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April 4th, 1931.
No. 1850.

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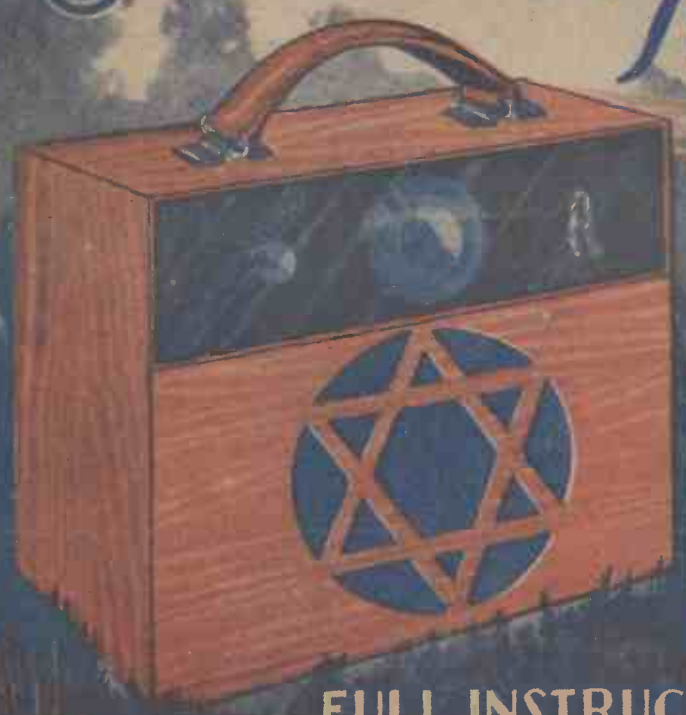

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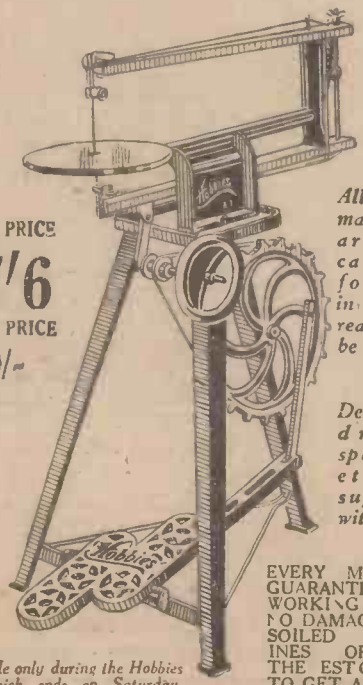

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Vol. 72. No. 1,850 Published Every Wednesday APRIL 4th, 1931

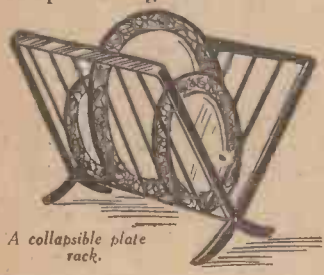
THIS WEEK'S CLEVER IDEAS

Aluminium Garden Labels.

AMATEUR gardeners like to stick little pieces of wood with paper attached into the earth, where they have planted seeds. On the piece of paper is the name of the plant expected, to remind them when the plant comes up that the chrysanthemum is not a marrow! Now, one of the troubles of this crude method is that a shower of rain speedily renders the writing on this piece of paper illegible, or the wind may blow it away entirely. An inventor has recently marketed garden labels of this sort, but made of aluminium. and when the name of the particular plant is written on this with a hard pencil it will remain on indefinitely, so in future there will be no excuse for confusing phlox with dahlias. One of these labels is shown to the right. By the way, why don't we write the names of our flowers in English? Does it look clever to write its Latin equivalent?

Aluminium garden labels.

A Space-saving Plate Rack.



A collapsible plate rack.

IN many modern homes space or lack of it is a serious consideration. We are all aware of the modern desirable freehold bungalow where, to get from the dining-room to the drawing-room you stay where you are! The tendency is to produce combination articles, such as box-ottoman-bed-cum-sideboard-wardrobe, in an attempt to conserve space. The rack shown below really is a space-saving device, for it is collapsible, and when not in use need not remain open with its wings spread to the empyrean. It folds up. When the crockery is being washed up it stands on the draining board, and when not in use it can be placed out of the way.

A Folding Shopping Bag.

HAVING the same idea of space-saving, the shopping bag here illustrated has been produced. This has the great advantage that it may be expanded to accommodate the accumulation of knick-knacks and other trifles which an empty-handed lady on a shopping expedition seems to collect round her with — er — mushroom-like rapidity. It is fitted with two pockets, one of which carries the purse and the other the handkerchief, shopping list, etc. It is made of waterproof material throughout, and may be obtained in a variety of colours and tweed effects. When not required for shopping it folds up into the compact pochette shown in the smaller illustration.

An expanding and contracting handbag.

Mercury Switch Light.

THE primary object of a mercury switch is to break a circuit carrying high voltage and high current. Unfortunately, with the usual form of mercury switch arcing takes place, giving rise to mercury vapour which is very poisonous. The little switch shown below, however, is totally enclosed. The electrode enters the tube by means of a small glass which retains some of the mercury round the electrode.

Model Aeroboats.

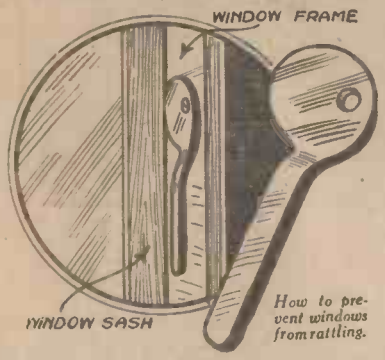
A neat mercury switch.

THE new Hobbies-Bowman Aeroboats, like their steamboats, have established a reputation for being the fastest, most reliable and certainly the cheapest boats on the market. The fact that even the Snipe model at 22s. 6d. will travel at racing speed for a mile on one filling, and that the smallest of the boats can cross a really large lake, makes them particularly interesting. The 12s. 6d. Aeroboat is half as long again as the guinea German clockwork boat, and runs for nine minutes.

NOTES AND NOTIONS from our READERS

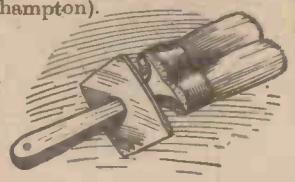
A Useful Window Stop.

WHEN a window commences to rattle, the usual method of stopping it is by means of a wooden



How to prevent windows from rattling.

or paper wedge. The disadvantage with this kind of window stop is that when the window is opened or shut the wedge falls out and the window continues to rattle until a fresh wedge is fixed in. By adopting the form of window stop shown in the sketch, it is quite a simple matter to wedge a window. The catch is fixed to the side of the window, as shown, and when pressed against the window holds it quite firmly.—G. M. (Wolverhampton).


A whitewash brush shield.

A Whitewash Brush Shield.

BEFORE commencing to whitewash a ceiling it is a good idea to fix a 4in. square of rubber over the handle as shown in the sketch. This will prevent the whitewash running down your arms and inconveniencing you while working.—R. P. (Newcastle-on-Tyne).

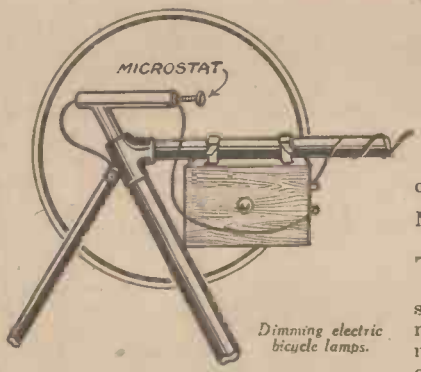

A substitute for a torch.

THAT DODGE OF *YOURS!*

Why not pass it on to us? We pay Five Shillings for every item published on this page. Mark your envelope "Notes and Notions."

A Substitute for a Torch.

FOR those who do not possess a torch, a handy substitute can be made in the following manner. Fix a bulb to the small terminal with a piece of wire, and bend down the end of the larger terminal about an $\frac{1}{8}$in. Press with the finger on the longer terminal, and when it touches the sensitive end of the bulb, quite a good light results.—C. B. (Fulham).



Dimming electric bicycle lamps.

Dimming Electric Bicycle Lamps.

OBTAIN a Lissen microstat and fix it inside the saddle stump by means of a cork. Connect one terminal of the battery to the top connection of the microstat. The bottom microstat connection is then passed through the back opening of the saddle-stump and connected to the bicycle frame with the saddle-stump fixing screw. The circuit is now complete, as the second battery terminal is connected to the lamp. The lamp can now be dimmed or brightened by screwing the microstat up or down. A glance at the diagram should make this quite clear.—I. E. (Staffs).

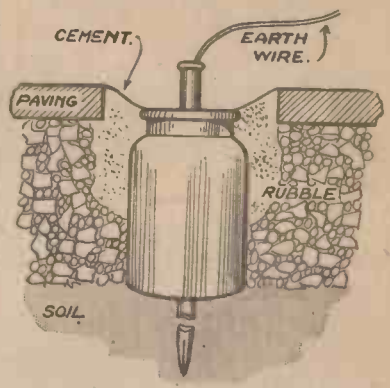
THIS WEEK'S MENTAL NUT

A man was recently observed to have dug a hole. He was 5ft. 10in. in height, and he announced his intention of digging twice as deep. His head would then be twice as far below ground as it was then above ground. How deep would the hole be?

Answer to Last Week's Problem

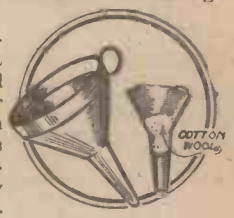
THIS solution shows that eleven manipulations were required.

10-qt.		10-qt.		5-qt.		4-qt.
10	..	10	..	0	..	0
5	..	10	..	5	..	0
5	..	10	..	1	..	4
9	..	10	..	1	..	0
9	..	6	..	1	..	4
9	..	7	..	0	..	4
9	..	7	..	4	..	0
9	..	3	..	4	..	4
9	..	3	..	5	..	3
9	..	8	..	0	..	3
4	..	8	..	5	..	3
4	..	10	..	3	..	3



Making an earth connection through concrete.

Making an Earth Connection through Concrete.



A simple strainer.

THE following is a successful method for making earth connections through concrete or crazy paving. Obtain a glass jar about 3in. diameter and knock the bottom out. Dig a hole through the concrete or paving until you reach the soil underneath, and stand the jar in the hole (see sketch). The earth tube can now be driven through into the earth. This method avoids untidy jagged holes, and the jar collects moisture and rain, thus making an effective earth for your wireless.—L. J. (Carlisle).

A Simple Strainer.

A SUBSTITUTE for a strainer can be made by fixing a piece of cotton wool inside a funnel as shown in the diagram. This will act quite well for straining liquids.—R. R. (Cornwall).

A Handy Glass Cutter.

IF a gramophone needle holder be fitted to a suitable handle and a sharp gramophone needle is inserted in the holder, it will make a handy glass cutter. When the needle becomes blunt it can easily be replaced.

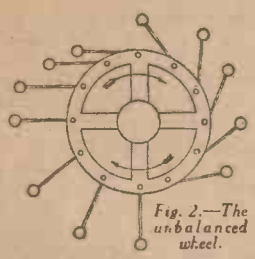


Fig. 2.—The unbalanced wheel.

THE ROMANCE OF PERPETUAL MOTION

The Dream of Centuries.

Ingenious Devices Intended to Work for Ever!

By The Editor

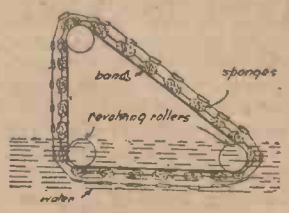


Fig. 5.—The endless band of sponges.

THE debt we owe to those who, by striving to achieve the impossible, have stumbled across some discovery or invention of great value to civilisation will never be realised. The alchemists endeavoured to turn base metals into gold. It was a singular desire, for, had it been possible, the value of gold, and hence of the process of conversion, would have vanished; gold would have been of no more value than lead. In their endeavour, however, they accidently made discoveries which have been of great value in other directions.

So has it been in the world of mechanics. For centuries men have toiled to invent a machine which would go for ever. Now it can be definitely stated that perpetual motion is an impossibility and will never be an accomplished fact. It is only the untrained mind, the unmechanical mind, the mind knowing little of first principles, that would waste time, money or thought on the proposition. And yet every year the specifications at the Patent Office represent a bulky and tangible proof of the fact that it is still thought to be possible.

Fig. 1.—The lever, which shows why perpetual motion is impossible.

Patents Granted.

Apparently these misguided persons think that the fact of letters patent being granted for an invention is proof of the soundness of the idea!

One hundred years hence the dream of centuries will be as fresh as ever. The country will still draw patent fees from people who believe that they can get something for nothing! Perhaps this desire is more or less dormant in all of us, for certain of us have a strong inclination to get more money units out of a given effort than the equivalent work units we put into it. The idea is nice to toy with! However, in stating that perpetual motion is an impossibility and can never be achieved, it must not be inferred that the ideas lack ingenuity, for some of the projects for perpetual motion are quite clever in conception.

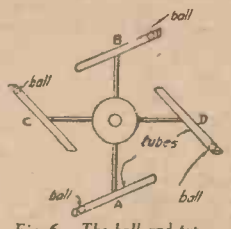


Fig. 6.—The ball and tubes.

Why Perpetual Motion Is Impossible.

To repeat a well-known law of mechanics, it is impossible to get more work out of a machine than is put into it. Engineers would be well satisfied if they could get out as much as they put in, but after friction and other losses have been allowed for actually out of, say, 100lb. of energy put in, only, perhaps, seventy are available for useful work! In order that the reader may more fully appreciate the reason why devices for perpetual motion cannot work, a drawing of a simple lever is given in Fig. 1.

Fig. 3.—The wheel and balls.

It is well known that a machine is a device for altering the direction, point of application, or magnitude of a force. Altering the magnitude of a force does not increase the original force. For example, the lever in Fig. 1 works about the fulcrum shown as a small black circle. The portion marked *l* is one-tenth of the length of L, therefore the leverage is ten to one. A force of 1lb. applied at B will, therefore, lift a weight at C of 10lb. The force, however, is still the same, because L × 1lb. equals 1 × 10lb. That is to say, 10 × 1 equals 1 × 10.

The Unbalanced Wheel.

Describing now some of the devices which have been made, pride of place is given to the unbalanced wheel, shown in Fig. 2. The inventor thought (and a good many have thought since) that if he could construct a device which would constantly destroy its own balance, perpetual motion would result. On this principle he constructed the unbalanced wheel, which consists of a number of arms pivoted at equal distances round the outer edge of a wheel. He erroneously thought that the arms on the right-hand side of the wheel, being further extended, would cause a lack of balance, and, therefore, the wheel would revolve. By the time the wheel had made a quarter turn the other arms would be fully extended, and so on for ever and ever!

It is quite plain that the wheel would remain stationary with the arms all drooping downwards.

A few years ago some London firms showed a model of this device in their windows, apparently working by itself. It was, of course, driven by a small motor, so contrived that it was obscured from the view of the observer.

The Balls in the Wheel and the Magnetic Wheel.

An adaptation of this device is shown in Fig. 3, where a series of balls are shown in their relative positions in the spokes of a wheel, as if the latter were revolving, the spokes being so constructed that the balls ran in a little track to prevent them falling out. Unfortunately, it was not successful!

Fig. 4 recalls the old idea for perpetual motion, known as the magnetic wheel. The specious claims of the inventor state that "a light wheel is mounted on fricton rollers, set with slips of iron at an angle round its periphery. The two magnets N,

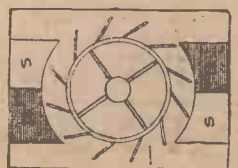


Fig. 4.—The magnetic wheel.

which attract the rim of the wheel, will render one side lighter and the other heavier, thus imparting perpetual motion! To render the apparatus more powerful, the steel rims might be magnetised and fixed on the wheel with their north poles facing towards its centre. Two more magnets (shown unshaded) must be added."

Again the hopes of the inventor, alas! were dashed to the ground, for nothing short of some form of motor would induce it to work.

The Endless Band of Sponges.

The endless band of sponges (Fig. 5) partly immersed in water is another example of fruitless endeavour, and its sponsor was none other than Sir W. Congreve. It will be seen that three rollers are mounted in a frame, and an endless band of sponges is passed over these rollers. Connected to the outside of the sponges is another band, carrying a series of identical weights. The inventor thought that as the weights on the perpendicular side of the triangle formed by the bands and rollers hang truly vertically, they would not compress the sponges at that point. Therefore, the open pores of those sponges would absorb water and so create a load which cannot exist on the ascending side of the band, because the weights compress the sponges and close their pores; the load, therefore, causes the band to revolve!

This example is merely given to show that some people of scientific attainments have entered the field, but it is difficult to believe that their efforts were serious.

Fig. 7.—The bellows wheel.

A Ball and Tube Device.

Probably the reader will remember the device shown by Fig. 6—the ball-and-tube device. As the balls in tubes A and B are equidistant from the central line, they are in equilibrium, but the ball in C, being farther from the supporting point than D, destroys the balance, and thereby causes the device to revolve, so that tube A then occupies the position formerly occupied by C; and, by a continuous repetition of this, actual perpetual motion is achieved—on paper!

The bellows wheel (Fig. 7) is a further ingenious attempt to solve perpetual motion. It consists of a series of radial tubes, each connecting an inner and outer bellows. Liquid is poured into each tube, sufficient to fill the tube and one bellows.

Perpetual Motion—But Not Quite!

A weight is placed on the outside of the bellows. The bellows on one side will, therefore, all be gradually closing (the horizontal one on the rising side will be entirely closed), whilst those on the other (the descending) side will all be more or less open, according to their position. As, therefore, one side of the wheel will be heavier than the other, again we have perpetual motion; but not quite.

Sufficient is shown in the diagrams to show the impossibility of the problem. The nearest approach to perpetual motion is the human being itself, and to endeavour to solve perpetual motion is to endeavour to solve the mystery of life.

A MODERN WEATHER COTTAGE (*continued from opposite page.*)

bottom edge, to fit into the mortice in the platform. Cut the platform as shown in Fig. 6, $\frac{1}{8}$in. thick, with a mortice in each end, $\frac{1}{4}$in. from each edge, $\frac{3}{4}$in. long by $\frac{1}{8}$in. wide. Drill a hole in the centre, in which to fix the catgut. Glue the tenons on the figures into the mortices in the platform; fix the catgut in the centre, pass it through the hole, glue it and tie a knot underneath. Then thread it through the two supports "B," adjust it, so that the platform swings about $\frac{1}{4}$in. clear of the floor of the cottage, fixing at the top as already described. Having fixed all the interior parts, the front may now be screwed in place. Next cut the ridge piece, $\frac{3}{16}$in. thick, this may be enlarged quite easily from Fig. 7, to $2\frac{3}{4}$in. long, glue this in the openings in front and back of house.

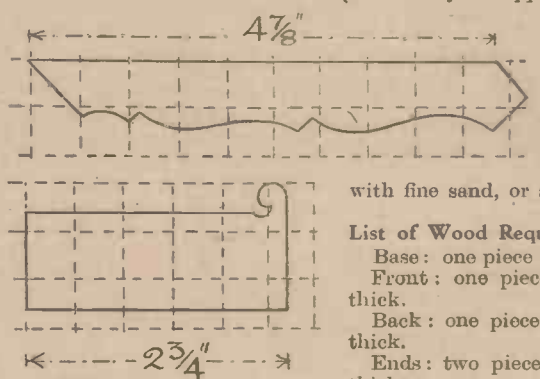


Fig. 7.—How to cut out the ridge pieces.

The Roof Slopes.

Cut the two roof slopes 5in. long by $2\frac{1}{2}$in. wide, $\frac{3}{16}$in. thick, chamfer this on the top edge only to fit close to the ridge piece, and screw into place. Now cut the two gable overlays $\frac{1}{8}$in. thick, this is also enlarged from Fig. 6 to $4\frac{7}{8}$in. long. Glue and pin these to the roof slopes, front edge. The cottage is now complete, and may be finished by covering with brick paper, and the roof with tile paper, or if a rough-cast finish is preferred cover the house with glue, and sprinkle with fine sand, or sawdust.

List of Wood Required for Cottage.

Base: one piece 7in. long, $2\frac{1}{2}$in. wide, $\frac{1}{4}$in. thick.

Front: one piece $9\frac{1}{8}$in. long, $6\frac{1}{2}$in. wide, $\frac{3}{16}$in. thick.

Back: one piece $9\frac{1}{8}$in. long, $6\frac{1}{2}$in. wide, $\frac{3}{16}$in. thick.

Ends: two pieces $9\frac{1}{8}$in. long, 2in. wide, $\frac{3}{16}$in. thick.

Roof slopes: two pieces 5in. long, $2\frac{1}{2}$in. wide, $\frac{3}{16}$in. thick.

Supports "B": two pieces 2in. long, 1in. wide, $\frac{3}{16}$in. thick.

Ridge piece: one piece $2\frac{3}{4}$in. long, $1\frac{3}{8}$in. wide, $\frac{3}{16}$in. thick.

Gable overlays: two pieces $4\frac{7}{8}$in. long, $\frac{3}{4}$in. wide, $\frac{1}{8}$in. thick.

Window overlays: two pieces $1\frac{7}{8}$in. long, $1\frac{3}{8}$in. wide, $\frac{1}{8}$in. thick.

Platform: one piece $4\frac{5}{8}$in. long, $1\frac{1}{4}$in. wide, $\frac{1}{8}$in. thick.

Two pieces $\frac{1}{8}$in. thick for the figures.

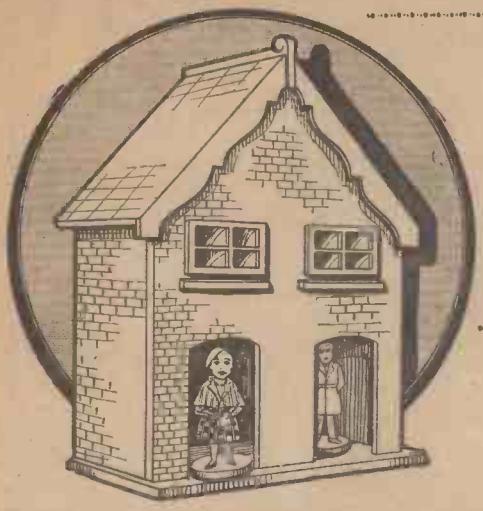


Fig. 1.—The finished "modern" weather cottage.

A MODERN WEATHER COTTAGE

and

HOW IT IS MADE

By E. Kerb

EVERYONE is, no doubt, familiar with the little weather cottage shown in Fig. 1. It never loses its popularity, and it will be even more fascinating to make one for yourself. As the outdoor season is approaching, for tennis, etc., it will be wise to consult the weather cottage before starting out, as, if the little lady is in the doorway, you may be sure of a fine time, but beware if the gentleman is out: "Take your mackintosh."

The cottage is quite simple to make, if you follow the diagrams carefully. Commence by cutting the base, as shown in Fig. 2, ¼in. thick; the dotted lines indicate the position of the back, front and ends.

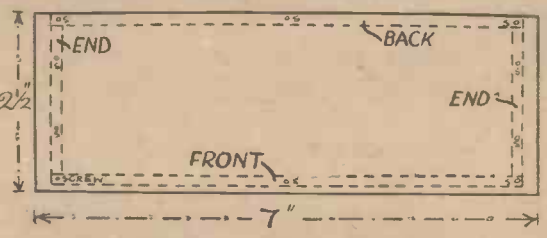


Fig. 2.—The measurements for cutting out the base.

The Front.

Next mark out the front, as shown in Fig. 3, 9⅛in. high by 6½in. wide, ⅜in. thick, the slope for the top being 45deg. taken from the side, 5⅞in. from the bottom edge. A line should be drawn across the wood, as the window openings are also 5⅞in. from the bottom edge, these may be marked out next, ⅞in. from each edge, the openings being 1¾in. wide by 1⅛in. high. The dotted lines indicate the position of the overlays, to hold glass in place, which are cut to the dimensions shown in Fig. 4, ⅛in. thick. Or if preferred a piece of transparent paper cut from chocolate boxes may be stuck at the back of the openings, instead of glass. The window-sills are plain pieces, 2in. long by ⅜in. wide, ⅛in. thick; these are glued underneath the windows in the position shown by the dotted lines. The dimensions for the doorways are shown clearly, they have curved tops, the radius being 1⅝in. The opening at the top is to take the ridge piece, the dotted lines "B" show the position of the supports, to which the catgut is fixed.

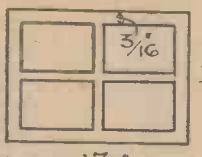


Fig. 4.—The overlays for holding the glass in position.

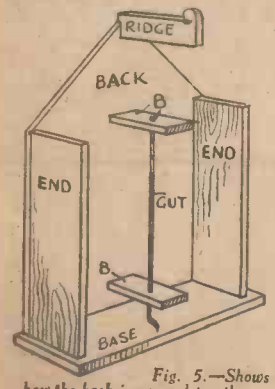


Fig. 5.—Shows how the back is screwed together.

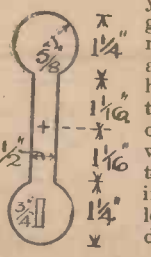


Fig. 6.—Details of the platform.

The Back.

This is cut to exactly the same shape as the front, ⅜in. thick, omitting all interior openings, but having the opening at the top to take the ridge piece. The two ends are just plain rectangular pieces, measuring 5⅞in. high, by 2in. wide, ⅜in. thick. Having cut the parts mentioned, screw the ends to the back, and then the whole to the base, leaving the front off for the time being. Now cut the two supports "B" 2ins. long by 1in. wide, ⅜in. thick, with a hole cut centrally, ¾in. from the front edge, just large enough to take the catgut. Screw these to the back centrally, the top one 5⅞in. from the bottom edge, and the bottom one ½in. from the bottom edge. Fig. 5 shows all these parts screwed together.

The Figures.

The figures should be coloured ones cut from magazines, a *modern* young lady and gentleman, measuring about 2½in. high; paste these to a piece of ⅛in. thick wood, and cut to outline, leaving a tenon ⅛in. long by ⅛in. deep, on the

(Continued on previous page.)

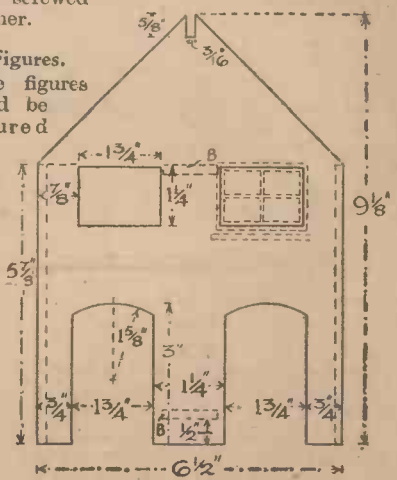


Fig. 3.—How the front is marked out.

The layout of the rock garden and pool.

A ROCK GARDEN AND POOL FOR A SMALL GARDEN

By A. Western

SEVERAL readers wish to construct small rock gardens with pools, and while it may not be possible to give definite instructions in this article to meet every need, yet, with the help given, any reader may turn a barren and desolate spot into a very pleasing prospect at very little trouble or expense.

Fig. 3.—A section view showing how to construct the pool.

Where to Place the Pools.

If a garden only is required, it will be a fairly simple matter to arrange it on any selected spot; but when a pool is also desired, it needs to be carefully planned before operations are commenced. Where the spot is very small, a pool may be quite out of the question. Much depends upon the size, shape, position, and condition of the available plot. If it is well drained, the garden may be formed without any thought being given to this matter, but if not, and especially if a paved brick, or cemented surface is being treated, it is imperative to arrange large stones around the border with their edges touching, and fill in to a good depth inside with somewhat smaller ones to enable rain-water to readily drain away.

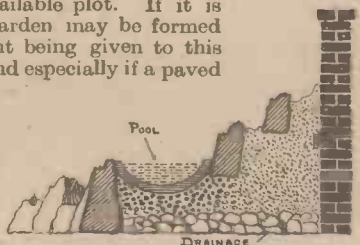


Fig. 1.—Rock garden and pool built against a wall.

The soil may be placed over this to any desired height, and to form any required shape of mound, but it is a good plan to first place a layer of old turves face down on the stones to prevent the soil being washed through the crevices. The exact form which the garden should take depends on if it is being built against a wall or not. If it is, then, of course, it will take the form shown at Fig. 1, but if not, the mound must slope on both sides, as shown at Fig. 2.

Fig. 4.—A pool built separately from the rock garden.

Fairly large stones, not less than a foot in length, should be used; they need to be firmly bedded in the soil and arranged to slope backwards slightly, as this allows the moisture to penetrate to the roots of the plants. It is possible to form a pool in the mound by arranging the stones with this end in view. A pool only 2ft. in diameter may be made most enchanting. Fig. 1 and section Fig. 3 give an idea of how it may be formed.

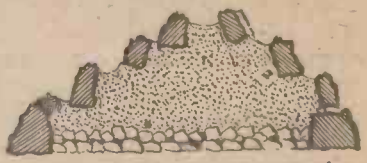


Fig. 2.—A rock garden for the centre of the garden.

Pool Made Separate from the Garden.

Where the plot is large enough, the pool may be made separate from the garden, and this is generally found to be more ornamental and give greater satisfaction. Two plans are shown at Figs. 4 and 5, or, by following the instructions, any shape plot may be treated. In the plans it is suggested that a pool surrounded with crazy paving should be laid out in the centre, with small rock gardens at each side, the latter being made as previously described.

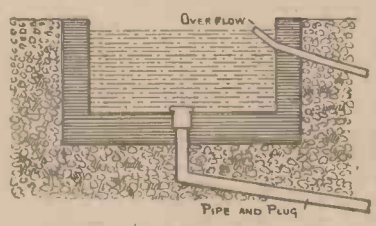


Fig. 6.—Another method for constructing the pool.

It will be found that a square or oblong pool is the simplest to make. The hole is dug to the required size and depth, and the soil is rammed quite firm. The bottom and sides are formed with concrete made from a mixture of small stones, sand, and cement. Three parts stones, two sand, and one cement makes good concrete. The bottom of a small pool should be about 4in. thick and the sides 3in. The section Fig. 6 shows a square pool with a drainage pipe and plug at the bottom, and an overflow pipe arrangednearthetop; both of these pipes should be arranged to flow into a drain.

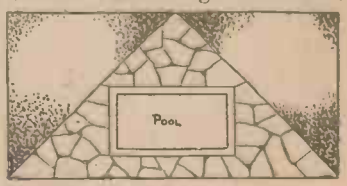


Fig. 5.—Another form of pool.

A SIMPLE AND SAFE MODEL AIRSHIP

A Satisfactory Flier described by "Home Mechanic"

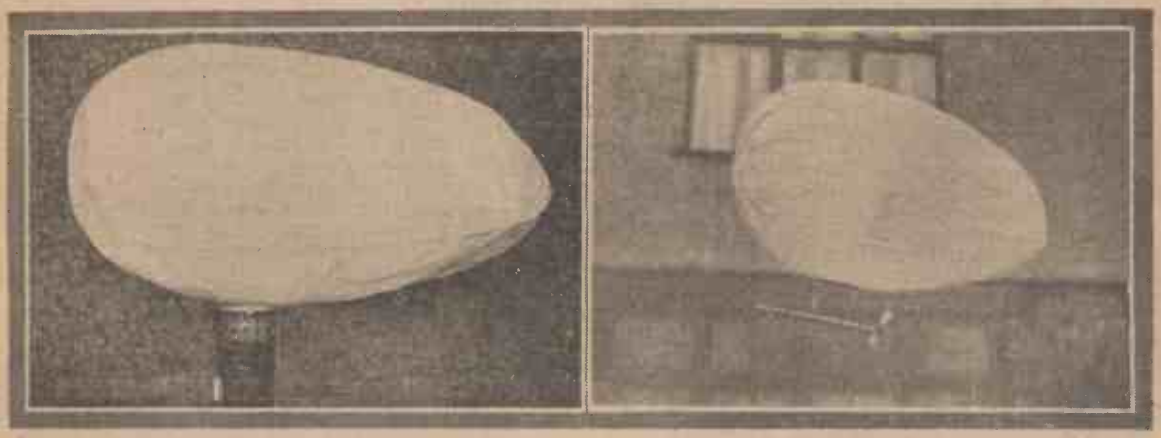


Fig. 1.—(Left) Inflating the envelope by means of an oil stove and (right) the airship in flight.

OWING to the enormous amount of interest created by the first HOBBIES airship and the large number of letters received from readers asking if the expense of the gold-beater's skin envelope could be avoided, experiments have been made with the object of producing a design for an airship which anybody can make at the cost of a few pence, at the same time avoiding the use of highly inflammable hydrogen gas for inflation.

The result of these experiments is an airship made of tissue paper inflated by hot air from an ordinary oil stove, as shown in the photograph (Fig. 1). The fuselage and propeller are not shown in this photograph; they are hooked on to the balloon when inflation is completed (see Fig. 1—right). When inflated as instructed, later on, the airship will make flights of about one minute or more in duration, usually longer than the propeller runs for. The duration of flight can be greatly prolonged by using a small pad of cotton wool soaked with methylated spirits and ignited to keep the air hot inside the envelope, but as there is some risk of setting fire to the envelope, it is not advisable to do this indoors. Out of doors the airship will rise to a great height and will probably blow away beyond recovery if provided with a methylated spirits flame.

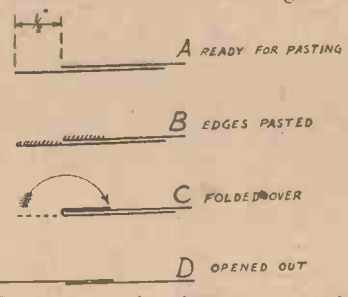


Fig. 2.—Showing how the sections are folded and joined together.

The Envelope.

To make the envelope, nearly a quire of tissue paper is required. The usual size for sheets of this paper appears to be 20in. by 30in. It should be as tough and strong as possible, but as the weight is very important, it should not weigh more than 5oz. for the quire (*i.e.*, 24 sheets). The airship illustrated was made from paper obtained from a W. H. Smith and Sons' shop at a cost of sixpence for one quire. Do not use the very soft fluffy sort of tissue paper, as this has very little strength; the right paper should make a crisp noise when crumpled up in the hand, and should be as free from porosity as is possible, though probably such thin paper is bound to be to some extent porous.

Take eighteen sheets of the paper and cut them in half lengthways, making thirty-six pieces each 30in. by 10 in. Paste these together in threes so as to make twelve pieces, each 90in. by 10in., and allow the paste to dry before proceeding.

How to Join the Twelve Sections of the Envelope.

Ordinary flour paste of rather thin consistency, brought to the boil and allowed to get cold before use—is quite suitable. The two pieces to be joined should be laid on top of each other, the lower one protruding ½in., as shown in Fig. 2A. Smear a little paste along the edges of both pieces and fold the underneath one back over the top one, as shown in Fig. 2C. Press down lightly with a pad of rag and open out flat before hanging up to dry.

When the twelve long pieces are dry (they will surely tear if not dry), crease one along its length to mark the centre line, then mark out the shape as shown in Fig. 3. The final shape of the airship depends upon the shape of these pieces, so draw the curves in nicely. Peeping along the end of the paper with one eye closed will foreshorten the curve and so help to show up irregularities. When you have the shape drawn to your satisfaction lay the sheet on top of the other eleven,

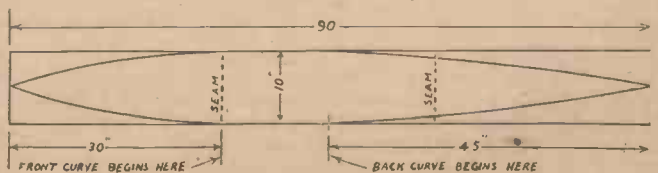


Fig. 3.—How each section is shaped to form the envelope.

keep them all together by laying weights on them and cut out all the twelve at once.

Now paste these together in twos along the edges, as shown in Fig. 2, and hang each pair up to dry. These pairs require to be hung up very carefully, for they will no longer lie flat when opened out. They will dry very well if hung concave side down over two chair backs about 2ft. apart. When the paste is dry, fold the double strips flat again as they were before being pasted, bring two of the double strips together, and join them as before, and open out before drying. You will now have three sections of the envelope, each consisting of four strips, which, when opened out, have a shape something similar to the shell of a boat.

When these three sections are dry, fold them up flat again, and join the first to the second and the second to the third, just as before, and allow these two seams to dry. The envelope is then practically complete except for the last seam, but do not attempt to open it out just yet.

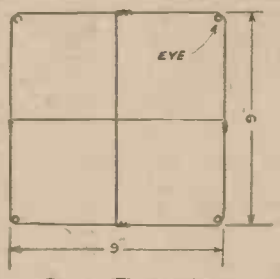


Fig. 4.—The wire frame.

The Disc for the Nose.

For the last seam, draw the edges together, keeping them flat on the table, and paste and fold over as before. Start from the tail end and leave about 2ft. of seam unjoined near the nose end, but join about 6in. of the seam right up to the nose. When this last seam is dry enough, open out the envelope as far as possible and paste a disc of tissue paper over the front end. This disc will probably require to be about 8in. in diameter to close the opening.

The best way of fixing the disc is to hold a dinner plate bottom upwards, inside the envelope (through the 2ft. of open seam), and get an assistant to apply the disc and press it down smoothly against the plate.

The tail does not require a disc, the pointed ends of the strips are simply gathered together and bound with sewing cotton.

Adhere to the dimensions closely, for if you try to make the envelope more slender in shape you will probably upset the stability, or if you think the thing looks too big for convenience, don't attempt to make it smaller or it may not have enough lifting power.

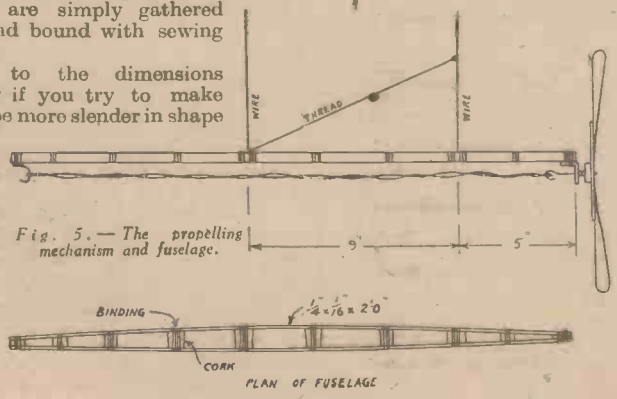


Fig. 5.—The propelling mechanism and fuselage.

The Wire Frame.

Do not be discouraged if the envelope does not appear to be of a good shape, as it is impossible to judge the shape until it is inflated.

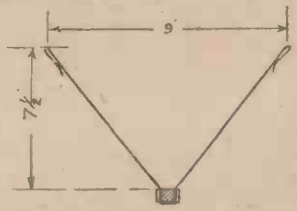
Now cut a square hole just behind the front transverse seam and fix in the wire frame shown in Fig. 4. This is made of thin piano wire about No. 23 gauge. It is fixed by simply lapping the envelope over the wire and pasting down. The 2ft. of open seam can then be pasted up in the manner familiar to you by now, and the envelope is finished. Its weight should at this stage be 3½oz.

The square opening is, of course, at the bottom of the envelope; on the top fix two single loops of darning wool by stitching the wool once in and out again through the double thickness of the transverse pasted seams, one loop at the front seam and one at the rear seam. These loops are for hanging the envelope up while it is being inflated.

The Propelling Mechanism.

The propeller and motor are illustrated in Fig. 5, and, as already mentioned, from a separate unit specially designed with a view to extreme lightness. The whole unit, including the suspension wires, should weigh about ¾oz. The fuselage is made from two strips of birch wood, ¼in. by ⅛in. by 2ft. long. These are spaced apart by small pieces of cork at intervals of about 3in., glued, and bound with sewing thread; the corks are ¼in. thick at each end, increasing in thickness towards the centre, where the two strips of wood should be about ½in. apart.

The bearing for the propeller shaft is brass about ¼in. × 1/32in., the propeller shaft being a piece of No. 23 gauge piano wire; the hook for the front end of the elastic is also made of the same wire. The propeller is a composite affair with a small cork for the boss, a strip of wood 4in. × ¼in. × ⅛in. for the arms, and blades of thin cardboard, the whole being 10in. diameter. Two good feathers stuck into the cork boss and trimmed to shape would probably make a good light propeller. Two small glass beads form the thrust bearing. Two strands of ⅛in. strip elastic should be used; this will turn the propeller comparatively slowly, but will provide enough thrust to keep the airship in motion.



The supporting wires are made of the same wire as used to frame the opening in the envelope; fix the wires between a cork and the wood. The hooks should be rather long, somewhat as shown, as they are easy to fix and do not jump out of their eyes as short, open hooks would do. The diagonal stays are of sewing cotton, the two rear wire stays having an eye near the top to prevent the cotton from sliding down the wire.

Inflating the Airship.

The best method of inflating the envelope is (as mentioned earlier) by means of an oil stove. The stove shown in the photograph is a large size "Valor Perfection" the cylindrical body of this being 7½in. diameter.

Remove the top plate by undoing two long bolts, and cover up the ornamental holes in the top end of the cylindrical body by wrapping a piece of tinplate (or any thin sheet metal) into a cylindrical form and slipping it inside the body of the stove. Four "ears" about ½in. wide should be made by snipping the tin plate with shears; by bending these ears outwards over the edge of the stove body the tinplate will be held

in position. The gaps left by the ears will then accommodate the cross-wires in the envelope opening, and allow the tinplate to protrude a little into the envelope.

With the wick turned right up the envelope becomes fully inflated in less than one minute, but it is advisable to keep it going longer, as the air inside then gets hotter and gives more lift and a longer duration of flight. In Fig. 1 the envelope is shown fully inflated, and endeavouring to rise, but it is held down by being tied to the stove. When properly heated it will easily rise to 50ft. or more with the propeller and motor attached. It simply leaps up.

How to Fly the Airship.

The best place to fly the airship is a lofty hall, but not everybody is fortunate enough to obtain access to such a place. If released in an ordinary room it rises to the ceiling and stays there, because the propeller has not enough thrust to overcome the friction and by the time the air has cooled enough to let the airship fall again the propeller has probably come to a standstill; but by inflating it just enough to support its own weight it is possible to get it to fly the length of the room. Do not fly it near a lighted gas or it may burn up, which might be dangerous if there are any curtains about.

Out-of-doors flights may be made when the air is quite still, but this is not a good time of the year for calm weather. The best time of the day to fly a model airship is usually just before sunrise—the air is frequently very still then, but directly the sun shows itself little puffs of wind spring up, which will probably cause some exciting moments.

Captive Flights.

Captive flights may be made with the airship on the end of a thread, but this is not usually very successful, for directly any pull comes on the thread the whole thing tilts, spills out the hot air and falls quickly. If you try it, fix about 1ft. of the thin piano wire on to the fuselage, projecting vertically downwards, and tie the thread to the wire, this prevents the thread and the elastic from becoming inextricably mixed.

If you do not mind losing your airship you can (after inflating by the stove) put a little pad of cotton-wool soaked in methylated spirits on the cross-wire in the envelope opening and ignite it. Do not try to fly it as a captive with the methylated spirits, because directly it tilts up with the pull of the thread the envelope will certainly catch light. Without the thread it will rise hundreds of feet, but will probably be carried away for some miles by air-currents before descending, even though the air is quite still near the ground.

BUILDING A BILLIARD TABLE

By "Home Mechanic"

The following information supplements that given in our issue of February 14th, 1931.

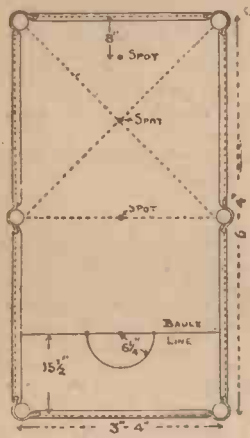


Fig. 2.—How to mark out a 6ft. 4in. billiard table.

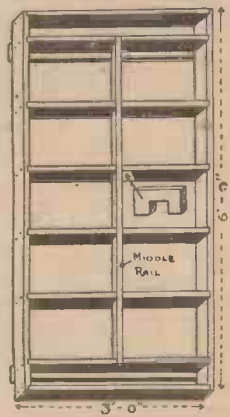


Fig. 1.—The frame for a 6ft. 4in. table.

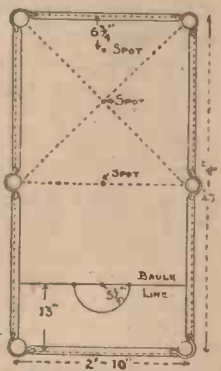


Fig. 3.—How to mark out a 5ft. 4in. table.

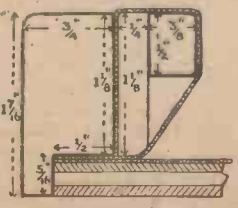


Fig. 4.—Details of the cushions.

THE billiard table designed to be made by the amateur at little expense from material readily obtainable, which was described in these pages a few weeks ago, aroused much interest among a considerable number of our readers, and some have asked for a few further particulars concerning the larger size tables. The construction of an ordinary slate bed table is rather outside the scope of the amateur, but, in making a table of the kind described with a plywood top, the most important consideration is the provision of a perfectly level frame to which the top may be fixed. The larger size table requires a stouter frame with additional cross-pieces, and in Fig. 1 we show the frame for a 6ft. 4in. table. The sides and cross-pieces should not be less than 3in. by 1in., the two end cross-pieces could be framed in and fixed first, after which the remaining ones are fitted and fixed, and the upper edges planed perfectly straight and true. Owing to the extra width it will be advisable to provide a middle rail 1½in. by 1in. to support the plywood between the cross-pieces. This should be fitted after the frame has been trued up, and it is then planed level with the cross-pieces. The 5ft. 4in. table could be made with or without the middle rail, but the framework need only be 2½in. by ⅞in.

The method of marking out a 6ft. 4in. table is shown at Fig. 2, and a 5ft. 4in. at Fig. 3. Balls 1⅞in. diameter should be used for the larger table, the pocket holes would be 2⅜in. diameter, and the rails, cushion slips, and cushions of the section shown at Fig. 4. For the smaller table the balls could be 1½in. or 1⅝in. diameter; if the former are used, the rails will be of the section previously given but the cushions could be ⅜in. by ¼in. As before mentioned, the rubber for the cushions should be fairly soft and springy, and if they are cut from a sheet of rubber this should be obtainable from any nearby rubber warehouse.

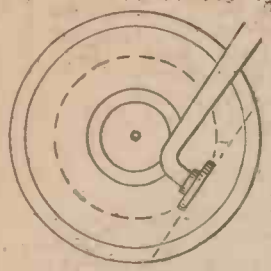


Fig. 12.—Adjusting the tone arm.

A CABINET GRAMOPHONE SIMPLE AND CHEAP TO MAKE

(Concluded from page 814, March 21st issue.)

By W. S. Rogers

WHILST making these pieces, the lid stay also may be made, as shown at Fig. 10. It is a strip of stout brass, drilled and slotted in the manner indicated.

Centre-bit holes for the needle cups may be bored in the right-hand near angle of the fixed part of the motor board.

The Escutcheon.

After drilling the hole for the winding key, the position of which should be determined by measuring down from the mark made on the side of the case, the escutcheon may be screwed in place, and the key pushed in to see that it works freely and engages with the winding spindle.

The Rubber Feet.

These are purchasable and may be attached as shown in Fig. 11, with care to see that the screw head enters sufficiently to clear the table top.

Fig. 11.—Rubber feet for the cabinet.

Lid Stay.

The fixing of this is a matter of experiment, to see that it holds the lid well back so that it remains open by its own weight.

Lid Hinge.

This also should be the piano variety. It should be placed on the side of the case opposite to that in which the winding key enters. Though often placed at the back of the case, the position indicated is a better one.

The Lock and Handles.

The lock may be fitted if deemed necessary. The handles may be of wood as shown in Fig. 1 (see March 21st issue), or suitable metal handles may be purchased and fitted.

The Tone Arm.

This would be purchased from the dealer. Many patterns are available—straight, goose-neck, swan-neck, crescent and convolute. The first, third and fourth named are all good. The other two should be avoided.

The length of tone arm must be correct, or it will not be possible to secure correct needle track adjustment, which means that the sound-box face stands tangential to the grooving on the record at a point midway across the band of grooving (see Fig. 12). To ensure this, the length of tone arm must be such that the needle point stands about ⅛in. in front of the motor spindle when the arm is swung over to that position. This length, therefore, should be measured and a tone arm of suitable length purchased. In the gramophone described the measurement would be 7⅞in., for which an 8in. tone arm would serve.

Fig. 10.—The lid stay is made of brass and slotted as shown here.

The Sound Box.

The patterns of these are legion and most of them are good. Those with metallic diaphragms are preferable. Prices range from 5s. 6d. up to 5 guineas, and there is little to choose between them. That known as "The Limit" is as good as any, and costs 10s. 6d.

Take your tone arm with you when buying the sound box, and see that the latter is a good fit in or on the tone-arm nose.

Finishing the Case.

This may be done in several ways. If the constructor is equal to the task, he may cover it with Rexine, glued securely to the wood. It is by no means a very difficult job, but a tricky one as regards joints, which, if not neatly made, would mar the good appearance of the instrument.

Perhaps a better method for the amateur is to finish the case with two or three coats of good enamel.

If black be preferred, there is no better enamel than that known as "Club," a preparation introduced originally for use on bicycles.

The fretted front may be gilded, using gold leaf, or given the appearance of silver by the use of aluminium powder, the vehicle in either case being gold size applied in a thin coat and the metal laid on when the size has dried to tackiness.

There is, of course, the further alternative of french polishing, which is best deputed to the professional polisher, unless the constructor has graduated in that rather tedious and tricky process.

Speed.

It is essential that the motor should be adjusted to run at the standard speed of 78 revolutions per minute, as shown on the scale of the speed indicator. The adjustment usually is made with the lever that couples with the brake. Pin a piece of white paper on the turntable and run the motor, noting with the watch how many turns it makes in a minute. It is a case of "trial and error" until the adjustment is correct. Then oil all bearings and you may proceed to play the instrument.

Fig. 9.—Details of the catch for the lid, the construction of which was described in our issue for March 21st.

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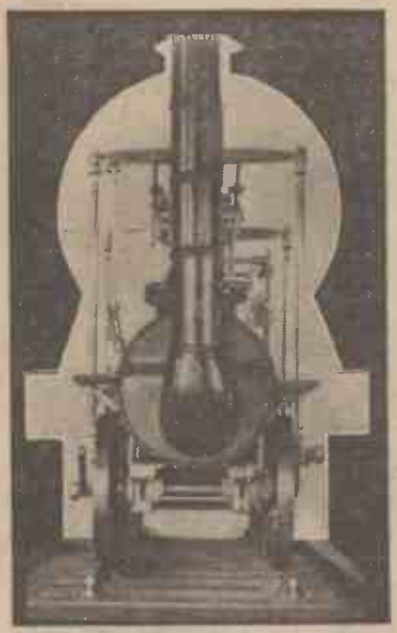
A MODEL OF STEPHENSON'S "LOCOMOTION No. 1"

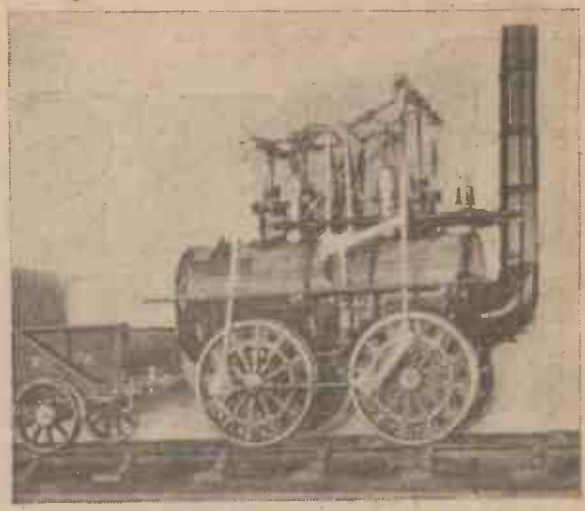
A South African Amateur's Achievement

AN enthusiastic amateur engineer now residing in Johannesburg has lately built a model of George Stephenson's first public railway locomotive, "Locomotion No. 1," of the Stockton and Darlington Railway.



1825 and 1930 illustrated by models. Mr. B. R. Hunt's model Stephenson engine and the outline of the G.W.R. loco.

The "Locomotion No. 1" model is one-eighth full size, built to fit a rail gauge of 7¼ inches, and is arranged to work under its own steam. It weighs about 80 lbs. in working order and has driving wheels 6¼ inches diameter. The two cylinders are vertical and partly immersed in the boiler. In the model they are ⅝ inch bore by 3 inch stroke and connect to the coupled wheels through cross beams guided by a wonderful system of levers invented by the great James Watt.



A model of Geo. Stephenson's "Locomotion No. 1" of 1825, built in Johannesburg by Mr. B. R. Hunt.

A parallel motion which maintains the piston rods in a true line will be fitted. All the four wheels are coupled together and one slip eccentric operates both valves. The boiler is a plain cylindrical vessel with a furnace of similar form. For model purposes the furnace-flue is fitted with water tubes and the method of firing is by petroleum or petrol blow-lamp placed in the tender. The model is just over 3 feet long, 20 inches high and 11 inches wide.

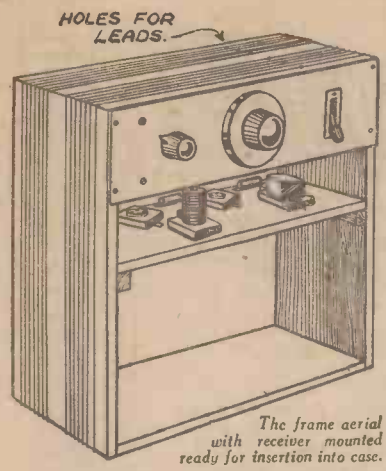
The driver of the original "Locomotion" engine sat on top of the boiler and operated the various levers. This position for the engineman was very necessary as in these early days reversing gears were of a very primitive character.

The front view picture is interesting in that it not only indicates the relative size of Mr. B. R. Hunt's second model—the G.W.R. engine now building, a model which will weigh ten times that of the "Locomotion No. 1"—but illustrates how the increase in the size of boiler has in the modern locomotive reduced the height of funnels.

A FINE MODEL OF THE SCHNEIDER TROPHY SEAPLANE

THE fine scale model shown on the right is of the famous Supermarine S.6 Rolls-Royce Engined Seaplane, which won the Schneider Trophy contest and established a world speed record of 357.7 miles an hour.

This model was made from odd pieces of wood with a fretsaw, chisel and plane, by Charles H. Hoyland, 17, Somerset Avenue, Hook, Surbiton, Surrey.



The frame aerial with receiver mounted ready for insertion into case.

THE receiver described this week is entirely self-contained, although provision has been made for the attachment of an external aerial and earth, where this is found to be necessary. No great skill is required in the construction of the complete set, although those readers who are handy with wood-working tools will be able to exploit their skill in the construction of the case. We will describe this part of the work first and it should be borne in mind that the design described is a very simple one, especially prepared for those who are not skilled in carpentry. It may be modified to suit your own personal taste provided the dimensions are adhered to, and that the fretted opening is of the correct size for the particular loud speaker employed.

The sides of the case are made from ½in. stuff, the actual material depending upon the finish required. Mahogany should be used if a french polished surface is desired, whilst any ordinary wood will suffice if the case is to be eventually covered with Rexine or similar material. The bottom and top are made from similar material, full dimensions being given in the drawings. Careful note should be taken of the fact that the top and bottom are screwed *inside* the side pieces. This is necessary in order that the horizontal screws may take the weight of the batteries. The front may be cut from plywood about ⅜in. thick, the required design being cut out, and for those who wish to avoid this part of the work we would suggest the purchase of one of the ready-cut-out frets at present on the market. The back of the set is made from ¼in. ply, held in position by small catches. Moulding or beading is mitred and fixed round the rectangular opening, as described later in the article.

The Frame Aerial.

The frame aerial should be the next part to receive attention, and this is made from ½in. soft wood, the screws holding the joints being countersunk to avoid contact with the wire of the aerial. Two pieces of ½in. square section stripwood are screwed on the inside of the frame, 7in. from the top. The actual winding consists of No. 22 D.C.C. wire wound in the following manner. Pierce two small holes near one edge as shown, and thread the wire round the holes to make a firm anchorage, leaving a few inches of wire for subsequent connection to the switch. Wind on tightly 15 turns of wire, allowing a space of 1/10th of an inch between each turn. At the 15th turn pierce a hole through the frame and pass a large loop of wire through the hole, afterwards wedging the wire in the hole with a small splinter of wood and a drop of glue. Continue the winding for a further 4 turns, pierce two holes, cut off the wire (leaving a length for connection) and anchor off. Half an inch away from this last turn make another pair of holes at which to commence the long wave winding. This commences with 9 turns of wire, each turn touching, after

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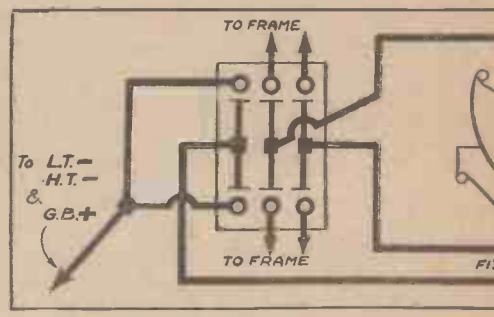
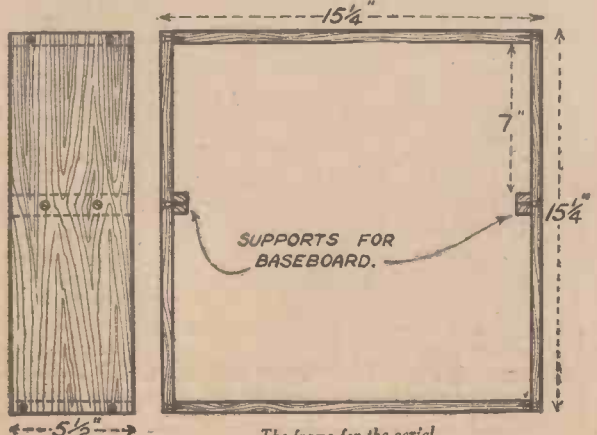
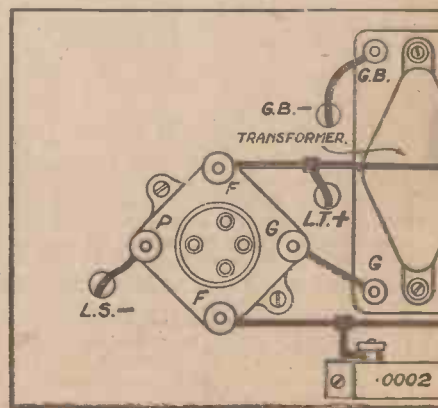
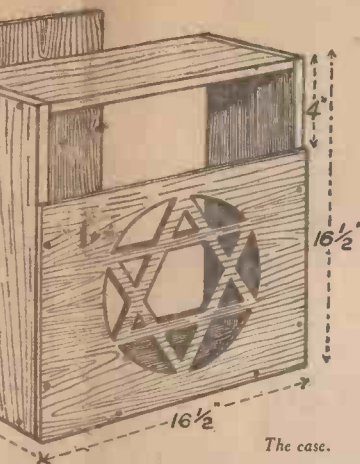


The wiring diagram.



The frame for the aerial.





The case.

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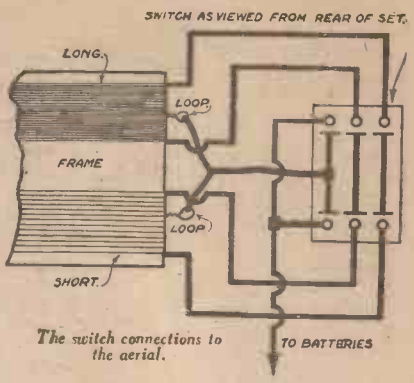
which a hole is made and a loop passed through as before, the winding continuing for another 50 turns. Each section of these windings should be in the same direction. The two loops of wire are bared and joined together, eventually being taken to the centre contacts of the switch nearest the edge of the panel. The remainder of the connections to the switch are clearly shown in the drawing.

How the Panel is Marked Out.

The panel should be marked out and drilled as shown, and then screwed to the top part of the frame on the side nearest the long-wave winding. Lengths of ordinary rubber-covered flex should be connected to the moving vanes of the tuning condenser, the aerial socket and the reaction condenser for subsequent connection to the proper components mounted on the baseboard. This latter should now be prepared, the components mounted on it as shown in the drawings, and holes made for the battery leads to pass down to the respective tappings. These leads should consist of flex, to the ends of which wander plugs should be attached. Wire up carefully and place the baseboard into position, screws being passed through the frame (in the space between the two sections of the aerial) to hold all secure.



The switch connections to the aerial.

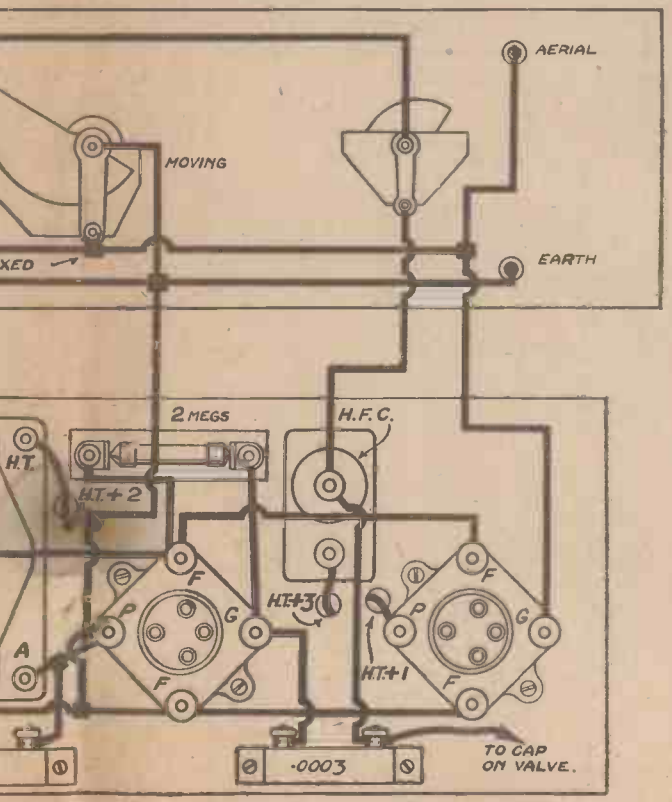
At this stage of the construction you should have a case provided with a fretted front, and a frame aerial to which is attached a complete receiver ready for insertion into the case. Before this can be fitted, however, it will be necessary to affix the loud speaker, and this should preferably consist of a commercially-made chassis, of small dimensions to suit the fret. A piece of silk gauze should be attached behind the grille by means of glue or seccotine and the speaker chassis then screwed into position. The frame may now be pushed home so that the ebonite panel projects through the opening in the front of the case. To give the front a finished appearance, and to hide the edges of the wood and ebonite the opening should be faced with a small neat moulding.

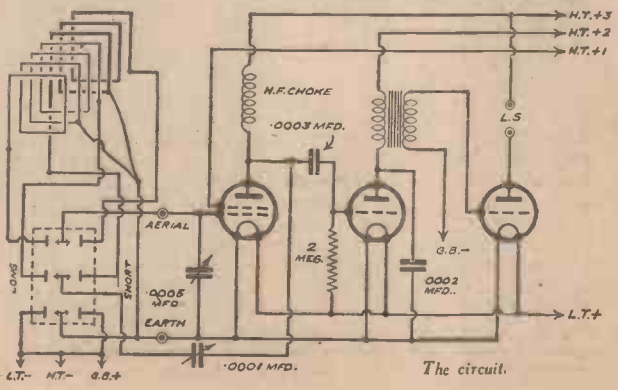
A small type of accumulator, preferably filled with jelly acid, a H.T. battery of 108 or 120 volts, both of the type built for portable receivers, and a 9-volt grid bias battery will then occupy the bottom of the receiver. A little care should be exercised in the choice of these components in view of the small space available.

The Valves.

The valves required are a screen grid, general purpose and L.F. type, the screen-grid valve going in the socket on the right (when viewing the receiver from the back), the general purpose valve in the centre, and the L.F. valve in the remaining socket. Attach the leads to the accumulator, plug H.T. + 1 into a tapping round about 80 volts, H.T. + 2 about 60 volts, and H.T. + 3 into the maximum voltage available. This latter plug will have two wires attached to it, one from the loud speaker, and one from the H.F. choke. This latter component must be of the type specially designed for use with screened valves, the ordinary type not being generally suitable.

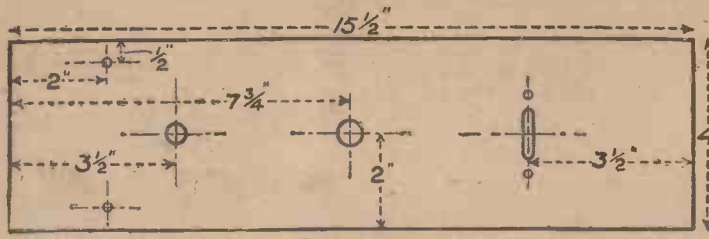
No difficulty should be experienced in operating the set, the centre knob being used to tune-in the required





The circuit.

station, the small knob on the left bringing the volume up to the required strength. The switch when pressed down will bring the long-wave aerial into action; when raised the short-wave aerial is in use, and in the centre position the valves are switched off. The actual position of the receiver has a great deal to do with the selectivity, the top of the set being pointed in the direction of the station for maximum strength. A turntable will be found very useful for the purpose of searching, although of course it is not essential. When an outside aerial and earth are employed very much louder signals will be obtained, but the selectivity will fall off.



The panel layout.

List of Components.

Ebonite panel 15½in. by 4in.

.0005 variable condenser (Ormond No. 4 or Formo).

.0001 reaction condenser (Formo Midget).

.0002 fixed condenser (Lissen).

.0003 fixed condenser (Lissen).

2 megohm grid leak.

3 valve-holders (Lotus, Benjamin, etc.).

L.F. transformer (Mullard "Permacore").

H.F. choke (S.G. type) (Bulgin, Dubilier, etc.).

Two flush mounting sockets (J. J. Eastick, Ltd.)

Three-pole change-over switch (Ormond, Utility, etc.).

Loud speaker chassis portable type (Ormond, etc.).

½ lb. No. 26 D.C.C. wire for frame aerial.

Wood for cabinet, silk gauze for grille.

Screws, Glazite for Terminals (J. J. Eastick, Ltd.), wiring up, wander plugs, etc.

To carry the receiver about a handle must be fitted at the top of the case, and this may be made from a strip of leather such as a section of a thick strap, held down by small blocks of wood and screws, or a ready-made suitcase handle may be purchased with the necessary fittings for attachment.

Care should be exercised in handling the set, otherwise valves may be broken. Put the set down gently; don't treat it as a suitcase and bang it down. Keep a note of the condenser readings so that you can readily tune in to a particular station; and take care to keep acid away from the wiring.

OUR CYCLIST'S CORNER

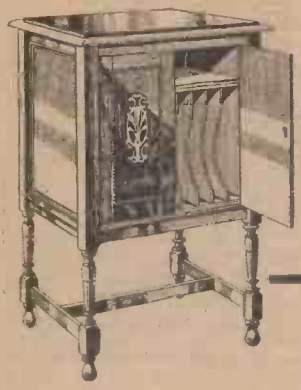
Conducted by F. T. Bidlake

EVERY cyclist nowadays knows that his machine is geared up, so that although his road-wheel is small his rate of pedalling is not so rapid as if he drove the road-wheel direct. In the days of the high bicycle the front wheel was driven direct, each rider straddling the biggest wheel he could conveniently stretch his legs upon, and though the very tall men could bestride a wheel standing 60ins. high, there were many more who used 54in. wheels, and the 52in. wheel was quite common; and these wheels were driven direct, with no intermediate gearing, that is, with the cranks fixed on the axle of the wheel, and each revolution of the pedals meant exactly one revolution of the road-wheel. To-day we are all geared up, and our small driven road-wheel does not carry the cranks, but they rotate on a separate spindle at the crank-bracket, and a chain couples the rotating cranks and the rotating road-wheel. If the front and the back chain wheels were both the same size, the cycle would be said to be geared level, and it would exactly reproduce the old ordinary as regards pedalling speed being the same as driving speed, but such a machine is never seen except for comical turns by stage cyclists, for as we nowadays use a 26in. driving-wheel pedalling a 26 is a pure whirligig of fun.

Gearing.

So we naturally gear up instead of gear level. And if the front chain wheel on the crank spindle is exactly twice as big as the chain ring on the back wheel, your cycle is geared to exactly double the size of the back wheel, so that if that is a 26in. wheel the gear is 52in. Similarly if your front chain ring is three times as big you are geared to 78in., which is quite a happy gear for a strong fellow able to hurry, and not prolonging his journeys after getting nicely tired. We can, however, get intermediate and other gears by choosing intermediate sizes of chain rings, not exact multiples of each other. All we have to do is to have one bigger than the other.

(To be continued.)



The amateur CARPENTER

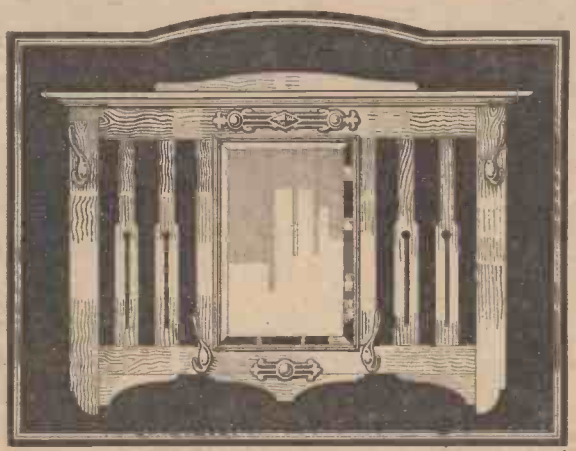
HALL MIRROR AND HAT RACK.

A handsome and inexpensive piece of work suitable for the modern hall. The amateur carpenter can complete it easily, and a special parcel of timber is supplied from which the parts can be cut. Make it from the full-size patterns on the design chart.

THE aim of the amateur carpenter is to turn out something useful, and which, at the same time, is not too expensive to construct. Most readers of these pages have a set of fretwork and carpentry tools, which enable them week by week to go forward with some piece of woodwork of which they can be proud. They have the big advantage always of being able to obtain a parcel of wood with all the necessary parts ready to start work upon, as well as full-size patterns to paste down or use as templates for the various pieces required.

A Modern Piece of Work.

This week the simple modern Hall Mirror illustrated can be made up in this way, and we are sure it will appeal very strongly to a great number of our readers, both for its simplicity and usefulness. It is in keeping with the modern trend of plain, dignified furniture, and is large enough for the modern small hall where an outsize in hall-stands would be no use. The subject is 2ft. 10in. long and 2ft. 0¾in. high. The central mirror measures 15 x 10, and on the rails are fixed four double hat and coat hangers On the face of it, the hall fitment is made up of two cross rails, two uprights, and four ornamental inside rails, with two further supports for the mirror. All this is perfectly straightforward. In addition, there is a flat rail above the mirror, a pediment, and some shaped work to be done below the lower rail.



This is the completed Hall Mirror and Hat Rack. A parcel of planed Spanish Chestnut with moulding and ornaments costs only 6/6 or 7/9 post free. The mirror (No. 5747) measures 15in. by 10in. and costs 8/3 (post 1/3). Coat-hangers are 8d. for 4 and postage 3½d. Complete parcel 17/- carriage paid. From Hobbies Ltd., Dereham, Norfolk, or any branches.

These various odd parts can be cut out with a fretsaw, and in no case is any of them beyond the ability of the average worker. The wood, of course, should be chosen with care for its strength and good looks. Oak is obviously the best for the purpose, but, as this may be a trifle hard for the young worker to cut, plane, chisel, etc., we can recommend that spanish chestnut be used instead.

The Use of Spanish Chestnut.

This material is very much like oak in its appearance, but has the advantage that it has a softer grain, and is, therefore, easier to operate upon by the amateur. When stained up, the average onlooker would not be able to tell but that the article was cut in oak.

The whole construction of the main work is by means of dowel joints, and for this reason the material is ½in. throughout. The dowel pins are ⅜in. and ¼in. diameter, and sufficient lengths are enclosed in the parcel, or can be bought separately, if desired.

A Word on Dowel Joints.

These dowels are really short pieces of rod sunk into two parts of the wood, and holding them together with glue. Wherever a dowel joint is required, an inch of the rod is cut off. A hole is cut in the work ½in. deep, and the dowel rod driven in after having been dipped in glue. It thus projects ½in. beyond the surface of the wood. This projecting portion is driven into another hole bored into the flat piece of wood which is to be joined on so the two parts are brought together and the glue on the rod and the edge of the wood holds them quite strongly. The detail at Fig. 1 shows this principle, and how the dowel joints are made. In boring the holes with a brace and bit, see that the brace is held upright, and make a mark on the bit to show when it is sunk into the wood the required distance. As in most other marking out in carpentry, the position of all the dowels should be made at one time wherever the two parts are to join. Put the two pieces in a vice, lay the square across, and then, to get the centre of the boring hole, use the marking gauge to half the width of the wood.

A drawing is given at Fig. 2 of the framework of

this hall mirror, and on the patterns can be seen the exact position of all the dowels which have to be fitted. The top and bottom cross rail have two at each end.

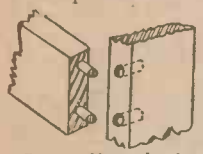


Fig. 1.—How a dowel joint is made on two parts of the frame.

Mark Out your Parts.

Between them, running vertically, are the two side rails to the mirror, and these, again, are held by two dowels at each end. Between this rail and the end of the fitment are two narrower and fretted uprights. The bottom of these contains two $\frac{3}{16}$in. dowels, and the top one. There is no need to paste the pattern down of the upper and lower rail if a careful measurement is made of the exact distances required either side of the centre line shown. The position of the dowels is shown dotted on all the parts concerned, and, moreover, the lettering A, B, C, etc., is quite helpful to bring the two parts together in their proper place. The making of the joints in every case must be undertaken first, and the parts tested together. Do not glue in all the dowels until later on, but see that the joints are made correctly before proceeding further with any other part. The joints holding together the upper and lower rails between the two ends are made, and the whole framework fitted together. Then take away the end rails, cut out the fretted rails and the side ones for the mirror, and test these in place for their dowel joints between the top and bottom strip. All these parts have straight edges, which call for more plane work than anything else.

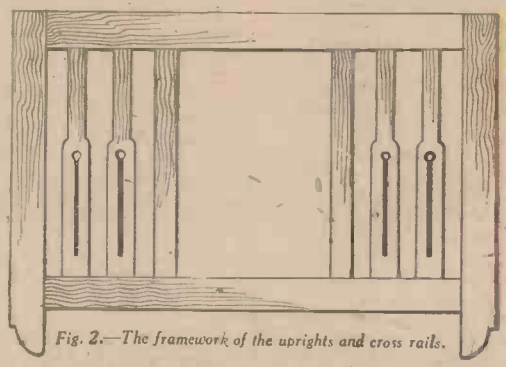


Fig. 2.—The framework of the uprights and cross rails.

Shape in the Rails.

The shaping to be done with the fretsaw is the long interior strip in the fretted upright rails, and the bottom of the end rails. In fixing the parts, use the square freely to ensure correct angles, and be particularly careful that, in making up the centre opening, it is large enough for the mirror. It must be 15 x 10 to ensure the piece of glass lying in place.

Beneath the bottom rail three pieces are cut to form the shaped edge seen in the picture of the finished article. There is the centre drop ornament and the two angle pieces, all of which are cut in $\frac{1}{2}$in. wood and glued along the bottom rail. In each case a strengthening screw can be driven through the narrow neck of wood in the position indicated on the pattern, but, in order that it may not be seen, it should be sunk well below the face of the material, and the hole refilled with plastic wood or filler of some kind. Get these parts flush with the surface on the front, and see that they make a good joint in the angle. Along the top edge is fitted on a flat rail, which is a piece 2ft. 9$\frac{1}{2}$in. long and 1$\frac{1}{2}$in. wide. Plane the edges square, and then shape off a thumb bead on the long front and two ends.

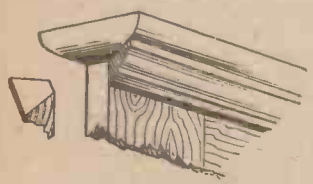


Fig. 3.—The way the moulding is shaped to turn round the end.

The Shelf and Moulding.

This is done with file and sandpaper, and we must remember that it comes underneath when we fix it. This rail is glued and screwed along the top edge of the framework, so that the back edge is flush, whilst the front projects 1$\frac{1}{4}$in. Beneath this projecting shelf is fitted a length of the No. 17 moulding supplied in the parcel. This moulding is cut with its ends mitred inwards, in order that a short piece may be used to turn the corner and carry it to the back edge of the fitment. The detail at Fig. 3 shows this clearly, where it will be seen that a piece only about 1$\frac{1}{2}$in. long is required to carry the shape of the moulding round the back and bring it square with the edge. A small pediment is added equidistant between the ends, and this, like the other pieces, is glued and screwed down to the surface of the top rail. An excellent diagram of these parts is given at Fig. 4, which shows the pediment, the top rail, and the moulding all fixed on to the main frame.

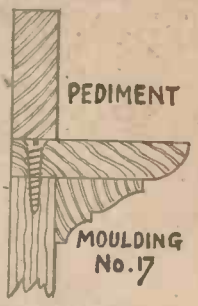


Fig. 4.—A side view of the shelf, moulding and pediment part.

The position of the mirror itself has already been provided for by the hollow central rectangle. If we have measured this up in constructing the framework, the mirror should just fit between two side rails and the top and bottom. It is held in place from the front by another framework of No. 18 moulding. This moulding is just over $\frac{1}{4}$in. wide, and it is glued round the aperture with $\frac{3}{16}$in. of its edge projecting. This provides the rebate which holds the mirror in place. Two pieces of moulding 16in. long are required, and two shorter pieces, 12in. long, help to make the rectangle. Each is mitred at the end, and the four parts are laid round the rails to ensure an equal projection over the back. Glue them very securely in place, and weight the parts down. This is important, as these pieces of moulding hold the mirror in place. Small fret pins can be added if it is thought necessary, but strong glue should be all-sufficient.

The main work of the article is now complete, but there remain the minor fittings of the hooks themselves, and the two ornamental overlays. Each of the latter is a simple piece of work cut from $\frac{1}{4}$in. wood. The longer one is glued centrally above the mirror on the upper rail, the smaller one comes below the mirror, but fits so that the centre of the wood runs along the join of the lower rail and the hanging addition. On each of these overlays there is a further ornament, but, as this is supplied ready shaped and cut, all that is needed here is to roughen the back with a file and then glue them in place, as clearly seen on the finished drawing.

Fig. 5.—A section to show how the mirror is fixed in. Notice the backing held by a "sprig" or nail.

The whole of the work is now ready for staining, and it should be treated with Hobbies oak spirit stain.

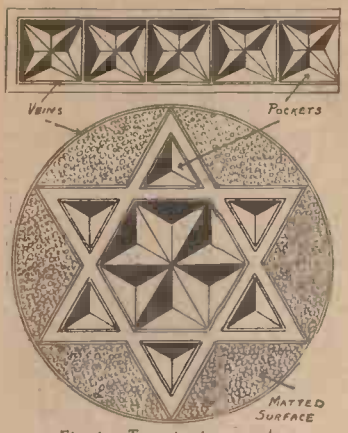


Fig. 1.—Two simple examples.

A Simple Lesson in CHIP and WOOD CARVING

There is so much interest in carving amongst our readers that we have had an expert write this article on how to begin, the tools and wood needed, etc. Full of practical hints and sound advice.

Written specially for the beginner.

CARVING designs often appear in HOBBIES, and we know that the e are a large number of new readers, and not a few old ones, who will welcome this article codeisely describing the methods beginners should adopt in taking up this faseinating hobby.

Chip carving is quite simple and very interesting, and even the novice will be able to turn out beautiful pieces of work with very little practice. Unlike wood carving, in which much depends upon experience and natural talent, it is only ne essary to master the use of the chip carving knife or chisel, and to know just how to make the cuts. Two examples of chip carving are shown at Fig. 1, one being a simple banding, and the other a more elaborate carved centre. It will be seen that they consist of a number of sunken pockets, and the cutting of the pockets is almost identical in every case. Chip carving designs are almost entirely composed of straight lines, circles or parts of circles, and in setting out a piece of work on the wood on which it is to be carved, a rule, compass and a firm dark pencil are necessary. The outline and all the leading lines should be marked first, and then the design is completely filled in, care being taken to see that all corresponding pieces are exactly alike in size and shape, and that if a circle is divided up it is done equally. Firm lines which may be easily seen are necessary for easy working.

Fig. 3.—The U and V are the shape of the most common chisels needed.

Hobbies Ltd. supply everything required for chip or wood carving. For chip carving, wood ¼in. or ⅜in. thick is generally used, but for wood carving ½in. or 1in. thickness is desirable, the most suitable kinds being oak, satin walnut, or mahogany. A good selection of carving tools, ranging from a single chip carving knife to a full set of wood carving tools, are shown in Hobbies' Catalogue, to which reference should be made. A set of four knives showing the most useful shapes is illustrated here.

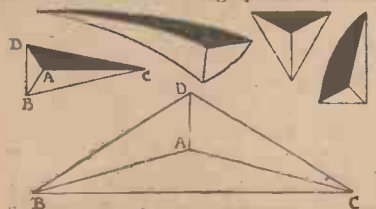


Fig. 5.—Details of cutting a pocket, the first simple lesson for the beginner.

Before the carving is started the wood should be firmly cramped to the bench, and a simple way of doing this is with two small cramps as shown at Fig. 2. For convenience of working, a Hobbies' bench cramp is desirable; this is also shown at Fig. 2, and by its use work may be quickly cramped and held firmly at any desired angle.

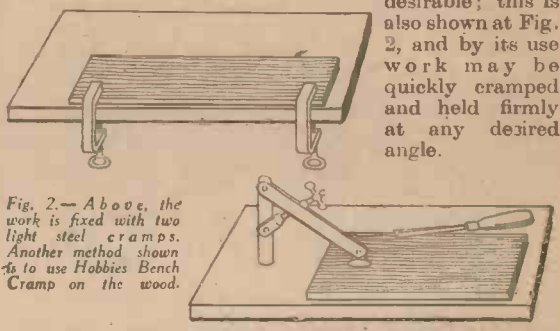


Fig. 2.—Above, the work is fixed with two light steel cramps. Another method shown is to use Hobbies Bench Cramp on the wood.

All the principal lines of a chip carving design should be veined; they may be V-or U-shaped, and are most easily cut with a chisel similar to that shown at Fig. 3, where the end shape of the cutting edge is seen as a U and a V. It is also possible to cut the lines with a knife if it is first held in an upright position to make a vertical cut, and then in slanting positions to make cuts on each side of the vertical and so form a small V-shaped vein as shown at Fig. 4.

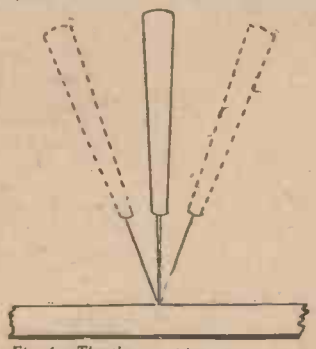


Fig. 4.—The three positions to get an upright and a sloping cut for a V.

These details having been attended to, the actual carving may be commenced. As before stated, this consists of cutting a number of shaped pockets which form the design. The pockets may be of varied shapes, as shown at Fig. 5, but they are all cut in the same way. The knife or chisel is inserted in the centre, A, and vertical cuts are made to the corners B, C, and D. The depth of the cut at A should be about ⅛in. more or less according to the size of the work in hand, and the cut should gradually diminish in depth until it rises to the surface at the corner. The carved pocket is then formed by shaping it out with the knife or chisel, as shown at Fig. 6. Taking

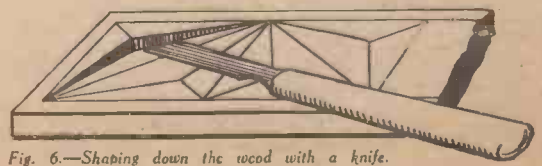


Fig. 6.—Shaping down the wood with a knife.

the triangle formed by the lines A—B, B—C, C—A first, the wood is chipped out from the line B—C to the centre A, to form one side of the sunk pocket. After that the other two triangular shapes are treated in a similar way, and the pocket is completely formed. Care must be taken in using the knife or chisel always to work with the grain or the wood will split. It must also be remembered that the work is completed with the knife or chisel, and neither file nor glasspaper should be used to give finishing touches.

Fig. 7 (above) is a simple design for carving. Fig 8 shows how to set out the work with compasses.

Wood carving is not so simple as chip carving, and some practice is necessary to advance in this branch. The beginner is advised to confine himself to simple subjects until he has gained some experience in handling the tools. In starting the work a carved centrepiece, or patera, similar to that shown at Fig. 7, is a very suitable subject. A knowledge of freehand drawing is very helpful to the wood-carver, as it is advisable to set out all the designs full-size on paper first, so they may be traced to the wood by means of carbon paper. This design should be set out on paper to measure about 4in. across. The outline and the method of setting it out are shown at Fig. 8; it may be traced from the paper to the wood, and the lines firmly marked.

The wood must be cramped to the bench, as previously described, before the carving is commenced. The first operation is to divide the carving from the ground, and to recess the latter to give the relief required, which, for an ordinary piece of flat relief carving, may be about ¼in. The easiest way to divide the carving from the ground is with a V or parting chisel, a tool similar to the V chisel used to cut the veined lines in chip carving. With this tool a groove is cut right around just clear of the outline to a depth of ¼in., as shown at Fig. 9. Care should be taken to work with the grain as far as possible, and if there is any tendency for the chisel to run, or the wood to split out, let it be on the ground. The next stage is to cut away the ground to a depth of ¼in., for which purpose a small sharp gouge should be used, as shown at Fig. 10. With care and experience it will be possible to make the ground flat and smooth with the gouge alone, but a smaller router could be used for this purpose when opportunity offers.

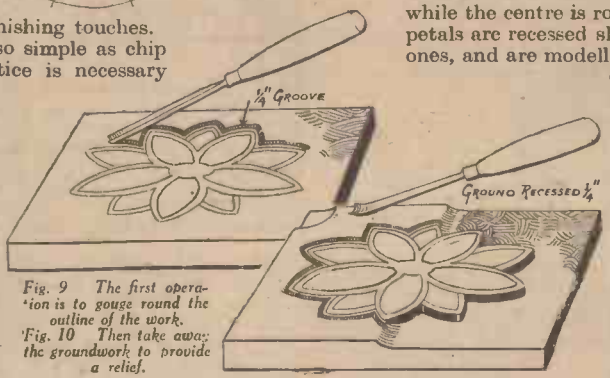
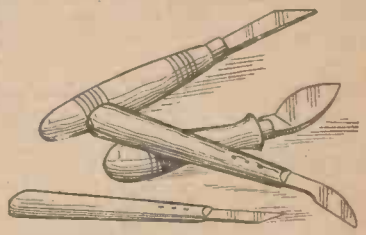


Fig. 9 The first operation is to gouge round the outline of the work.
Fig. 10 Then take away the groundwork to provide a relief.

The carving has now to be modelled to shape, but before this is done it will be necessary to see that the outline is perfect, and that it is cut quite square with the ground. Gouges or chisels which fit the shape as near as possible should be used, and any small irregularities in shape corrected. In modelling the piece of carving under consideration, the centre should be separated from the five prominent petals. The latter are recessed slightly at the base, and each one is hollowed or worked to a very flat V shape, while the centre is rounded. The less prominent petals are recessed slightly from the prominent ones, and are modelled in the same way. This carving is also finished directly from the tools without the use of files or glasspaper.

A matt surface is often introduced in both chip and wood carving. Reference to Fig. 1 will show how useful this may be in chip carving. In wood carving the matt surface is chiefly used on groundwork. The effect may be easily and quickly produced with matting tools, which may be purchased from Hobbies Ltd. quite cheaply in various sizes, the smaller of which are the most useful to the carver.

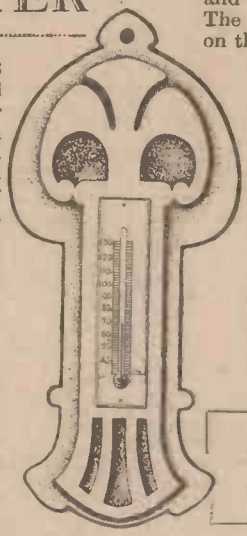


These are the knives used in carving. Their different shapes provide for cutting to any angle or slope or curve

Our free patterns for making a THERMOMETER

THE drawings we give on page 28 are for the two parts of a useful little thermometer any fretworker can make. Such an article is useful in any home, and if the worker makes up a large number, they will form excellent efforts for a bazaar or Scout sale of work. The two parts required can be cut in any common fretwood, and it is immaterial whether they are taken out in oak, mahogany or satin walnut. The larger piece required is $\frac{3}{16}$in. and the smaller piece—which forms the overlay—is $\frac{1}{8}$in. thick.

Paste the patterns down to the wood, or trace them off if you do not want to spoil the copy of HOBBIES. Do not commence to cut until the paper is dry, or it will tear up and spoil the pattern. Cut out the large piece first with a sharp fretsaw, keeping the edges straight by holding the handframe upright. Clean off the paper remains with a medium grade of sandpaper, and then cut out the smaller piece from the $\frac{1}{8}$in. thick wood. The five interior frets should be cut first, and then the outer edge of the work. Clean this part up both back and front, and glue centrally and securely to the larger and thicker piece. The position is indicated by the dotted lines on the pattern of the larger part, and it is also shown here how the background behind the fretted pieces in the overlay can be matted with a matting tool to make them more distinctive.

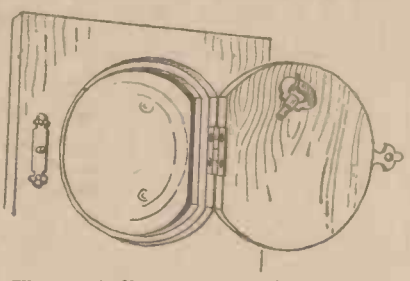


Each part can be polished before it is put on, or a coat of stain and dull polish applied if preferred. It will be noted that a small hole is provided in the piece which forms the back, in order to hang the thermometer up. The thermometer itself is a small but reliable instrument, measuring $3\frac{1}{4}$in. long and $\frac{3}{4}$in. wide, plainly marked off in degrees and with a tube mounted on a heavy metal plate. Two holes are provided for fret-nails to fix it to the overlay.

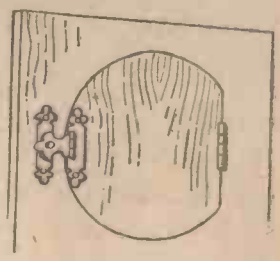
Suitable wood is obtainable from Hobbies Ltd., and the necessary thermometer (No. 5003) costs 1s. 3d., with 1½d. extra for postage. Any branch of Hobbies Ltd. can supply.

Fixing a Door to a Clock Case

IN fitting clocks into fretwork designs one sometimes has to leave the spindles holding the barrel projecting through the back. This looks unsightly if the clock is stood on a mantelshelf in front of a mirror so the back is always on view. A simple and neat way to overcome this is illustrated. A door is cut and hinged, and the actual back to the works set inside on shortened spindles.



These spindles can be easily cut to any length with a pair of pliers. The door can be circular or with square sides. If a circle, a short straight segment must be cut to take the hinges, as can be seen in the illustration. A small single hinge is fitted to this straight edge with screws. A watch hook is screwed inside to hold the winding key, whilst the door is kept closed by fitting on one of those pretty ornamental catches supplied by Hobbies Ltd. This is in embossed brass, and one piece is fixed with nails or screws to the door itself, whilst the other part, as can be seen, is put on the surrounding wood. Its position must be made accurate so when the catch is swung over it engages on the stud of the other part. This catch is No. 5475, and only costs 1½d. Its actual position when the door is closed is shown in the second picture.



This particular ornament is also useful for many other little jobs, and is especially useful as a catch for a small box lid. Its use has been illustrated in these pages, and when fitted to a box the piece with the hole is fixed to the underside of the lid, whilst the stud is put to receive it on the front of the box itself.

I WONDER how many of my readers know anything of South-West Africa beyond the fact that it has put forth a bewildering number of overprinted varieties of postage stamps. By many, probably, it has already been forgotten that it was, before the war, one of Germany's most cherished colonial possessions. Strictly speaking, it is not an integral part of the British Empire, but is administered by this country under a Mandate; Great Britain is bound, under the

The triangular South African 4d. *overprinted South-West Africa.*

terms of the Peace Treaty, to deliver an account of her stewardship, once every year, to the League of Nations. It covers a pretty sizable slice of Africa, embracing 323,000 square miles, with a coast-line of nearly 1,000 miles. The Cunem River, on the northern boundary, separates it from the tropical Portuguese colony of Angola; to the south, the Orange River separates it from Cape Colony; and to the west it is bordered by the British Colony of Bechuanaland.

Damaraland and Great Namaqualand.

So long ago as 1793 a Dutch expedition from Cape Town ventured so far into the wilds as Walfisch Bay (now called Walvis Bay) and there founded a settlement. For nearly a century the district, which was then divided into the two sections, Damaraland and Great Namaqualand, was almost an unknown land, but towards the middle of the last century British traders appeared on the coast and established trading stations. In 1863 de Pass, Spencer and Co., a British firm, bought a large tract of land from the native chiefs, and worked the huge guano deposits on the Ichaboe Islands, which lie close to the shore. A few years later there began a sustained incursion of German traders, whose tactics led to repeated appeals from the Government of the Cape Colony to the home authorities to take the country under British protection. The appeals were refused and the question shelved by Lord Granville's Government, with the result that, in 1884, Germany announced that she had taken the country under her protection; it then received the name of Sudwest Afrika. In this same year Germany made her famous moves in the "Scramble for Africa," and succeeded in adding altogether a million square miles to her overseas empire. During her efforts to get a "place in the sun," as the catchword went, she grabbed Togoland and the Cameroons in the west and a large slice of East Africa.

THE STORY of a LATE GERMAN COLONY.

By P. L. Pemberton.

(Concluded from p. 851, March 28th issue.)

DO YOU KNOW—

THAT a specimen of the New Zealand 4d. pictorial of 1903-9 has been found with the central picture upside down?

That this stamp, which has never been discovered before, was sold in London by auction in March?

That any collector may be harbouring a similar stamp unawares?

That an entirely new set of pictorial stamps for South-West Africa is to be issued shortly?

That there is a scarce variety of the current ½d. South African official in which there is a stop after OFFICIAL?

That Canada is the most popular country with British Empire collectors?

That it is run very closely by the Commonwealth of Australia and South Africa?

Germany and Walfisch Bay.

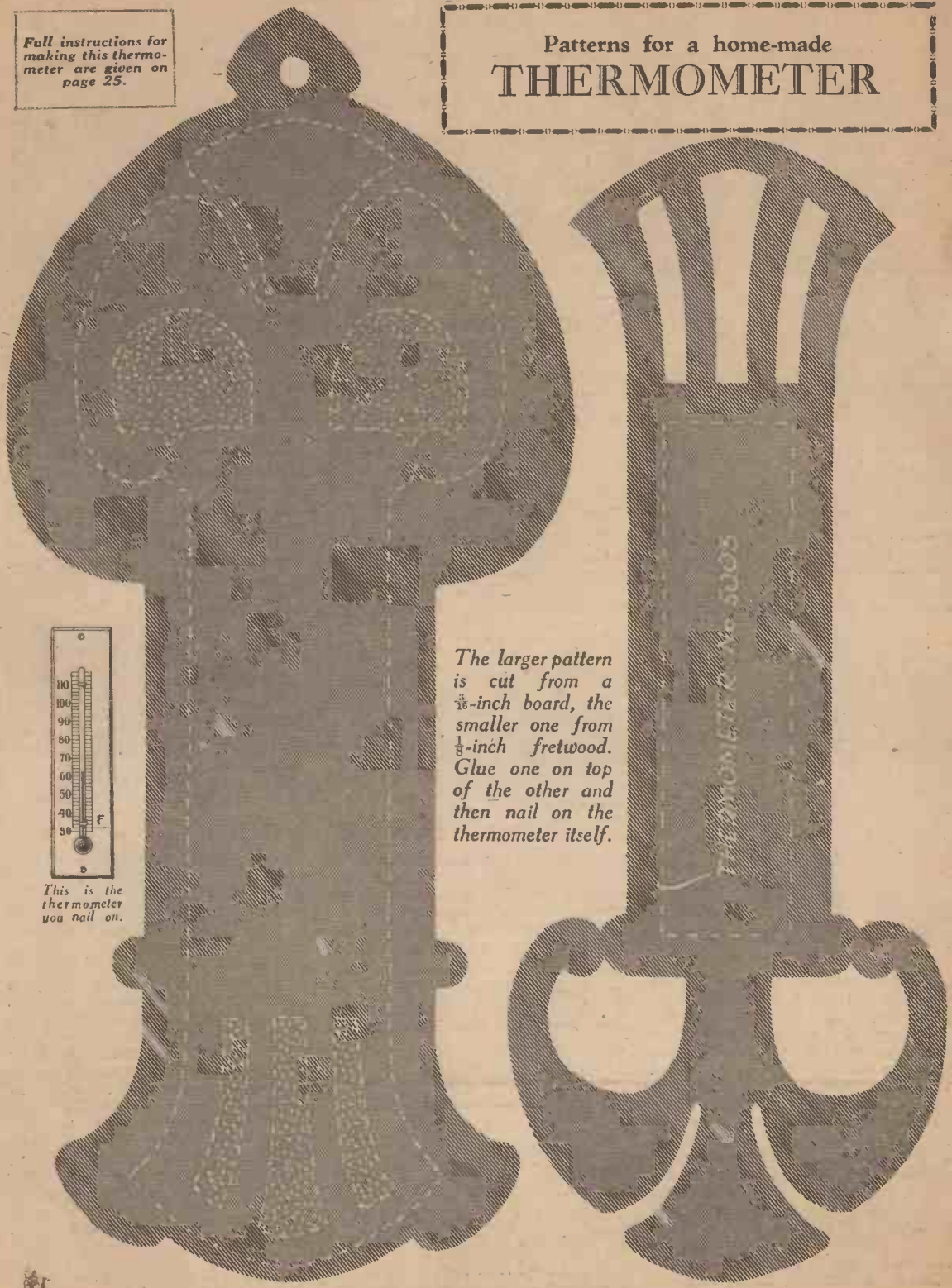
Although Germany annexed South-West Africa formally in July, 1890, she could not establish her claim to Walfisch Bay, the only safe harbour on the coast, nor to the islands near to, which remained British, and became a "district" of Cape Colony. When the War broke out in 1914, the Germans, who thought that it would

German colonial stamps show the Imperial yacht, "Hohenzollern."

soon be over, fully expected to hold their colonies. Garrisoned by 15,000 German troops and thirty batteries of guns, it was thought that, in the difficult country, they could keep the British at bay, especially as they counted, fatuously, on the defection of the Dutch element in the British colonies. Their hopes in this direction were ill-founded, for, though the Boer generals Maritz, Beyers, and de Wet went over to the enemy, they, with their followers, were soon routed by the colonial forces, under the staunch leadership of General Botha. The Boers, in a word, preferred the British yoke, which they could hardly feel, to the iron collar of German "kultur."

Full instructions for making this thermometer are given on page 25.

Patterns for a home-made
THERMOMETER



This is the thermometer you nail on.

The larger pattern is cut from a $\frac{3}{16}$-inch board, the smaller one from $\frac{1}{8}$-inch fretwood. Glue one on top of the other and then nail on the thermometer itself.

LEATHER WORK

By C. Conway

THERE are few more fascinating hobbies, for those with the necessary time, than that of making leather goods either for home use or as a means of increasing one's income.

It forms a most welcome change both for the private individual and also for the club or class.

One need not be able to draw well, though, of course, this is an advantage, but with the many designs that are on the market all that is needed is the ability to be able to trace these on leather.

Much depends upon the choice of the design, which must suit the article for which it is intended; such as a bold design for a shopping bag, blotter or telephone directory, and a more delicate one for the purse, comb-case (see Fig. 2), napkin ring (see Fig. 3), pen-wiper or note pad cover.

Kinds of Leather.

Calf is the most suitable for modelling and staining, because of its smooth surface. It can be used for all the smaller articles. *Cowhide.*—This being of a much stouter texture, is more suitable for such articles as screens, stools, large blotters, and bags. *Skiver*, or sheepskin, should be used for lining, and can be obtained in plain or variegated colours. *Persian Leather* should be used for pockets, gussets and thonging. *Suède Leather.*—This, being soft, can be used for shopping list covers, shoe-cleaning outfits, book-markers, etc. *Tools required.*—The tools required by the beginner are very few and simple, consisting of (*a*) a bone knitting needle for tracing, (*b*) a Dresden modelling tool, (*c*) a grounding punch, and (*d*) a six-way punch (see Fig. 1).

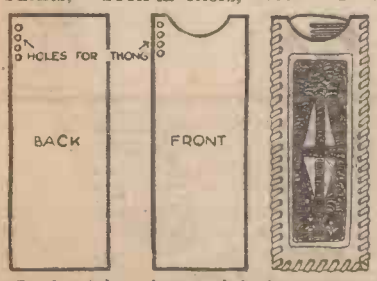


Fig. 2.—A design for a simple leather comb case.

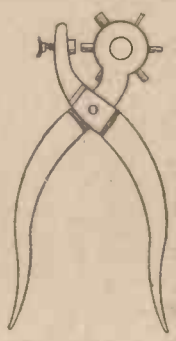


Fig. 1.—A six-way punch.

Method of Working.

Place the design on the leather, which has previously been damped with a wad of cotton-wool which has been squeezed in water; using the blunt point of the knitting needle, trace over the pattern carefully. Remember that wrong lines cannot be taken out. When the design has been traced, put the leather into a large bowl of cold water and let it remain for two hours. Take out and place face upwards on a towel to dry over night.

The Dresden tool is now used for modelling the design. Press firmly, using the side of the tool, on the outside of the outline, to work up the design. This should be punched, and for this purpose various patterns of punches can be obtained. They add to the general effect of the work. Tap the punch lightly with a hammer, moving it over the whole of the background.

Method of Colouring.

For colouring the leather you will need one or two powder stains, these being used with methylated spirits, diluting to the required strength.

For large surfaces use a wad of cotton-wool, working with a circular movement, then for the more intricate part of the design use a brush. Paint the background first and then proceed to the design. When the leather is quite dry, polish with a good shoe cream, rubbing well in with a brush and finishing with a velvet pad. Lastly, line your work with skiver, using photographic mountant, pressing from the centre to the outer edge. Leave under a weight till quite dry.

Tidy off the edges and then proceed to make up, which is done by means of a punch and thongs.

Fig. 3.—How to design and make a napkin ring.

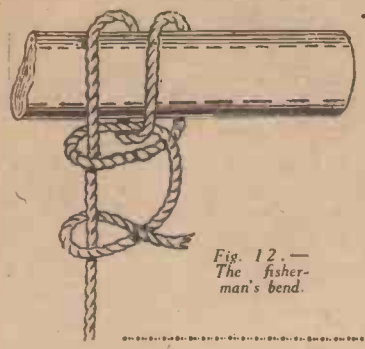


Fig. 12.—The fisherman's bend.

THE ART OF MAKING KNOTS

By "Home Mechanic"

Concluded from page 848 of our issue of March 28th, 1931.

The Clove and Timber Hitch.

The next two knots, the clove hitch and the timber hitch, are used for securing ends of ropes to spars or to bollards. You have all seen bollards; they are those short upright iron posts with round heads, which are set along piers and quays, and to which the cables of ships lying alongside are fastened. The clove hitch (Fig. 8) is very much used for this purpose, since it can be thrown on to the bollard in a moment by an expert, and, of course, it automatically tightens itself under a strain. The timber hitch (Fig. 9) is used chiefly for slinging logs—hence its name. Neither of these two knots is of use unless the strain is continuous, as they give when it is relaxed.

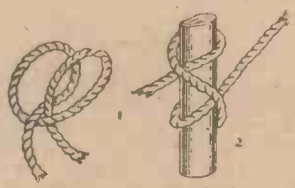


Fig. 8.—The clove hitch.

Tying Ropes to Spars.

Figs. 10, 11 and 12 show three more ways of tying ropes to spars or to other ropes. The two half-hitches are used chiefly for securing the running end of a rope to the standing part. The rolling bend is rather more secure, and does not jam so easily. It is used for finally making a rope fast to a bollard. The rolling bend is not secure under a strain which keeps on relaxing and increasing—such a strain, for instance, as a ship riding at anchor puts on her anchor cable. If we have to deal with a varying pull of this sort, we make use of the fisherman's bend.

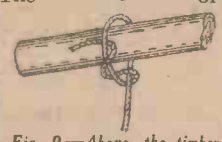


Fig. 9.—Above, the timber hitch, and below, the knot in use.

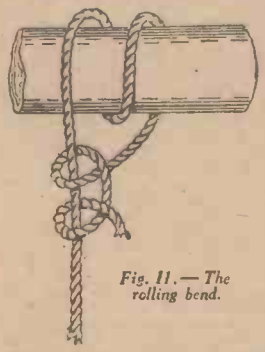


Fig. 11.—The rolling bend.

We have now seen how to make a good many knots; there are, of course, a great many more in everyday use, but I have tried to pick out the simplest and most useful of them. A knowledge of knotting is of great use to an officer, for occasions are constantly arising, especially on active service, when cordage has to be dealt with, and the man who knows the right knot to make and how to make it quickly and neatly will make a better job of things than the man who does not.

A List of Useful Knots.

Carry a piece of string in your pocket, and when you have nothing else to do, spend a few minutes in practising the knots which we have described. You will be surprised to find how soon you become quite expert at making them all.

Here is a useful list of knots and the purposes for which they are used:—

1. The thumb and figure of eight—to make a stop on a rope.
2. The reef, sheet-bend, double sheet-bend, and carrick bend—for fastening two ropes together.
3. The loop and the bowline—for making a loop on the end of a rope.
4. The bowline on a bight—for making a pair of loops on the end of a rope.
5. The harness hitch—for making a loop in the middle of a rope.
6. The lever hitch—for fastening a spar or beam across a rope.
7. The timber hitch—for fastening a log to the end of a rope.
8. The clove hitch, two half-hitches, rolling bend, and fisherman's bend—for fastening the end of a rope to another rope, a spar, or a bollard.
9. The hawser bend—for fastening two heavy ropes together.

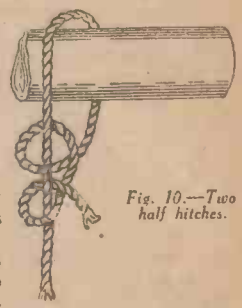


Fig. 10.—Two half hitches.

Remember that a rope is measured by its circumference in inches and not by its diameter. Thus, a "six-inch hawser" is only about two inches in diameter.

HEART-BEATS FROM THE LOUD-SPEAKER

OWING to the popularity of the cone type loud-speaker, many a wireless enthusiast has laid aside his former horn loud-speaker. This should not be discarded, as it can easily be used as an efficient microphone by simply connecting the two terminals to the grid and filament of the first valve on the wireless set. To listen-in to one's heart-beats, remove the horn and turn the adjusting screw to its most sensitive position, which can be ascertained by lightly tapping the diaphragm. Then hold the "microphone" against the chest. If a loud metallic ticking issues from the loud-speaker, do not be alarmed, but remove the watch from the vest pocket to a more distant position and then listen to the heart-beats proper.

Let Your Editor Help You. Address your letters and queries to The Editor, "Hobbies," Geo. Newnes, Ltd., 8-11, Southampton Street, Strand, London, W.C.2. All letters and queries must bear the full name and address of the sender.

Bind your "Hobbies."

THIS is the first issue of a new volume. Those readers who wish to have the last volume bound up (Volume 71), may like to know that we shall shortly be selling a binding case, title page and index for a nominal sum. I strongly urge all readers to keep for reference back issues of HOBBIES, and to have them bound with the index supplied with the binding case, so that they have a ready means of turning up the information they require. The index, by the way, has been very thoroughly prepared; it is cross-referenced so that a particular item can be found at once. Loose copies are likely to be lost. Will those readers who require binding cases write to me at once please?

A "Hobbies" Club.

APROPOS my recent paragraph in which I asked for readers' criticisms, quite a number have suggested that I should start a "Hobbies Club," issuing a badge and certificate of membership for a nominal sum. Readers have pointed out the advantage this would have in placing readers in contact with one another. What is *your* view of this proposition?

No Serial Story!

MANY readers have expressed their opinion regarding the suggestion mooted some time ago that I should run a serial story in HOBBIES. The "no's" have it! By an overwhelming majority, readers have voted against the suggestion; so that's that!

Free Model Aeroplane Design Given Next.

NEXT week the promised design chart for making a long-distance tractor monoplane will be given free to every reader. A member of my staff has just returned from a test of this model, and tells me that it really is a ripping flier. By the way, this model has been designed by the world's acknowledged authority on the subject. Simplicity is its keynote, whilst its performance is equally as good as anything you can buy.

Puzzle-Picture Competition.

NEXT week I shall publish the first of a series of puzzle-pictures. The competition will last for three weeks only. The competition will not be too easy. I have tried to make it sufficiently difficult to make ties an impossibility. The prize list will be different from the last puzzle-picture competition, but equally as lengthy. Readers have been bombarding me for several weeks past to start a puzzle-picture competition, and now is *your* chance. If you were unsuccessful in previous competitions, I am sure you will enter it determined *this time* to succeed!

NEXT WEEK.

Free Design Sheet for A LONG-DISTANCE MODEL MONOPLANE

A DUAL WIRELESS COIL

AN ELECTRIC ALARM CLOCK

PUZZLE-PICTURE COMPETITION

Model Aeroplane Topics—Stamps—Electrics—Model Making—Cycling Notes, etc.

QUERIES AND REPLIES.

Birds on Telegraph Wires.

"Why can birds alight on telegraph or other electric wires without apparently receiving a shock?" asks B. B. (Ipswich). They do not complete a circuit with both feet on the same wire. If the bird straddled two wires or touched anything that was a conductor while standing on one wire, the circuit would be completed and the current would pass through its body. If you jump on to the "live" rail of an electric railway with both feet you will receive no shock, but if one foot touches that rail and your other foot or any part of you touches the ground or the other rail, or the platform, you will be instantly killed.

The Lowest Powered Motor Cycle.

The lowest powered motor cycle made to-day, E. W. (Dorking), is 75 c.c. or ¾-h.p. It is of French manufacture. In France races are held for these small motor cycles, and the record stands at nearly 48 miles an hour. You will find full details of these in "The Motor Cyclist's Reference Year Book," 1s. from all newsagents, or 1s. 2d., post free, from George Newnes, Ltd., 8-11, Southampton Street, Strand, W.C.2. There is no other work of this nature published.

Model Aeroplane Records, 1930.

The British records for model aeroplanes, G. M. (Bradford), are as follows:

Fuselage Machines:	
Off ground	110 secs.
Off water	31.4 ,,
Hand launched	162 ,,
Speed	30m.p.h.
Fuselage Glider:	
Hand launched	58 secs.
Spar Twin Pusher:	
Off ground	247 ,,
Off water	65 ,,
Hand launched	113.5 ,,
Spar Autogiro:	
Hand launched	25.8 ,,
Spar Tractor:	
Off ground	111.2 ,,
Off water	43 ,,
Hand launched	110.6 ,,
Spar Farman Type:	
Off ground	32.4 ,,
Hand launched	37.8 ,,
Spar Glider:	
Hand launched	53.4 ,,
Compressed Air-Driven:	
Fuselage (off ground)	67.6 ,,
Non-fuselage (off ground)	70 ,,
Petrol Driven:	
Off ground	51 ,,

Can We See Air?

Wind is air in motion, N. H. (Edinburgh), and as air is invisible it is impossible to see it. Under certain conditions, such as, for instance, when it is over a heated surface, the motion of air is visually apparent, but this is due to the quickly-changing refracting power of the heated air owing to its constantly varying density. Under these circumstances, it acts like a flexible lens constantly twisting the air about.

A Mistake in the Calendar

O. H. V. (Northampton), asks several queries relating to the calendar, the nature of which will be gathered from the following. Practically all civilised nations use the year, that is, the time taken by the earth to make one complete revolution around the sun, as the standard measurement. This cannot be expressed by an exact number of days, and in order to maintain the relative positions of the months and seasons, additional days are inserted or "intercalated." In the Julian Calendar, introduced by Julius Cæsar, the length of the year was taken to be 365¼ days. To avoid fractions, an ordinary year was reckoned as consisting of 365 days, with an additional day every fourth year ("Leap year"). The length of the year is slightly less than this estimate, and, in consequence, by 1582 a mistake of ten days had arisen. To correct this error, Pope Gregory ordered ten days to be dropped from the month of October in that year, and to prevent the mistake arising again, directed that the last year of each century should be regarded as a leap year, only when the number of the century was exactly divisible by four. This calendar has been adopted, at various times, by all the European nations, and by China and Japan. It has also been adopted by the Greek Orthodox Church. Our own country did not adopt the new calendar until 1752, when eleven days were left out in September. The Julian calendar is known as the Old Style and the Gregorian as the New Style. The Jewish year consists of twelve lunar months, an additional month being intercalated at intervals. The Mohammedan year also consists of twelve lunar months, but as they do not intercalate, there is no correspondence between their months and seasons.

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