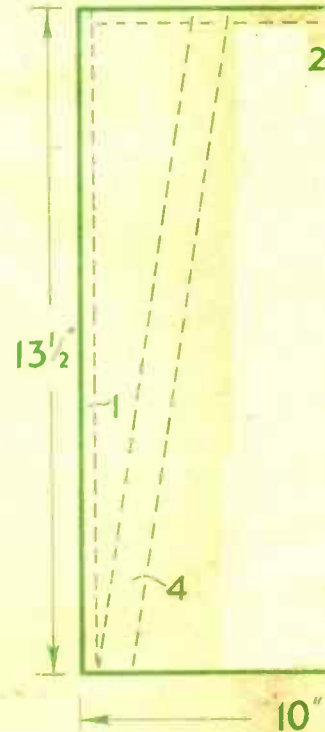
ADDRESS

.....

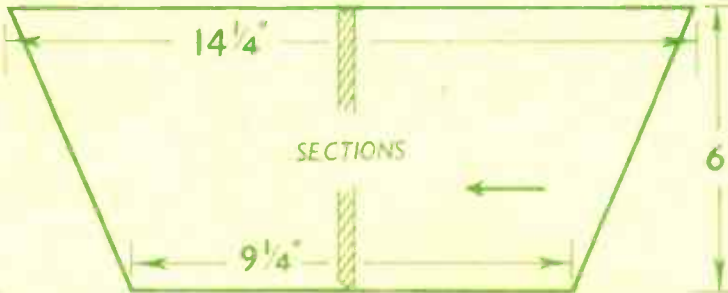
DATE OF BIRTH



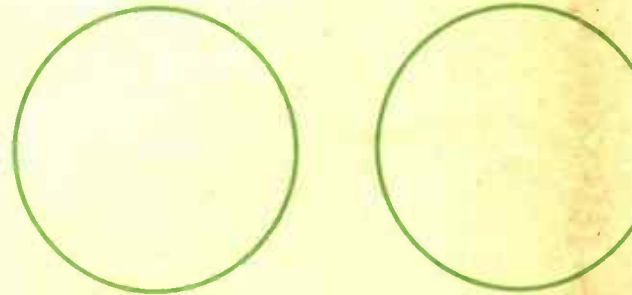
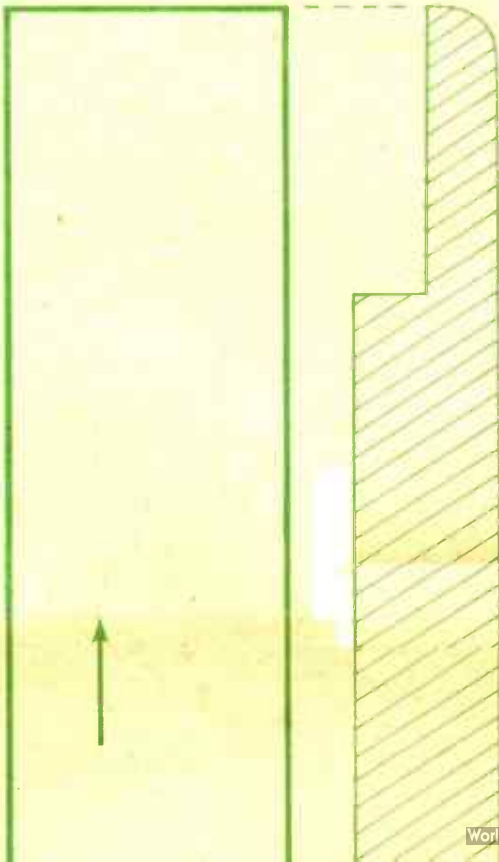
SIDES 1. MARKED OUT ON 1 in. SQUARES.
CUT TWO $\frac{3}{8}$ in.



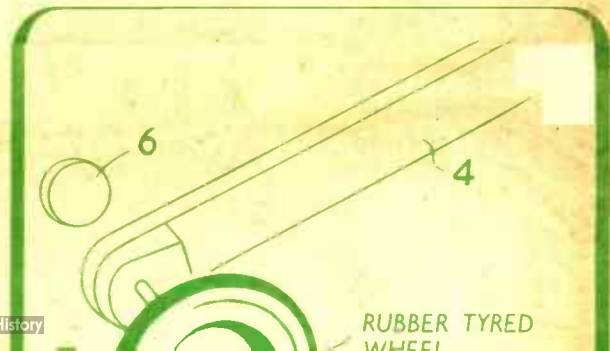
BOTTOM 3. CUT
 $\frac{3}{16}$ in. PLY



FRONT 2. CUT ONE $\frac{3}{8}$ in.
SHAPE TO SECTIONS.



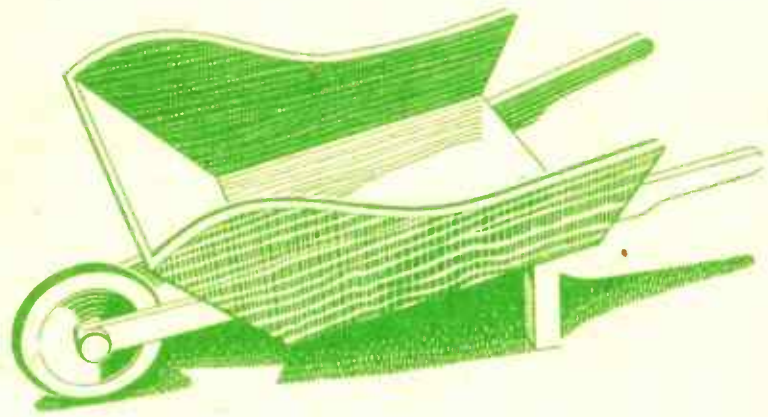
PIECES 6. CUT ONE OF
EACH $\frac{3}{8}$ in.



RUBBER TYRED
WHEEL

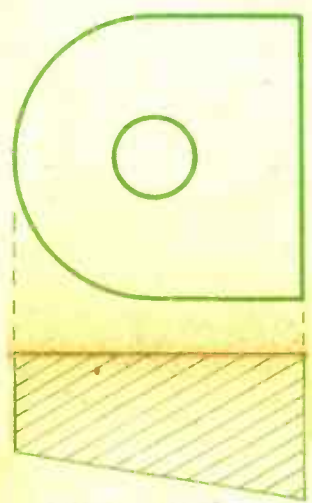
TOY WHEELBARROW

SIZE — LENGTH 28 ins.
HEIGHT 10½ ins.



10"
1 3 CUT ONE FROM
in. PLYWOOD.

A COMPLETE KIT OF MATERIALS FOR MAKING THIS DESIGN IS SUPPLIED BY HOBBIES LIMITED, DEREHAM, NORFOLK. PRICE ON APPLICATION.



PIECES 7. CUT TWO 3/4 in. AND SHAPE TO SECTION.

Use **CASCAMITE** 'One Shot' Resin Glue for all wood gluing



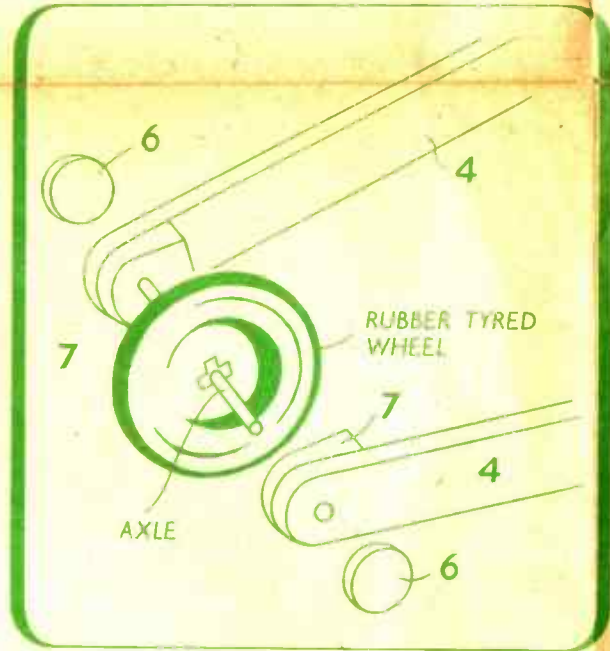
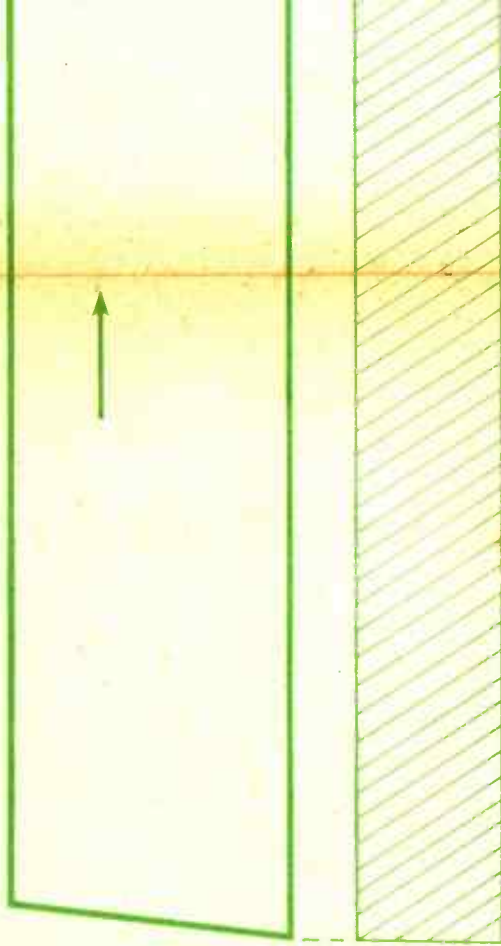
- Mixed & use cold
- Waterproof type
- Gap-filling and non-staining

Available in 3½ oz., 7 oz., and 1 lb. tins.

Stocked by: Ironmongers, Builders, Merchants, etc.

Manufactured by: **LOVELL & CO. LTD.** North, Baldesley, Southampton

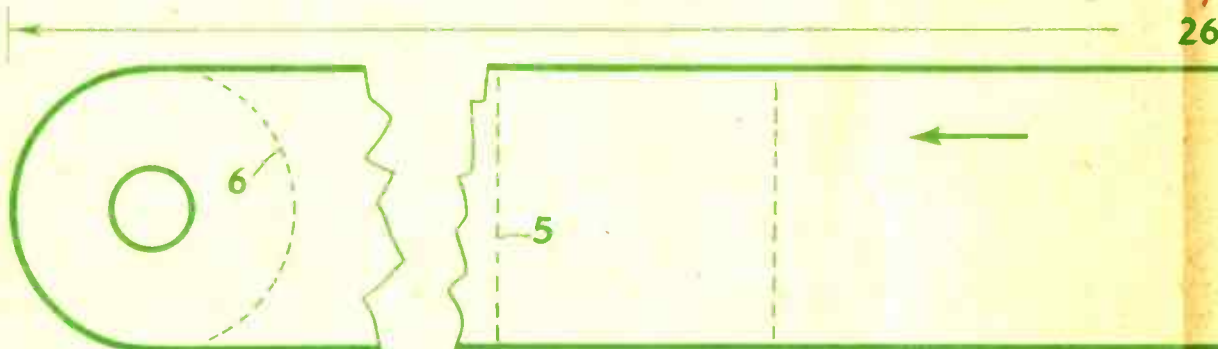
PIECES 6. CUT ONE OF EACH 3/8 in.



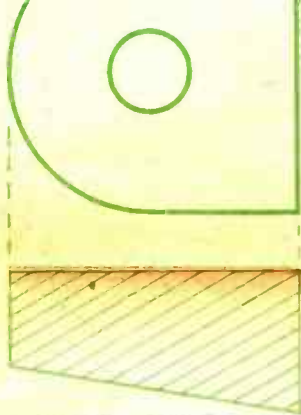
EXPLODED VIEW.

LEGS 5. CUT TWO FROM 1 1/2 in. BY 3/4 in. STRIPWOOD AND SHAPE TO SECTION.

 The
Toy for e



HANDLES 4. CUT TWO FROM 1 1/2 in. BY 3/4 in. STRIPWOOD.



PIECES 7. CUT TWO
3/4 in. AND SHAPE TO
SECTION.

THE ARROWS INDICATE
THE DIRECTION OF
GRAIN OF WOOD.

The Ideal
for every Boy

26 3/4"

Use **CASCAMITE**
'One Shot'
Resin Glue
for all wood gluing

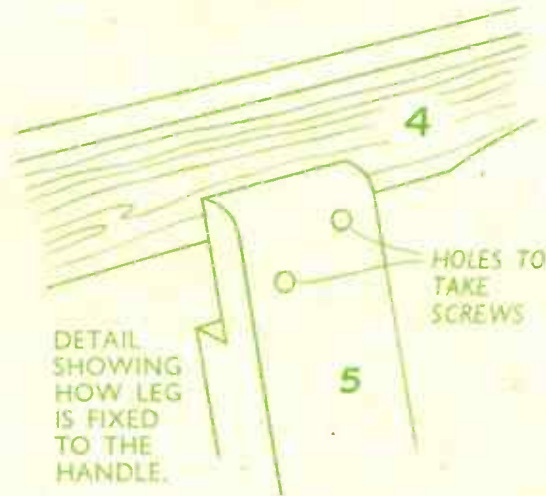


- Mixed & use cold
- Waterproof type
- Gap-filling and non-staining

Obtainable in 1/2-lb., 1-lb., and 5-lb. tins.

Stocked by: Ironmongers, Builders' Merchants, etc.

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LEICESTER, LOVELL & CO. LTD. North Baddeley, Southampton



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