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This Week: THE PLANE. Next Week: THE FITTINGS

HOME CRAFTS — WOOD WORKING — MODEL MAKING — AMATEUR MECHANICS ETC. ETC.

Hobbies

2D

January 31st, 1931.

No. 1841.

Published every Wednesday.

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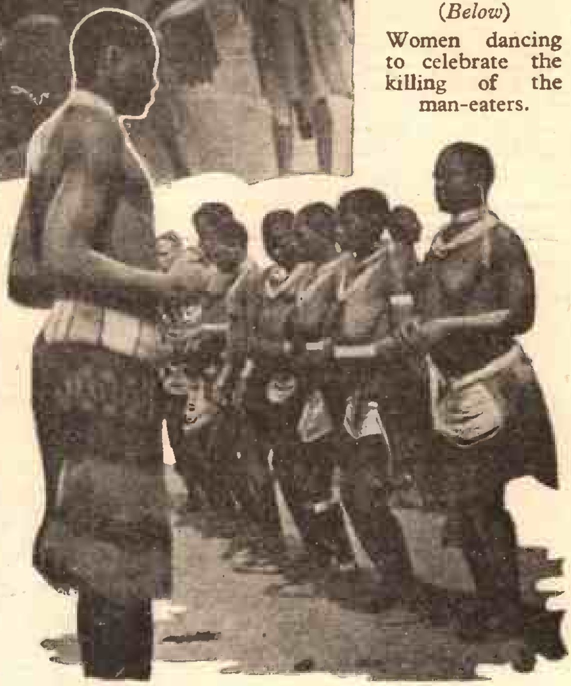
Illustrations from "The 'Lion-Men' of Ussure."

(*Left*) Triumphal dance.

(*Below*) Women dancing to celebrate the killing of the man-eaters.



READERS who like mystery "Thrillers" have a treat in store in this issue. "The Great Vera Cruz Mystery," the opening story, is most fascinating, and the final *denouement* is as dramatic and surprising as any work of fiction. Another good story is "The Treasure That Wasn't," an account of the curious experience that befell the Author in Central America. "Among the Ifugaos" is a description of a visit to a little-known tribe of former head-hunters in the Philippine Islands, while "Black Devil" gives a thrilling account of the doings of a cunning man-eating crocodile and its eventual dispatch. Under the heading "The Queer Side of Things" the *Wide World* has published some very remarkable stories, and this month's item, "The Disappearance of Captain Anderson," is a most unusual narrative. There are several other excellent contributions, all profusely illustrated.

The contributors are men and women who have actually undergone the experiences they describe, which fact gives their narratives the vivid actuality that is so characteristic of the magazine. It is fascinatingly interesting; an education in itself. The *Wide World* will widen your mental horizon, teach you more about this queer old earth of ours than you could learn from a library of geography books, and bring all the world's romance and adventure to you.

The February

WIDE WORLD

A MAN'S MAGAZINE

On Sale Everywhere - - - - - One Shilling

Geo. Newnes, Ltd.

BRITISH tools for the FRETWORKER.

Here are fretwork tools to add to your set or to use as a beginning. Each one is the best of its kind, and made as a result of years of practical knowledge of the requirements of the worker.

HOBBIES LEVER HANDFRAME.

The lever on the top arm provides the right tension without any trouble; the Spring-open Clamps are the best made for holding any saws; and the spiral movement of the knob in the handle allows the use of shortened saw-blades. What better could you want?

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WITH FOUR BITS, READY TO USE.

Price 2/-

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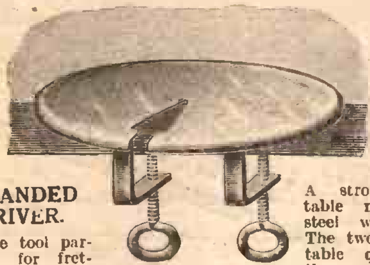


THE DOUBLE CRAMP TABLE.

A strong rigid cutting table made of polished steel with round edges. The two cramps hold the table quite firmly, and the pear-shaped cutting opening allows the saw to work in the finest fret.

Polished Steel.

Price 2/9. *Post 6d.*

SINGLE HANDED SCREWDRIVER.

A splendid little tool particularly useful for fretwork screws. The head is held in the palm, and the knurled shank turned with the fingers, thus allowing the other hand to hold the screw. **9d.** Post 1½d.

Your friends who are fretworkers would also be interested. Show them these tools and tell them how good they are.

BUY BRITISH GOODS FOR SATISFACTION.

HOBBIES HAND VICE.

A useful little tool for holding small work for fitting or during sandpapering. Well made and finished with polished parts.

Price 2/- Post 5d.

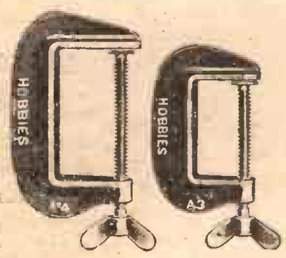
Any ironmonger or stores can supply these tools, but be sure they are Hobbies make.

USEFUL STEEL CRAMPS.

These serviceable cramps will hold the wood after gluing or serve a hundred and one other useful purposes. The A2 has a 2in. jaw, the A4 four in., and the A6 a six-in. jaw.

A2 1/6 A4 2/9
A6 4/6

Postage 6d. extra.



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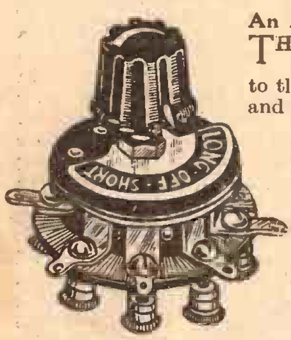
Hobbies

Vol. 71. No. 1,841 Published Every Wednesday JANUARY 31st, 1931

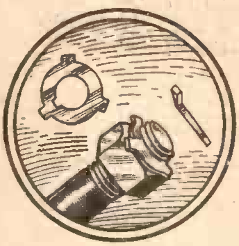
THIS WEEK'S CLEVER IDEAS



An all-round switch for wireless sets.

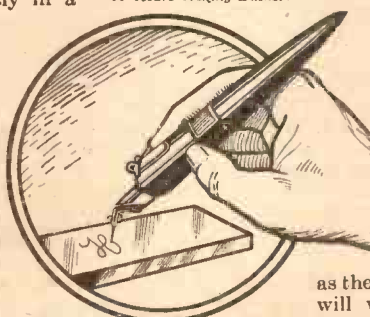
An All-round Wireless Switch.

THE multi-purpose wireless switch shown in the sketch to the left is rotary in action, and has two balls in the extremities of the Bakelite arm. The balls snick securely into the spaces between the contact strips, making low-resistance contacts between two pairs of strips simultaneously. The switch performs all the functions of a double-pole, double-throw, change-over switch. In the diagram one of the ball contacts is seen making a firm connection between adjacent strips. A special feature of this switch is the terminal, which will hold several wires simultaneously in a vice-like grip. It is obtainable for 3s. 6d. complete with terminals from The Benjamin Electric Limited, Tarriff Road, Tottenham, N.17.


A secure locking-washer

A Secure Locking-Washer.

ONE of the problems confronting the maker of model and other small pieces of machinery is that of keeping the nuts tight under vibration. Many devices to get over the difficulty have been marketed, but the locking-washer shown in the centre of this page provides a satisfactory solution. The washer has three lugs on its outer edge, and it is twisted, the angle of the twist corresponding to the thread angle of the bolt for which it is intended. The nut is screwed on in the usual way with a spanner, after which the locking-washer is screwed on and secured by tapping one of the lugs with a hammer. It is obvious that different washers are required for bolts of varying screw threads and diameters. It is made by The Locking Engineering Company, Limited, Cardiff.


An electric pen for engraving metal articles.

A Handy Fountain-Pen Engraving Tool.

THE handy little electric fountain-pen engraving tool shown in one of the centre illustrations on this page will enable you to engrave your name or other matter on metal articles and tools and thus protect them from theft. The instrument works from a very low current, such as may be provided by a dry cell. The tool will engrave equally as well on hard metal as on soft. It is an American product, costing about 14s., and is marketed by the Arkograf Pen Co., 1171, E. Stark Street, Portland, Oregon.

A Handy Charging and Lighting Dynamo.

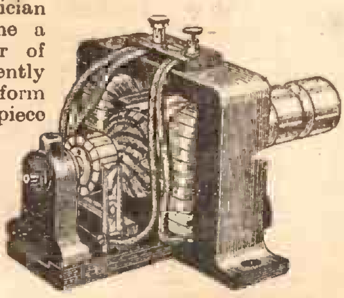
THE small charging and lighting dynamo shown in the illustration below has a capacity of 18 watts at 3,000 revolutions, thus yielding 5½ amps. at 3½-volts, 3 amps. at 6-volts, and 1½ amps at 12-volts, and so on. It is fitted with self-cleaning low-resistance gauze brushes and spring rocker gear. It will be found extremely useful for home charging and lighting. It is sold by Messrs. A. W. Gamage, Ltd., Holborn, E.C.1, for 37s. 6d. Post extra.

A Matchless Match.

DR. FERDINAND RINGER of Vienna has recently patented a match which can be lit over 600 times. They are made of chlorate mixed with substances that render them less inflammable and unaffected by heat or moisture. They are cheaper than ordinary matches and are to be marketed in cases containing five or six.

Pliers for Making Wire Eyes.

The wireless constructor as well as the electrician will welcome a special pair of pliers recently marketed, which will form loops at the ends of a piece of wire. The size of the eye can be varied to suit the diameter of the terminal it is to fit. The pliers are known as Volute pliers, and they provide no less than eight sizes of loops.


A small dynamo for charging and lighting.

NOTES AND NOTIONS from our READERS

A Bottle Barometer.

A VERY reliable barometer can be made from an empty glass jam-jar and an ordinary vinegar bottle.

See that the bottle sits without wobbling when placed upside down in the jar. Mix a little red ink with water and half-fill the bottle with it. Invert the jar over the bottle and reverse, gently raising the bottle until only an inch or so of the coloured water remains in the neck.

A bottle barometer.

The barometer should be placed in some place where it will be easily seen—say, close to a window.

When the column of water in the neck of the bottle rises to the level of the water in the jar, good weather may be expected, but when it falls to an inch or so, rain or high winds may be looked for in the near future. These barometers are very reliable; the state of the weather expected may be gauged by the amount of the rise and fall. The sketch shows barometer indicating bad weather.

Removing Cork from Bottle.

A CORK that has been pushed inside a bottle can easily be removed by the following method.

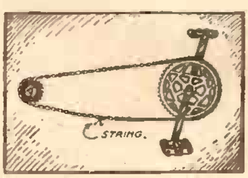
An old dodge for extracting the cork from the bottle.

Insert into the bottle a piece of string forming a loop in the shape of a U. After doing this shake the bottle, then, when the cork rests on the string in the neck of the bottle, give the string a sharp upward jerk, and the cork will come out.

Cycle Chain Dodge.

MANY cycling readers may have had the unpleasant experience of walking home due to a broken chain.

A much better way is to tie together the two broken links with a piece of string with the broken part of the chain on the underneath side, as in the illustration. Then, by means of pedalling backwards and forwards to keep the string in between the two cogwheels, the stranded cyclist will be able to ride home.

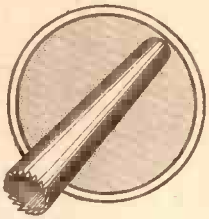


Temporarily repairing a broken cycle chain.

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 Hollow Punch for Brickwork.

GET a piece of stout electric or gas piping about 8in. long, according to the size of the hole required. Then cut teeth in one end with a three-cornered file or hack-saw. With a hammer drive this into the wall (it cuts very cleanly); at the same time twist it right and left. All particles of mortar and brick will drop inside the tube, which can be tapped out at intervals until the required depth is reached.



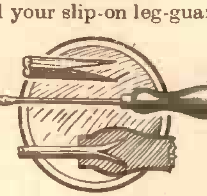
A hollow tube cutter, for bricks, cement, etc.

Fixing the Blade of a Screwdriver.

TO fix the blade of a screwdriver in its shaft, make a cut in the end of the screwdriver blade with a hacksaw, and drive it in the handle. The two ends will then open out and hold the blade securely.

Slip-on Leg-guards.

YOU can easily make yourself waterproof leg-guards. Get two pieces of an old mackintosh about a foot long and 9in. wide, and two pairs of cycle clips. Then hem the short sides of the mackintosh over the clips, and your slip-on leg-guards are ready for use.



Making the screwdriver blade secure.

Improvised Cramp.

VERY often a "cramp"—a most useful tool—is not obtainable, and a very suitable substitute I have found is to tie a double piece of strong string round the tea-tray, picture frame, or whatever it might be, and then get a piece of wood about 6in. by 1in. by ½in. and put this through the doubled string; then turn the wood round and this will hold the work tight and firm.

Fixing Wall Brackets.

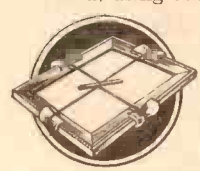
TO those readers living in council or estate houses who have small brackets or light china cabinets that need fixing on the wall, the following idea will get over the difficulty of not being allowed to make holes in the walls.

Useful leggings for cyclists.

Procure two picture hangers, straighten out the bottom lip, bore and countersink a hole large enough to take a No. 6 screw, and, after cutting a slot in the bracket, fix with the largest screw that the thickness of wood will allow. When hangers are bent to the proper angle the finished article will hang on the picture rail and lie close to the wall.

How to Sharpen a Gimlet.

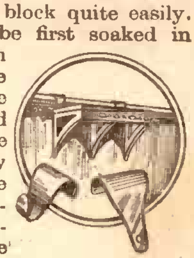
FIRST bore a hole in a piece of hard wood, using the gimlet which is to be sharpened, then fill in the hole with a mixture of emery and oil. The gimlet should be inserted and turned to and fro in the mixture. Change the emery and oil from time to time, and to give a good final polish bore a hole in soft wood, fill it with flour or brick-dust and give the gimlet a few turns in this, when it will come up like new.



A useful cramp for picture frames.

Easy Home-made Method of Graining Wood.

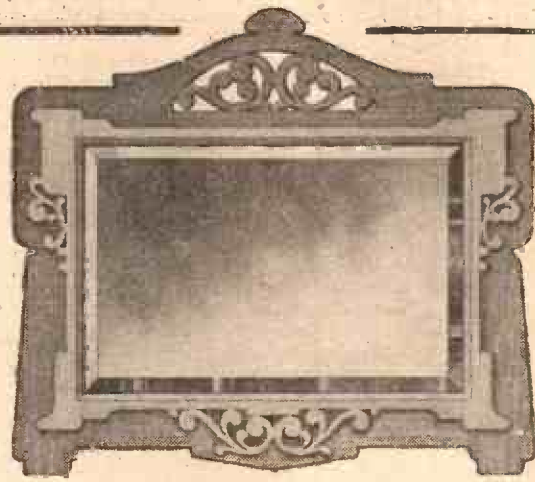
PLAIN wood can be made to appear to be grained by taking a curved block of wood and tacking on it pieces of rope in a semi-circular manner, each half-circle gradually diminishing in size until only a very small one is possible. A handle can be added to the block quite easily. The rope must be first soaked in water, after which the varnish may be applied. When the varnish has worked its way into the rope, exceptionally good results will be obtained. In addition, the operation is both simple and speedy.



A picture hanging hint.

A SMALL OVERMANTEL

This handsome overmantel is easily built in oak and is planned for a mantelshelf of average size. It extends 1ft. 8in. and just 18in. high with a glass 15in. by 10in. All the cutting patterns are given in this week's gift chart.



A VERY large number of our readers, we know, are amateur carpenters, and are being, or have been taught the way to make really useful articles for the home with their woodworking tools. We have seen a good many examples of their work, and are amazed at the excellent standard attained. The knowledge of handling tools properly is a great asset, and we are constantly offering in these pages opportunities of turning that knowledge to good account. An Overmantel at first sight may sound a bit too much for the young carpenter, but there is really no reason why he should not undertake it if he knows how to go to work properly. One of the first things in carpentry, of course, is the setting out of the work, and this is often a monotonous job, seldom liked by the beginner.

Cut Out in Oak.

We have, therefore, overcome this difficulty in the making of the Overmantel illustrated, by supplying a complete set of patterns printed full size, so that, instead of marking out in the ordinary way, all one has to do is to paste these down to the wood and cut them out according to the shapes given. Then, too, there is the question of wood. An overmantel usually looks best in oak, and one can imagine what an attractive piece of work would be provided with the one illustrated here made up in that material. The Overmantel is, then, built in oak, and in order to make it a real piece of work it wants to be cut in $\frac{1}{2}$in. material. The planning of it has purposely been kept simple, and beyond the background there is only the work of cutting the frame which holds the mirror in place. The whole thing when completed is 1ft. 8in. long and 1ft. 6in. high—just the size to suit the ordinary modern house. The work involved is not great, and besides the ordinary carpentry tools one needs those found on any Hobbies fretwork outfit.

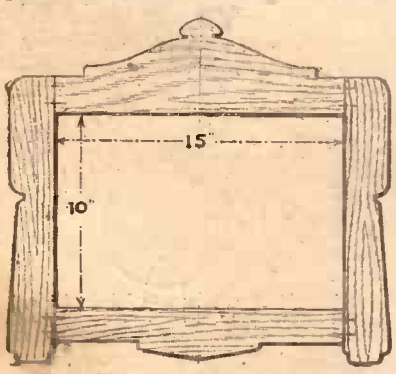


Fig 1.—This is the way the framework is put together. The position of the dowel pins at the joints is clearly indicated.

So far as the wood is concerned, the oak boards can be obtained from the same source, but in order to save the time of measuring up and marking out, a complete parcel of wood is supplied for the absurdly small sum of 2s. 9d. One of the troubles of some of this class of work is the getting of the fittings, and it is little use making such an overmantel as this unless you have a mirror which fits it. It is arranged, therefore, to have the clear mirror of good quality, measuring 15in. by 10in., supplied, and particulars of it are given on the next page.

The opportunity is thus afforded for any handyman to make up an overmantel suitable for any home, and if it is a question of cost there is no doubt that the outlay will be repaid several times by the result. The whole thing, you must remember, is completed for 11s. 2d.—a nicely completed article should sell for at least double that amount.

Simple to Cut.

We have mentioned the pattern sheet already, and a reference to it will show that the parts to cut consist of four $\frac{1}{2}$in. boards for the main frame, and four $\frac{3}{16}$in. strips to form the rebate which holds the mirror in place. The patterns for these parts are, therefore, cut from the sheet and pasted down carefully to their respective boards from the parcel supplied. Where boards have a straight edge it can often be utilised to save cutting by pasting the pattern down so that any straight line along it comes to the extreme edge of the board. In the case of the side rail only one pattern is given. Cut this out in the wood and then lay the part on another board, marking round it with a pencil to get the second outline required.

The framework is in $\frac{1}{2}$in. wood, and we must be particularly careful, therefore, when using the fretwork handframe to keep the blade upright. The user of a machine, of course, has not this trouble, because the saw is held vertically for him in the rigid arms. The framework is held together by dowels, the two horizontal pieces being fitted between the two side rails (see Fig. 1). These dowels are formed of pieces of $\frac{1}{4}$in. circular rod (supplied with the parcel of wood, or obtainable from Hobbies separately), let into the edge of the wood and glued to hold the parts together. A sketch is given at Fig. 2 showing quite plainly how this is done. The great thing in fitting these dowels is to see they are driven in straight and opposite each other. If they are not dead true the parts will wring, and a good joint cannot be made. It is, however, merely a matter of holding the brace and bit upright, and a good plan is to stand at the end of the bench rather than at the front of it. One can then look down the brace and see that it is perfectly vertical. A piece of cotton should be tied round the bit $\frac{3}{4}$in. from the cutting blade, in order to mark the depth it is to go. The dowelling itself is $\frac{1}{4}$in. in diameter, and the hole is the same. Both are sunk $\frac{5}{8}$in. into each piece of wood, so that the dowel pins are $1\frac{1}{4}$in. long. Make a groove along the edge with a file or chisel, in order to allow the glue and air to squeeze out when they are forced home. To ensure this accuracy the boards into which the dowels are driven should be marked at the same time, before the paper pattern is cleaned off. Take the lower rail and one of the side rails, for instance, and put it in a bench vice so that the dotted lines showing the position of the dowelling come exactly opposite each other. To test this, lay a square across and then draw a line on the edge of the wood at the centre point between the thickness of the two dowels (see Fig. 3). Then take a marking gauge and test up with it half the thickness of each board, afterwards crossing the other line in the ordinary way with a little cut in the wood (see Fig. 4). Thus we have the exact position at which the point of the bit is to enter, and the work of boring the holes is completed.

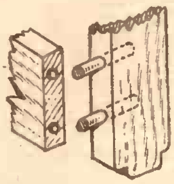


Fig. 2.—The manner in which the dowel pins are fixed to make a strong joint.

Before actually joining up these rails, we must, of course, see that all the edges are properly cut and—in the case of the top rail—get out the fretted scroll work. It will be noted in fixing that the end of the top rail comes flush with the top edge of the side rail. In the case of the bottom rail, however, it is some way up from the bottom of the side rails, and in marking out for dowelling we should note that the distance inside the frame is large enough to take the mirror—that is, 15in. by 10in.

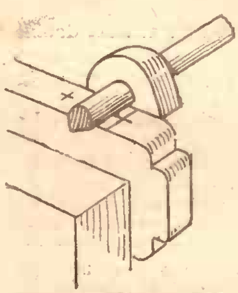


Fig. 4.—Using the marking gauge to indicate the centre of the hole for the bit.

The framework can be all dowelled together before the remains of the paper pattern are sandpapered off, the whole thing being then cleaned up.

As has been mentioned, the glass is held in place by an overlay frame cut from thinner wood. Four strips are required, and all are cut with a fretsaw to get out the small amount of decoration which they contain. As in the case of the outer frame they are joined together by the two horizontal strips put between the two upright ones. The wood is all $\frac{3}{16}$in. thick, and in order to make it look thinner where it meets the mirror, a chamfered edge is cut. This simply means cutting the edge away to a slope—a flat angle of about 45 degrees. A sectional drawing is given on each rail to show that this chamfer brings the inner edge to a sharp point. This chamfer, however, is intended to be merely round the mirror itself, so that it cannot be carried to the extreme ends of all four strips. The top and bottom rail have the chamfer the whole length, and it can be done by putting the wood in a vice and running a small fretwork plane along at an angle and cutting the wood down to the shape required. The other two rails, however, have what is called a stop chamfer—that is, it does not extend the full length, but finishes about 1in. from the ends. The centre of this chamfer can, perhaps, be done with a small plane, but where it finishes must be carried out with a fairly coarse file used carefully with both hands. At the extreme end, too, the chamfer is carried round at an angle to meet the similar chamfer on the top and bottom rail, and this is done either with a chisel or with the file. A picture of the stop chamfer is given at Fig. 5, where is also shown the manner in which the file is held in producing the result desired.

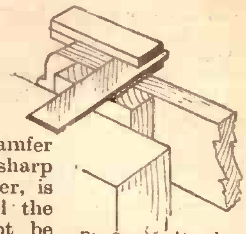


Fig. 3.—Marking the positions of the dowel pins on two parts together to ensure accuracy.

These overlay parts are cleaned up with sandpaper, used on a block, of course, in the ordinary way, and are then laid in place temporarily to see that they fit round the edges of the inside frame of the overmantel. When they have been proved to fit accurately, they are glued in place so that there is a projection of about $\frac{1}{8}$in. all round. Get the parts securely glued in place by weighting the whole lot down flat. The mirror is, of course, placed behind this part, and is then held by putting behind it a piece of plywood backing 15in. by 10in. This is fixed by photo clips or small headless nails in the same way as a picture frame backing is held. A piece of brown paper is pasted over the back to keep the dust out. To get this drum-tight it should be dampened before being pasted on, and when dry it will stretch taut.

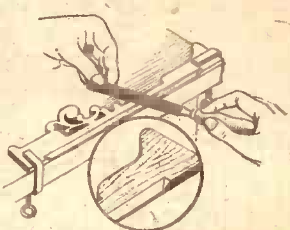


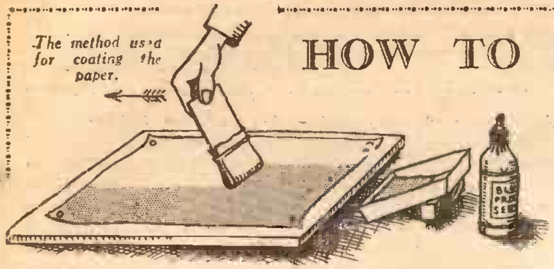
Fig. 5.—The way to hold a file in chamfering and (in the circle) the angle at the end of the chamfer.

(*Continued on page 589.*)

HOW TO MAKE BLUE PRINTS

By S. J. Garratt

How to prepare your own sensitive paper



THE "Blue Print" process is extensively used for making copies of engineers' tracings, but it can be used successfully for prints from photographic negatives if the negatives are strong and contrasty, having dense high lights and clear shadows. Weak, thin negatives—although giving good results with gaslight paper—are useless for making blue prints. The process is simple, cheap and easy to work, for after exposure the prints only need a wash in water to make them permanent, thus avoiding the usual developing, toning and fixing. This paper is very suitable for printing rough proofs, being much cheaper than self-toning or bromide papers. It does not appear to be sold in small quantities suitable for amateurs but can easily be made at home by following the instructions given below.

Chemicals Required.

Procure from a chemist or photographic dealer 1 oz. of ammonio-citrate of iron and 1 oz. of ferricyanide of potash. Dissolve each of these chemicals separately in 4 ozs. of water, *i.e.*, dissolve the ammonio-citrate in 4 ozs. of water in one vessel and the ferricyanide in another 4 ozs. of water in a separate vessel. When both are completely dissolved, mix the two solutions together to make 8 ozs. of sensitiser. The mixed solution should be kept away from the light; a good tip for achieving this object is to wrap thick brown paper round the outside of the bottle, binding the paper with string or rubber bands.

Ask the chemist to weigh out the exact quantity of each chemical, for it is not advisable to keep small quantities of poisonous chemicals unless you have a properly equipped dark room with a special chemical cupboard. For a similar reason you are advised to coat as much paper as you are likely to require and throw away the surplus solution, as it only costs a very few pence to prepare a fresh lot when required; in any case *never* put any solution whatever away without labelling the bottle clearly, describing the contents.

Coating the Paper.

Writing paper with a smooth but not greasy surface is a suitable material for coating. Pin the paper out flat on a board with drawing pins to stop it curling up when wet. The best method of applying the solution is as shown in the illustration. A piece of absorbent cloth folded into two or more thicknesses is doubled over the edge of a piece of glass and held in place with a rubber band; an old negative will do for the glass. The solution is poured out into a flat dish so that the coating appliance may be dipped in to charge it with solution; the gadget is then passed over the surface of the paper in a weak light only, leaving a wide band of sensitive solution on the surface; make other bands slightly overlapping the previous one until the surface of the paper is covered, then while still wet give a second coating with the bands at right angles to the first and put away to dry in the dark. It does not matter if the paper looks a bit streaky when coated as long as the surface is covered completely.

The Method of Printing.

This is carried out in the ordinary way and should be continued until the deepest shadows assume a bronzed appearance. No time for printing can be given as so much depends upon the light and the negative. A very few minutes would suffice in summer sunshine, but it might take all day or more in winter.

To finish the print it is just washed in water after being removed from the printing frame until the water runs off clear and free from yellow tinge. The colour becomes darker as the print dries and will be slightly improved if the wet print is subjected to a bath of extremely weak acid—say a teaspoonful of vinegar in a pint of water—before the final rinsing in clean water.

Titles may be written on the finished print with an ordinary pen by using a solution of ordinary washing soda in place of ink.

The sensitised paper should be stored in a dry, dark place, between the leaves of a book will do if the book is not damp.

SOME FINE MINIATURE MODELS

Models of a horizontal mill engine a coal truck, and the Schneider Trophy plane. The size will be gauged from the cigarette.

FORMING FEET FOR WOODWORK

THERE are several different ways in which the woodworker can add feet to the articles he makes, and the keen handyman will be glad to know them all. At first sight the addition of feet is quite a minor detail, but one must realise that they can be so ugly as to spoil an otherwise excellent piece of work if they are not correctly cut. The numerous designs of woodcraft illustrated in Hobbies' Catalogue are an object lesson any worker will do well to study. The different occasions on which different feet are used is shown quite clearly, and these few words on how they are made up will add greatly to the useful knowledge of any worker.

Fig. 1.—A common and simple foot to a corner of a cabinet.

Fig. 2.—The addition of a rounded flat toe makes a distinctive finish to the foot.

At Fig. 1 we have a method very much used in woodcraft, and one which is simple to complete. It is merely the addition of a square of fairly thin wood glued beneath the corner of the box or clock, or whatever the article is. It is usually about 1½in. square and ¼in. thick, and is the easiest way of raising the work on feet. Of course, it does not suit every occasion, but can be seen used in many designs of boxes or square clocks, etc.

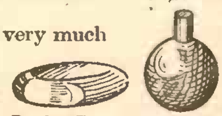


Fig. 3.—Two kinds of ready-made toes, obtainable in several sizes at a few pence per dozen.

The second method illustrated (Fig. 2) is to add to this square foot one of the little round toes supplied by Hobbies as shown. These toes, of course, can in some instances be put on without the square of wood above. They are useful for tray bottoms, and are very often used as decorative buttons as well. This foot is flat and can be easily glued on. It will hold better if the flat surface is roughly scratched first to give the glue more grip. A similar foot, or toe, which can be used to raise the work higher than that just mentioned is shown at Fig. 3 with the other kind. Here is a round knob with a spindle projecting from one side. A hole is bored into the work, and this spindle is glued in tight and firm. Both the feet illustrated are obtainable in two or three sizes very cheaply, and any woodworker should have a stock at hand for general use.

Another, and more modern form of foot, is illustrated at Fig. 4, and this is built up of two ordinary pieces of fretwood cut a shape and in proportion to the rest of the work. Each corner has to have two parts and they butt up to each other with the one along the front of the work covering the edge of the one along the side. The two parts are, of course, exactly alike, and when one has been cut out it is laid on a piece of wood and a pencil run round to mark out its exact shape. Suppose it is being fitted to a narrow box which measures 8in. along the front but only 4in. from back to front. Then the feet in the corner cannot, obviously, be the same length; the one at the side must be considerably shorter. The wood, of course, is glued under the work in its proper place, and if it is likely to get roughly handled, it may be necessary to cut little strips or blocks of wood to put behind in the angle of the bottom to provide greater strength.

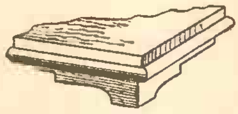


Fig. 4.—Two pieces of fretwood the shape of the one above make an excellent corner foot if fitted as shown in the lower illustration.

Finally, there is the fretwork foot found in many ornate designs and styles. Several illustrations of it are given in Hobbies' Catalogue, and an idea of its construction is given at Fig. 5. There is the complete foot, not necessarily cut to that particular shape, but generally having a curved and ornamental outline. The foot is made up of two pieces of fretwood halved together to form a rigid and rectangular piece of work. The fitting is provided by cutting a slot in each piece but from opposite directions (see Fig. 5), so the two parts will slide together to form one solid piece. This joint—called a halving joint—must, of course, be cut accurately, and the same width as the thickness of the wood. These feet can often be incorporated in the actual sides, but can also be cut as distinct parts and glued on afterwards beneath the base of the article if this is desired.

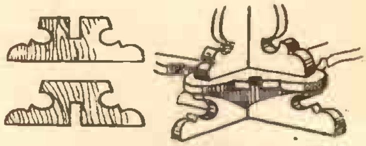


Fig. 5.—An ordinary fretwork foot, made in two pieces and fitted together by the halving joint. This forms a rigid and flat corner for almost any article.

PRIZEWINNERS!—In Hobbies Fretwork Competition.

The Hobbies Fretwork Competition specially devoted to beginners under sixteen years of age, which closed last month, was a huge success. There were a bigger number of entries than ever before, largely due to the fact that the piece to be cut was so simple and straightforward. The competitors were given a design for a mirror frame, and some beautiful work was sent in. The judges had a difficult task to pick out the best, for the standard of fretwork in all of them was very high. Below is the complete list of prizewinners—all of whom have received, or will shortly receive, their award. The actual pieces of work will be returned in due course if the necessary postage was enclosed. The Open Section closes with January, and the results announced as soon as possible. The prizewinners were :—

1st Prize—Gem Machine (value 35s.) C. F. Woodrow, Bournemouth.
2nd Prize—A.3 Outfit (value 20s.). H. J. Hunt, Lyme Regis.
3rd Prize.—A.1 Outfit (value 10s.). Sean Casey, Cahir.
4th Prize.—No. 2 Outfit.—John Fox, Oldcastle, Co. Meath.
5th Prize.—Hobbies Plane.—J. S. Pybus, Grimsby.

A Gross of Fretsaws have been awarded to each of the following: R. E. Wilshire, Huntingdon; J. Turk, Ashford, Kent; M. O'Catasaigh, Mitchelstown, Co. Cork; T. Earney, Saintfield, Co. Down; T. N. Robinson, Brewood, Stafford; Paul Jefferies, Newcastle-on-Tyne; A. D. Howe, Dolton, Nth. Devon; J. Smith, Drybrook, Glos.; John Blandford, Toddington; R. George, Newton Abbot; J. Chisholm, Berwick-on-Tweed; J. Evans, Marchwell; B. Woodward, Brewood, Stafford; C. Kisby, March; J. G. Lockhead, Myroe, Co. Derry, C. Whitworth, Layton, Blackpool; P. R. Stewart, Cornhill, Banffshire; G. Holloway, Stapleton; W. Dams, Peterborough; T. W. Salmon, Ardleigh. 50 further Consolation Prizes also awarded.

AN EFFECTIVE CROSS-BOW

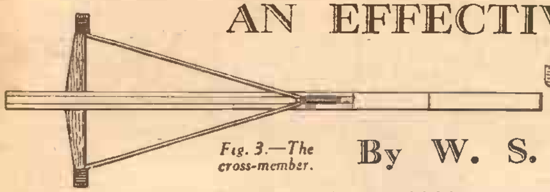


Fig. 3.—The cross-member.

By W. S. Rogers

Fig. 1.—How the stock is made.

THE weapon about to be described here employs a stretched rubber cord as the propelling agent, thus resembling the catapult.

The stock may be cut from a piece of straight-grained deal, 1in. thick, to the pattern shown in Fig. 1.

The top surface must be grooved half round, as in Fig. 2, to a full 5/16in. radius, so as to provide a channel for the bolt, which is made from ⅝in. dowelling. This groove should be well smoothed with glass-paper.

Fig. 2.—The top surface of the barrel is grooved as shown here.

If no suitable plane is available, use a small gouge, and even the surface with a rat-tail file before glass-papering.

Fig. 5.—A piece of dowelling made up as shown can be used for the bolts.

Cut the slot shown at A 1in. by ¼in., and fit to it the cross-member, as shown in Fig. 3. This should be tapered in width to ½in. at each end, as shown.

We have now to consider the lock. Make a vertical slot centrally as shown in Fig. 4, ¼in. wide, and long enough to house the lock mechanism.

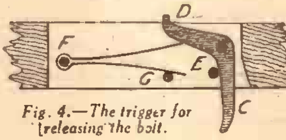


Fig. 4.—The trigger for releasing the bolt.

The trigger C, Fig. 4, may be cut from thick brass sheet. It is secured with a screw, taking care that it pivots on the plain part of the screw. Its turned-up point D must stand above the upper surface ¼in., for a ¼in. diameter-cord. When the adjustment is made a screw should be driven through the stock at E.

A lock spring is used to give the return action to the trigger, fixed in place by the two screws F and G.

It only remains to attach the rubber. Wrap the ends with a strip cut from a piece of old kid glove, and bind them firmly with thin copper or brass wire to the cross-member. The length of the cord must be ascertained by experiment. It should be sufficient to admit of hitching it over the trigger head when stretched to nearly its limit.

The bolts may be 8in. long, cut from ⅝in. dowelling. A wire nail is driven into one end, and the "feathers" may be cut from thin celluloid in one piece and glued into a saw-cut made from the back end of the bolt. There is no need to put a notch in the end (see Fig. 5).

As this form of cross-bow has considerable driving force, the usual precautions should be taken to guard neighbours and companions from stray missiles, say, by devoting part of the garden to a range, and fixing up a sufficiently large target.

The latter may be an old packing-case lid, marked out in circles, with a conspicuous bull's-eye.

MAKING BELLOWS OF PAPER

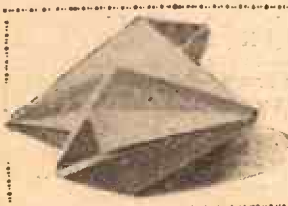


Fig. 5.—The bellows when completed.

By S. Gifford

HERE is a piece of paper-folding that is not generally known. Carefully done, it results in a very efficient bellows, useful on occasions for reviving a flagging fire.

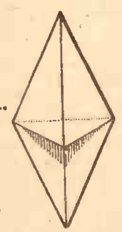


Fig. 4.—The folding completed.

Use a thin, tough brown paper. Cut a square as at Fig. 1. First fold from corner to corner, then turn over and fold from side to side, as indicated by the dotted lines. Pinch together the corners and flatten out as at Fig. 2. This gives two ears on each side. Fold forward the two uppermost ones along the dotted lines, turn over and do the same with the two others. You will now have a square as at Fig. 3. Fold again along the dotted lines, pinching together the corners, so that the folds lie flat, and the result will be as at Fig. 4.

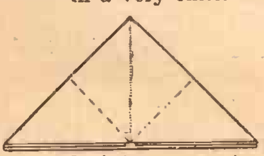


Fig. 2.—Pinch the corners together and flatten out as shown.

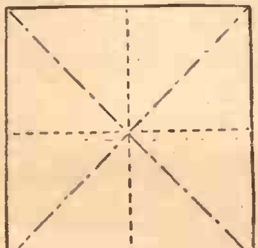


Fig. 1.—Cut a square of paper as shown and fold along dotted lines.

How the Bellows Work.

If now you grasp each pair of corners between thumbs and fingers and draw them apart, the bellows will inflate and appear as shown in the perspective sketch (Fig. 5). There will, of course, be a small opening at one end of the structure through which the air will be expelled when the corners are pressed inwards.

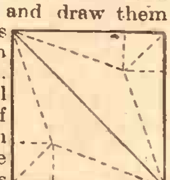


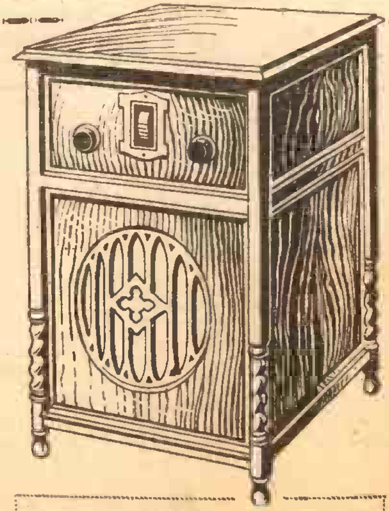
Fig. 3.—Fold along the dotted lines and it will appear as in Fig. 4.

These bellows give a really efficient blast of air and do not quickly go to pieces if the paper is of tough quality.

The pairs of ears that constitute the handles may be joined each pair into one with sealing-wax, which makes it easier to manipulate the bellows.

This is but one of the many uses to which folded paper may be put.

A HOME-MADE WIRELESS TABLE



This compact instrument contains the set and speaker, can be made for gramophone amplification, and used as a table. Quite simple and cheap to make in oak.

NOW that the radio set and the gramophone have become so closely related, something special is called for in order to be able to use the instruments conveniently. Nothing is more confusing than a set here, a gramophone there, batteries somewhere else, and a loud speaker perhaps in another room. Many on the other hand cannot afford a de luxe combined and self-contained instrument, or perhaps for general purposes and convenience prefer each item to be independent and separate. To such an essential need is a table suitably designed. We will assume, therefore, that you have a wireless set either ordinary cabinet model or portable model, a gramophone, and all accessories, and that you wish to be able for instance, to operate the gramophone via the set with convenience.

Because we do not know exactly what the size of your table gramophone is, or the size of your set, we cannot give set dimensions, so we design a table of ample size to ensure that it will be suitable for the average instrument. This is an advantage inasmuch as if you ever want to build or buy another set, you still have your table available. The table must be simply designed essentially for the purpose in view, namely—convenience. On the top we place our gramophone, on the first shelf below our set complete in cabinet, behind this and out of sight our batteries or mains equipment, and on the bottom shelf our loud speaker. If we have a portable, the loud speaker will no doubt be part of the set and this can be placed below with equipment above.

Use Good Wood.

With everything properly arranged in this manner, all our connecting leads, aerial, earth, leads to speaker, leads to pick up, and so forth, will be short and neatly arranged and we can fit switch panels for further convenience where we like.

Good wood should be chosen which will stand any amount of wear and use, and oak is best for the purpose. The complete cutting list is as below, together with cost, the equipment being obtainable from Hobbies Ltd.

The total cost of construction is therefore 16s. 2d. only, which is very little for a really first-class table.

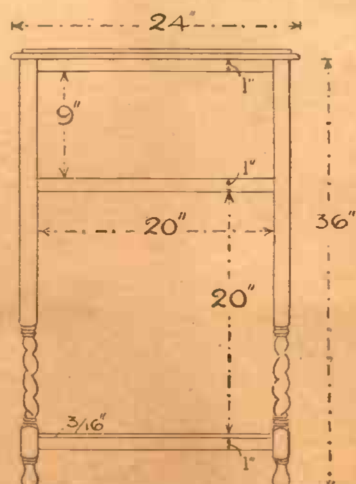
The full details of construction are clearly shown in the diagrams, which will make the method of construction quite clear. The work is very simple and there are no difficult joints to negotiate. First the legs are prepared, to receive the three tiers of cross bars which strengthen the table and carry the top and shelf pieces. Next all these cross pieces are cut alike from the 12in. wide piece of oak 2ft. long. If the strips are all cut 1in. wide, there will be twelve strips in all. These are trued up and the ends of each piece prepared for fitting to the legs. The work can now be framed up by gluing and clamping, with the setting square. The shelf pieces are next cut and fitted and the edges perfectly smoothed, and lastly the top piece fitted. This is also provided with a moulded rim to prevent the gramophone from shifting, as well as to add to appearance. This completes the simple constructional work and our table is ready for use.

You will find no difficulty if you desire to do so to slightly alter dimensions to suit your particular needs, but do not make the table too small. If you are using a portable for indoors, you can fit the table with ball castors or domes of silence (but not with wheels). These will make it easy to turn the table to any desired direction for frame reception. A better idea, however, is to first place a turntable on the tableshelf, and place the portable on the turntable.

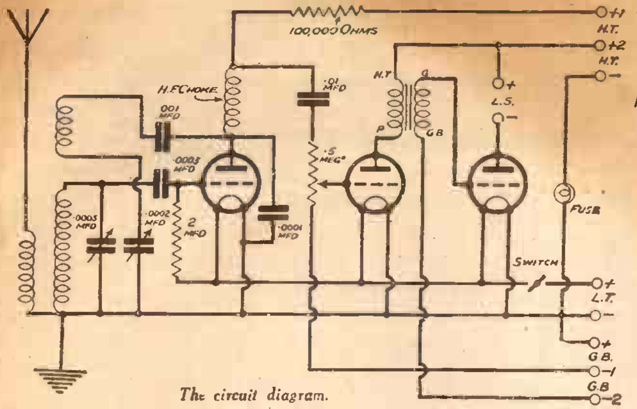
Diagrams showing how the cross rails are fitted into the leg by a mortise and tenon joint.

A COMPLETE LIST OF THE PARTS AND THEIR COST.

	s.	d.
Set of 4 No. 501 legs in oak	5	6
2ft. of 12in. x ⅜in. oak for crossbars ..	2	4
Ditto for top	2	4
2 pieces of 3-16in. oak plywood 2ft. sq. for shelves	5	4
8ft. of No. 24 moulding @ 1d. per foot ..		8



These dimensions are helpful in the construction, but can be altered to suit the worker's own requirements if desired. All parts are in oak, and the sides are left open or filled as desired.



The circuit diagram.

HOBBIES THREE-VALVER

By the Hobbies Wireless Expert

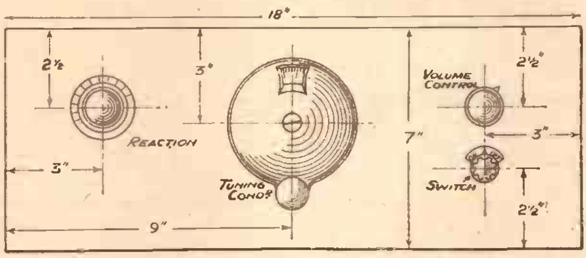
THERE is little doubt that the most popular type of home-made wireless receiver is the three-valver, and when the three valves are arranged in the form of a detector and two low-frequency stages, the best all-round results are obtained. As no doubt the majority of our readers know, there are two methods of low-frequency coupling, that known as transformer coupling giving the loudest signals, but resistance coupling giving the greatest purity of tone. In the receiver described this week, the two methods are combined in such a way as to give signals which are both loud and pure, and provided a high value of high tension can be employed, the quality of signals is such as to justify the use of a moving coil type of speaker.

A glance at the sketches accompanying this article will show that plug-in coils are used. This allows of the receiver being used, out of the ordinary broadcasting hours, for the reception of either the short or the very long waves, and much amusement may be obtained listening to the amateur transmitters and foreign stations. A safety device, in the form of a fuse between H.T.– and L.T.–, is fitted, and this will prevent the valves being destroyed in the event of a short-circuit occurring.

We describe here the construction of such a set, the method of operating, the alternative values of coils valves, etc.

Commencing the Construction.

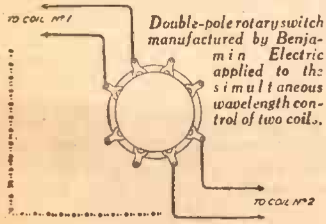
Having obtained the components as specified in the attached list, commence construction by arranging the various components on the baseboard in approximately the positions shown in the diagram of wiring. Do not make any large alteration in the layout—a certain amount of latitude may be allowed for components of different makes, but it is important to keep as near to the actual arrangement as possible. When all the components are in position—but not screwed down—try the tuning condenser in its position, and make sure it will not foul the valve in its socket, or any other component as it is rotated. Some variable condensers extend rather a long way from the panel, and it is as well to make sure that there will be no trouble from this source before finally drilling the panel and mounting all components in their respective places. Having made sure that everything is O.K., you may proceed with the actual drilling of the panel, using, if possible, the dimensions shown in the "Panel Layout." The sizes of the various holes will depend, of course, on the special components being used. Next, screw down the baseboard components, making sure that the three coil-holders are arranged in exactly the same way, namely, with the pin of the holder nearest the edge of the baseboard. Drill the terminal-strip and mount the terminals as shown in the wiring diagram, allowing one inch between each terminal and five inches between the earth terminal and L.T. +. Next, screw the terminal strip to the back of the baseboard, and wire up the components with Glazite or other suitable wire. It is best to carry out the wiring in a systematic manner, starting with the grid and plate leads—keeping these as short as possible—next, the filament wiring, and so on. As a wire is put into its place, run over the corresponding wire on the plan with a blue pencil. In this way, no wires will be left out or connected wrongly, as the pencilling serves as a check.



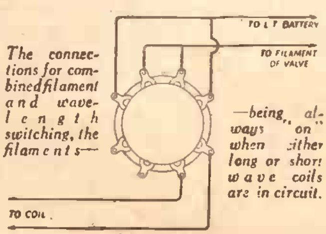
The panel layout.

Connecting the Tuning and Reaction Condensers.

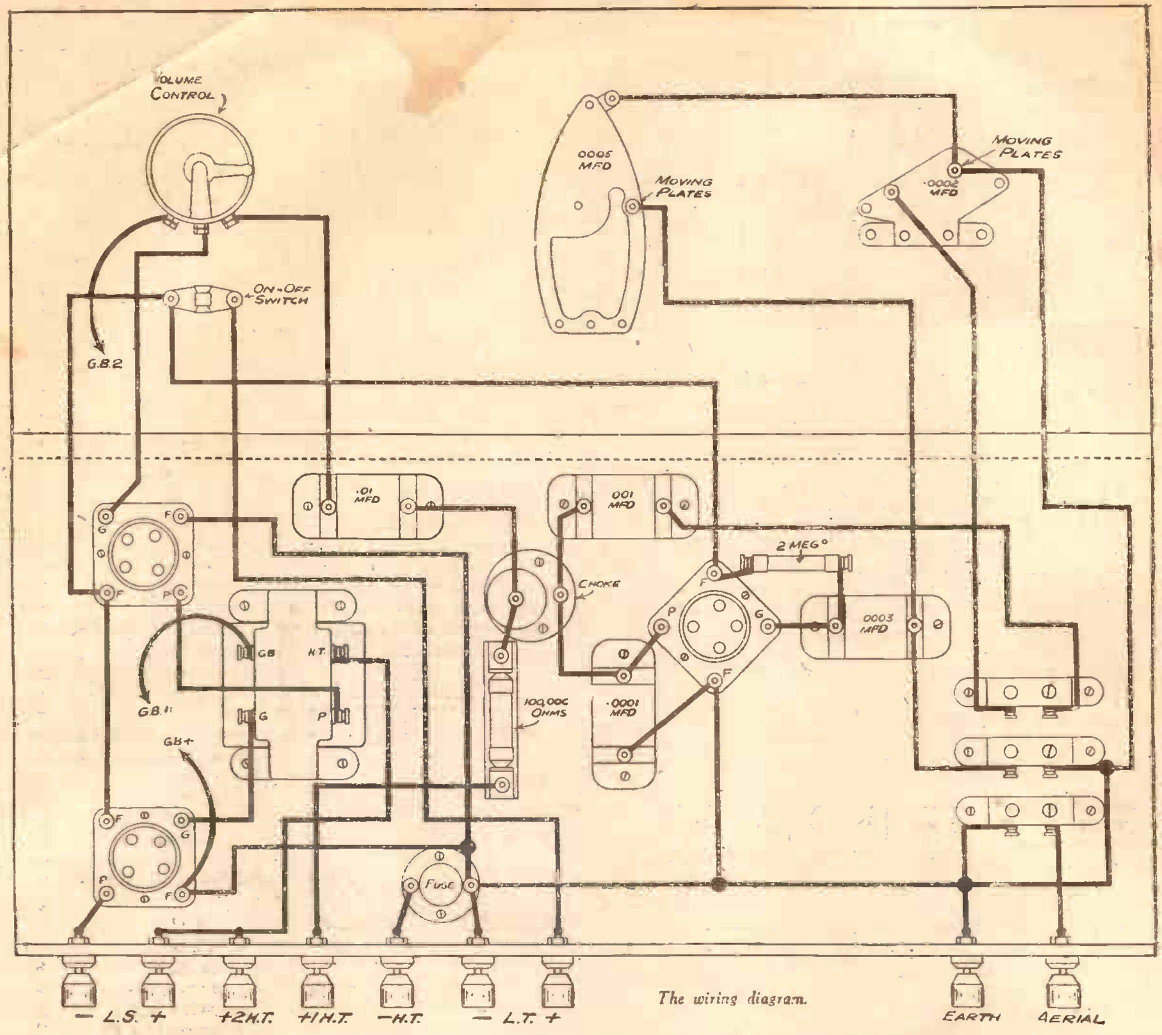
Next, screw the panel to the baseboard, and complete the wiring to the variable condenser and the other components which are mounted on the panel. Note carefully the connections to the tuning and reaction condensers. The moving vanes of these are connected together and the wire joining them is connected to earth. If these connections are not made correctly, you will obtain "hand capacity effects," that is, a station will be tuned in, perhaps a long-distance foreigner, and as soon as the hand is removed from the dial it will disappear, and quite a lot of juggling will be necessary to



Double-pole rotary switch manufactured by Benjamin Electric applied to the simultaneous wavelength control of two coils.



The connections for combined filament and wave-length switching, the filaments—being always "on" when either long or short wave coils are in circuit.



The wiring diagram.

"hold" the signal. Connecting both sets of moving vanes to earth obviates this trouble.

Testing the Set.

Having made sure that all the wiring is correctly carried out, you may proceed to test out the set. With regard to the valves to use, these may be of the 2- or 6-volt class, it being remembered that the 6-volt type are generally more efficient, but require a greater capital outlay for the accumulator and are also more expensive to run. Whatever type it is decided to use, the first valve should be of the "H.F." type, that is, with an impedance of about 30,000 and an amplification of 20 to 30. The next valve should be of the L.F type—impedance about 10,000 ohms, and the last valve a power or super-power. If you are situated a long way from a main station the power valve will serve, but if you live near a powerful station it will be necessary to use a super-power valve in order to avoid distortion due to overloading. For the normal broadcast band, you will require a No. 60 coil for the centre socket, a No. 40 or 50 for the socket nearest the panel; and, in the remaining socket, a coil which will give you the selectivity required in your particular locality. If near a main station, a No. 25 will prove adequate, while if no very powerful station is near you, or during the hours when no broadcasting is taking place, a No. 40 will give much louder results. However, the choice of this coil rests upon individual conditions, such as the locality, length of aerial, etc.

For the benefit of those whose knowledge of wireless is limited, we give the values of high tension, etc., which will give the best results. H.T.-1 should be about 100 volts, and H.T.-2 should be 150 volts. This, generally speaking, is the highest value that can be applied to battery driven valves. The grid bias values should be adjusted according to the instructions furnished with the valves, and it should be remembered that the highest possible value of H.T. should be employed if really first-class results are desired. Watch the grid-bias battery, as this governs the amount of high tension being taken from the H.T. battery, and also prevents the valve being over-run.

(Continued on page 598.)

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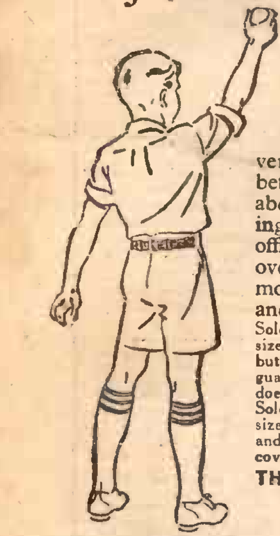

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LONDON - - 147 BISHOPSGATE, E.C.
LONDON - 83 NEWINGTON BUTTS, S.E.11.
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MANCHESTER - - - 10a PICCADILLY.
BIRMINGHAM - - 9a HIGH STREET.
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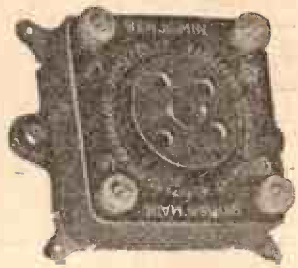

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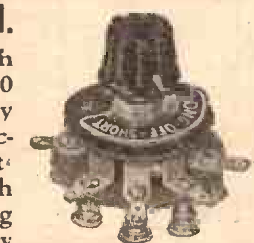

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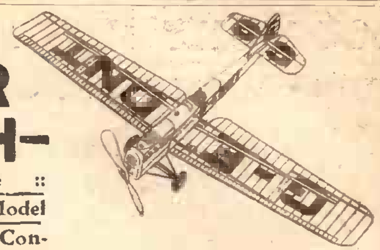

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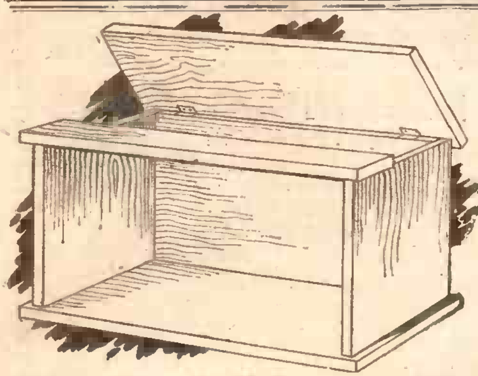

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BLACK MAGIC WITH CHEMICALS

By H. Welton

MUCH instruction, mystification and amusement is to be quite easily derived from experimenting with a few chemicals. For successful results and personal safety, careful manipulation is necessary; hence, to obtain the best effects, it is necessary to follow the directions carefully.

"The Noisy Floor."

Obtain a little iodine (not tincture), and with a knife gently rub it into a fine powder. Transfer as much of this powder as will cover sixpence to a dish, and pour over it a little strong ammonia. Allow to stand aside for half an hour, then pour the entire contents of the dish on to a piece of blotting paper, and leave for a few hours to drain and dry. When the drying operation is completed, a small amount of a brown powder will remain on the paper. *This powder must be handled carefully, as it is very sensitive to friction and, with rough handling, may "go off" before it is desired.* Gently pick up the paper and sprinkle the powder on the floor. When anyone walks over this part of the floor they will be much alarmed at the tiny explosions which accompany every step they make, much to the amusement of the experimentor. (See Fig. 1.)

Fig. 1.—The noisy floor.

A Chemical Garden.

Procure a glass bowl and cover the bottom with a layer of fine, clean sand. Small pieces of stone may now be distributed artistically over the surface of the sand together with fragments of copper sulphate, iron sulphate, and aluminium sulphate. Now cover the sand, stones, and chemicals with water-glass solution and leave to stand aside for a week. At the end of this period carefully decant the water-glass solution and replace it with distilled water. If the above directions are carefully followed, a fine chemical garden will result.

A Chemical Tree.

Obtain a small transparent bottle with a cork and secure to the cork with a piece of sealing wax a short length of thread. Tie to this thread a few irregularly shaped pieces of scrap zinc, and almost fill the bottle with silver nitrate solution. Lower the thread and scrap zinc into the solution and insert the attached cork. Allow the bottle to remain undisturbed for a few days at the end of which time a beautiful silver tree will be found to have grown in the bottle. (See Fig. 2.)

Obtaining a Light without Matches.

Dip a piece of wood in turpentine and place it on a stone, metal plate, or some similar material that is not likely to be damaged by a flame. On the wood lay a small crystal of potassium chlorate (a small fragment broken off a chlorate of potash tablet serves perfectly), and by means of a glass rod allow one drop of concentrated sulphuric acid to fall on this chemical. The wood will immediately burst into flame. (See Fig. 3.)

Fig. 3.—Obtaining a light without matches.

"Burning Glycerine."

Powder a little potassium permanganate and moisten it with a few drops of glycerine. In a short time the mass will emit fumes and take fire, burning with a beautiful lilac flame.

Lighting a Cigarette with a Piece of Ice.

Obtain from a chemist a small piece of metallic potassium (caution, stored under oil). With a pair of forceps force a fragment into the end of a cigarette. If a piece of ice is held to this end of the "weed," the latter will catch fire and thus light the cigarette. The potassium does not really burn—it liberates hydrogen from the ice, the heat of the reaction igniting the hydrogen.

Fig. 4.—Lighting a cigarette with a piece of ice.

Fig. 2.—The chemical tree.

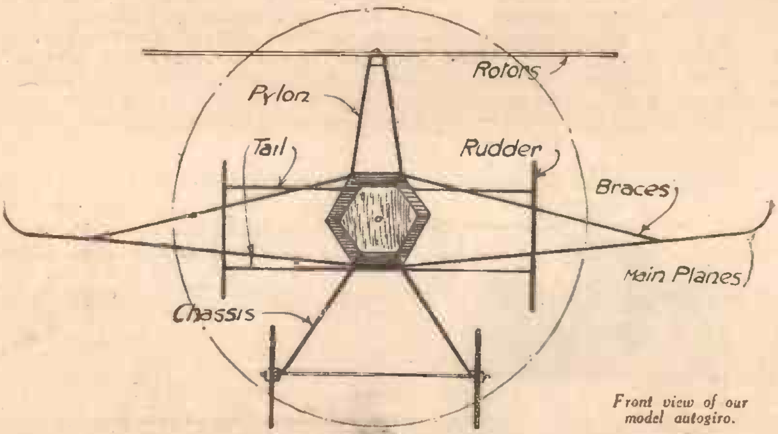
HOBBIES MODEL AUTOGIRO

HOW TO ERECT THE PARTS GIVEN WITH THIS WEEK'S ISSUE

As most readers of HOBBIES know, the Autogiro is the most modern development in aviation, and rivals in scientific achievement the invention of the aeroplane itself. The Autogiro is an aircraft which obtains the majority of its lift from a system of rotating blades mounted on a pylon. Apart from these rotating blades or rotors, the machine has the appearance of an ordinary aeroplane and is "taken-off" and flown in the same manner. The controls consist of the orthodox joystick and rudder-bar.

The Rotors.

The rotor blades are in effect wings of small width, hinged at their attachment to the pylon head to allow movement in both the vertical (or flapping) plane and in the horizontal plane. In next week's issue will appear an interesting article fully explaining the principles of the Autogiro. This week it is merely necessary to say that the Autogiro is a highly successful flying machine destined in the near future to revolutionise the whole world of aviation. It is based on sound scientific and engineering principles and rids aviation of its greatest drawback, to wit, the length of run necessary to take off and land. This will readily be appreciated when it is mentioned that an extra-



Front view of our model autogiro.

ordinarily short take-off (30 to 40 yards only) is necessary before the Autogiro lifts. It can, of course, descend almost vertically, and it is far easier to pilot than an aeroplane.

Coming now to our free inset, it is necessary to state that this model, when erected, in general form resembles an Autogiro; but unfortunately (and as is usually the case with small models), it does not embody all of the features which make the Autogiro the most prominent thing in the world of aviation to-day.

The Fuselage.

A fair amount of latitude has therefore been allowed the designer of the model in producing this cardboard replica of it. These models, by the way, are manufactured under special licence granted to the proprietors of this journal by The Cierva Autogiro Co., Ltd., Bush House, Aldwych, W.C.2. All of the parts of the model Autogiro are contained on the two cards given with this issue. The propeller and driving mechanism will be given away with every copy of next week's issue.

The first part of the model to make is the body (Fig. 1). Carefully cut this out and score along the line so that it folds up into a cigar-shaped tube, hexagonal in section. Note that the top surface of the fuselage is that between those two containing the word "Hobbies" in red. The tabs at the front end of the model are glued back flat, and are merely provided to strengthen up the front of the model and prevent it from splitting out when the elastic is fully wound.

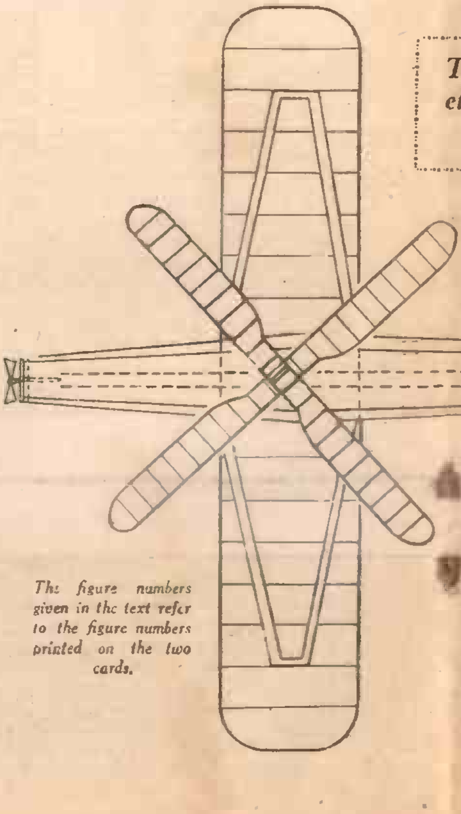
The Wings.

The next part to attach are the two wings (Fig. 6). These should be glued on to the underneath surface of the fuselage 2in. from the nose so that the rear

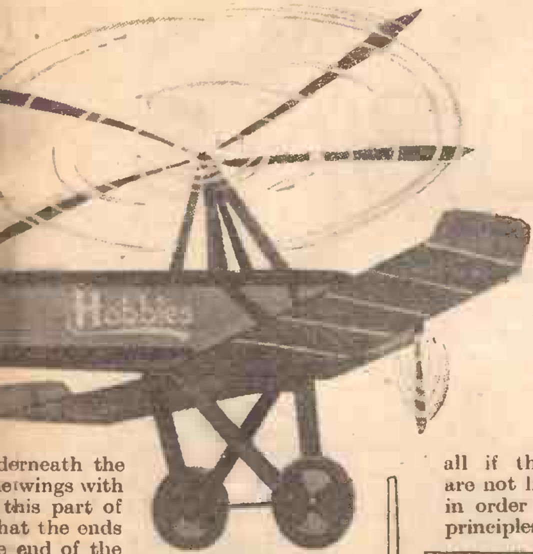
part of the wings will not be attached to the fuselage at all. The wings themselves will thus incline at a slight angle. Un[...]
wings glue the chassis (Fig. 10), and brace th[...]
the tie (Fig. 5). If the tabs at the end of [...]
the model are attached to the wings so t[...]
are level with the second rib in from th[...]
wing the right dihedral angle will be impar[...]
tie is glued to the fuselage. Above the tie [...]
provides a support and bearing for the fou[...]
latter part of the model, however, we shall g[...]
these next week.

The Wheels.

The two wheels (Fig. 2) should be stuck [...]



The figure numbers given in the text refer to the figure numbers printed on the two cards.



derneath the
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is glued the pylon (Fig. 8), which
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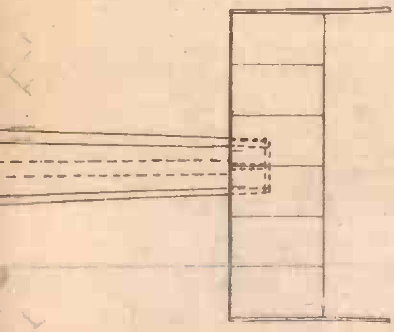
down on to a fairly stout piece

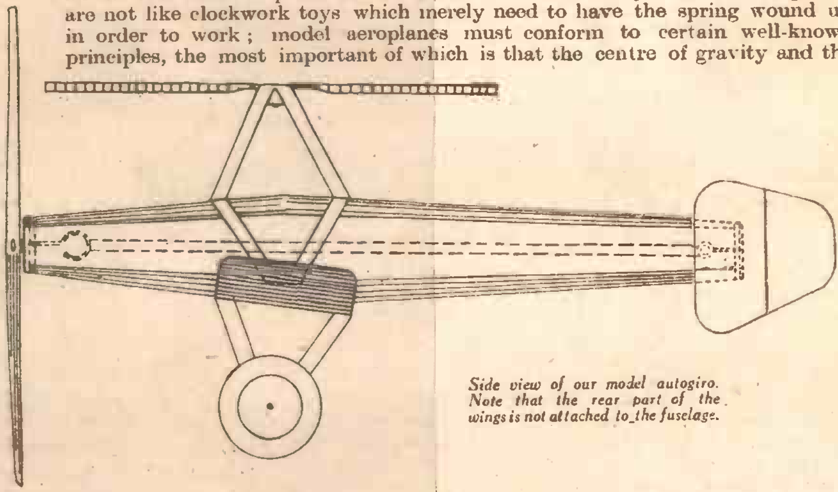
he Propeller, Elastic, tc., will be given with next week's issue.



The plan view of the model autogiro. The assembly of the rotors, and hints on flying the model will appear next week.

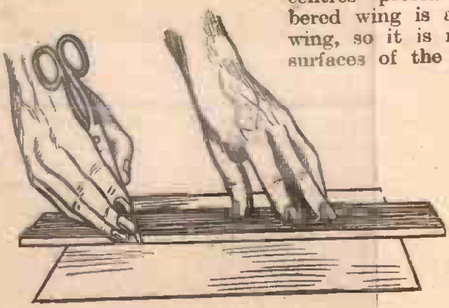
of card and secured to the chassis by means of a short piece of 20-gauge wire, pieces of cork being used inside and outside the chassis limbs to prevent the wheels from coming off. The biplane tail (Fig. 7) should have two cuts made in the leading edge of each part to form a sort of hinge so that the tail can be set true and not follow the angle of the fuselage. The part to cut is indicated by four short lines. Turn up each end of the two tail surfaces to provide tabs on which to secure the rudders (Fig. 9). To receive the propeller and elastic skein each end of the fuselage should be packed with two removable pieces of wood cut to the dimensions shown on this page. Carefully cut out the four rotor blades (Fig. 4) and your model is ready for the final assembly according to the instructions to be given next week. Take care to see that your wings are true and that the model in every way conforms to the photographs and diagrams on these two pages.

Compare the diagrams and photographic reproduction. It is important that both rudders should be absolutely vertical, and that the leading and trailing edges of the mainplanes and tail surfaces should be in correct alignment. These little points may seem trifling in themselves, but they make a vast amount of difference to the performance of the model, which may not fly at all if the various parts are not true. Unfortunately, model aeroplanes are not like clockwork toys which merely need to have the spring wound up in order to work; model aeroplanes must conform to certain well-known principles, the most important of which is that the centre of gravity and the

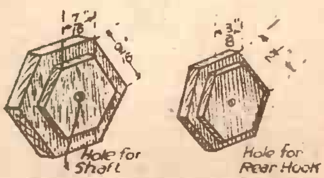


Side view of our model autogiro. Note that the rear part of the wings is not attached to the fuselage.

centre of pressure must coincide. The centre of gravity is the point from which the model will poise horizontally when suspended from a string—but the position of the centre of pressure is more difficult to determine, for it varies according to the section of the wing. In a wing which is practically flat it is situated at a point about one-third of the width of the plane from the leading edge, and it will be necessary next week to ascertain that these two centres—pressure and gravity—coincide. A cambered wing is always more efficient than a flat wing, so it is recommended that the two main surfaces of the model autogiro be cambered or



How to score the card.



The packing pieces for the two ends of the fuselage.

arched into section. Note that the end of each half wing is curled up, as shown in the photographic reproduction in the centre of these pages.

Simple Tricks Which YOU Can Do!

CONJURING

By A. COLLINS

The Multiplying Ace.

PICK out the ace of spades from a pack of cards and hand it round for examination. Remark that not many people have noticed that the imprint of the four aces appear in its centre. Now remark that if the ace of spades is tapped in a certain manner the other three aces can be produced from it.

Fig. 1.—An ace being retained in the left hand, from the top of the pack in the right.

To execute this trick whilst looking for the ace of spades manœuvre the other aces to the top of the pack. When the spade is passed round, cut the pack in halves, one half being held in the left hand and the other retained in the right. In this manner the back of the top card (an ace) faces but does not touch the palm of the right hand. The ace of spades is then replaced face downward on top of the pack in the left hand. Now hold your right hand about 8 inches above the left. The cards in the former are brought down edge on, to the back of the ace of spades, see Fig. 1. The middle finger of the left hand then slips betwen the palm of the right hand and top card, and retains this (an ace) which falls on top of the ace of spades when the hand is jerked upwards. Repeat this action for the two remaining aces, and then produce them from the top of the pack in the left hand.

The Mysterious Orange.

A shilling is borrowed from a friend and vanished by any method you care to adopt. An orange is then cut open and the shilling is found embedded in the centre.

Fig. 3.—The handkerchiefs with the rubber band in position.

The success of this trick depends on a specially constructed knife which is quite simple to make (see Fig. 2). A spring catch, as shown, holds the coin against the blade of the knife and is pressed to release the coin, when cutting the orange. A simple method for vanishing the coin was described in a previous article.

A "Knotty" Problem.

Two coloured handkerchiefs are passed round for inspection. They are then thrown into the air, and when they reach the ground are found to be tied together (see Fig 3.) Again they are tossed into the air and, on descending, are found to have untied themselves and no trace of a knot is seen (see Fig 4).

Fig. 2.—The coin held against the knife blade by means of a spring catch.

To do this trick, obtain a small rubber band and place it over the thumb and first finger of the right hand. With the left hand pick up the two handkerchiefs and hand them round for inspection. When they are handed back, place the two corners between the thumb and finger over which you have placed the rubber band. As you toss the handkerchiefs into the air drop your hand slightly and allow the band to slip over the two ends, so that when they fall to the floor, they will appear to be tied together. In throwing them into the air a second time, give the handkerchiefs a sharp jerk, which releases the band and so frees them.

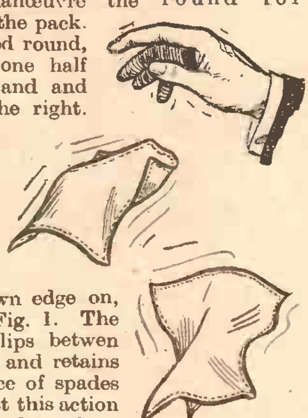


Fig. 4.—Jerk the handkerchiefs as shown when tossing them into the air and this will release the rubber band.

The String and Pencils.

A piece of string appears to be threaded through two pencils. A knife is then passed between the pencils, apparently cutting the string. Next, by waving your hand over the pencils, the string is once more restored.

The secret is, that the pencils are hollowed out by removing the lead and slotting one side of each, as shown in Fig. 5. The string is then threaded as in Fig. 6. A small piece of string is then fixed in place across the inside of the two pencils. This piece is not attached to the genuine piece but is merely used to prove that the string is cut. When the string is pulled it will move up the slotted sides and take the place of the cut piece of string.

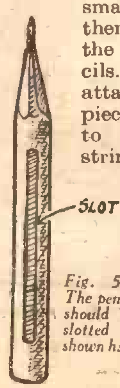


Fig. 5.—The pencils should be slotted as shown here.

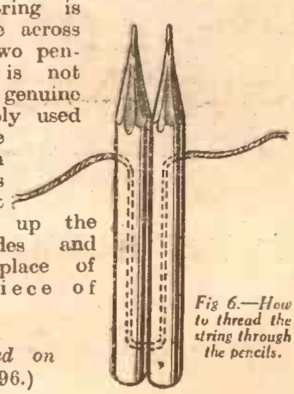
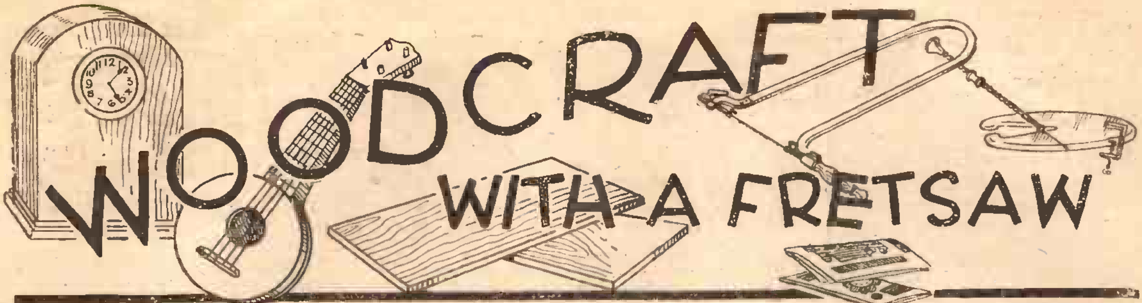


Fig 6.—How to thread the string through the pencils.

(Continued on page 596.)



WOODCRAFT WITH A FRETSAW

EVERY fellow in these days feels the urge and the need to use his hands and brains usefully and profitably. There can be few periodicals in which he is given such a range of activities wherewith to spend his spare time. And undoubtedly one of the most popular and interesting is the use of fretwork tools in the making of everyday pieces of work. In two previous articles (in our issues of October 4th and November 1st) we have dealt with some of the things which the owner of a set of tools can turn out. What other hobby gives you such a range of subjects to be undertaken? We have already dealt with the use of some of the tools, and given hints of undoubted use to workers.

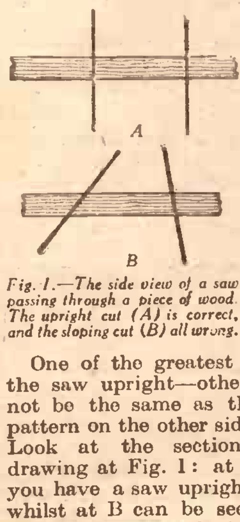


Fig. 1.—The side view of a saw passing through a piece of wood. The upright cut (A) is correct, and the sloping cut (B) all wrong.

Now let us deal with further matters of interest both to the beginner and the expert. The excitement of making up the designs given with HOBBIES must be undertaken to be understood. Get three or four of your pals and form a sort of private factory for helping each other's output. Then as one does the cutting others can be cleaning the parts, whilst others are testing the finished pieces in the construction of the finished article.

One of the greatest essentials in cutting is to keep the saw upright—otherwise the top of the work will not be the same as the pattern on the other side. Look at the sectional drawing at Fig. 1: at A you have a saw upright, whilst at B can be seen the difference a sloping cut will make. This, perhaps, can be more clearly seen in the picture at Fig. 2, when the patterns of the two styles are given. Above we have the upper cut, where the pattern lines are followed. But turn the work over and, instead of a similar pattern—as it should be—one has a thick, heavy decoration not a bit nice or correct. Learn, first thing, then, to hold your saw handframe upright—especially at corners.

There can be no definite speed given to work the saw up and down—as some readers seem to imagine. Naturally one can go quicker on straight work than in corners. In sharp angles the saw may actually move up and down quicker, but it must not travel forward at the same rate. Keep the saw going all the time in turning, and move the wood round gradually, without forcing the blade forward. Practice until you can turn a saw in its own width, and without cutting a line at all. Some workers can turn in acute angles quite easily, but this requires experience. The beginner will do well to remember that various angles are cut in different ways. A curved angle is best approached from two directions if the final shape is to be obtained. Look at Fig. 3. The saw starts at one side and goes round to the point. Then it is drawn back, with an up and down motion all the time, of course, to the starting point, so it can go down the opposite side from the same drill hole. The cutting lines gradually converge until they meet in a single sharp angle at the required point.

Fig. 2.—The result of cutting with a sloping saw. Above is a correctly cut design; below is the same pattern on the underside.

At Fig. 4 is another form of angle—this time cut with a continuous motion. The dotted lines show how the saw turns in the waste wood and comes to the opposite line at the sharp angle, making the correct square. If one turns the saw actually on the cutting line, one is apt to get a rounded effect, as seen at Fig. 5. The same kind of cut is seen in the curve of Fig. 6. By continuing to carry the saw round in the waste wood, it comes back to get a sharp point on the pattern, where otherwise a flat edge would be the result.

Some of the things you can make

Modern Fretwork produces as those shown here. The knowledge how to use them such real pieces of work proper tools and a are essential. The accompanying article is full of practical hints for beginner and expert.

It is important to remember to cut along the line of the pattern—to cut inside or outside the line may make all the difference in the fit of the parts. It may seem a small matter, but it is very important. Remember that if too much wood is cut away it cannot be replaced. Fretwork is, after all, not a question of the number of pieces which have been cut out, but rather of producing a pleasing and artistic design. Keep the saw to the centre of the cutting line if it is a line, or to the exact edge of the pattern if it is printed solid.

Fig. 3.—The position of a drill hole when approaching an acute angle.

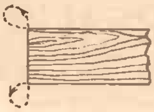


Fig. 4.—Ensure a sharp corner on the pattern by cutting round in the waste wood.

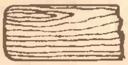


Fig. 5.—The result of turning a corner too quickly; a rounded angle instead of a right angle.

Fig. 6.—Another curve where the saw turns in the waste wood to approach properly.

Now let us look at one or two points to be remembered in drilling. Hold the drill firmly on the work, upright, and with the palm of the hand on the swivel top. The finger and thumb of the other hand hold the metal slide to work it up and down easily as shown at Fig. 7. Do not press the drill too heavily on the work, but get the bobbin working up and down, before exerting pressure, with the other hand. If you wriggle the drill about once the bit has got into the wood it is liable to break off in the work. Do not forget, too, that the drill goes right through the wood, so if you are doing it on the kitchen table, put another piece of wood beneath the work so as not to damage it with little worm-like holes.

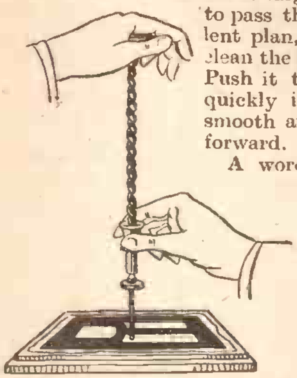


Fig. 7.—The proper way to hold a drill—upright and steady. Note the waste wood to prevent damaging the table beneath.

Some workers prefer to do all their drilling before they begin cutting. Others drill each hole as they proceed with the work. Either method is satisfactory but the second is probably preferable. There are good and bad positions for drill holes, and if one makes them as they are needed, one can often learn a better place to make the hole. A pattern is often balanced—that is—has a pattern alike each side of the centre line. If one cuts out the fret on one side first, it may show a better place to make the drill hole when one cuts the second pattern. There is, of course, no reason why more than one hole should not be made in one piece to be cut out.

Fig. 8. Two or three holes can be made in each pattern to be cut; it facilitates the turning of the saw.

A glance at Fig. 8 will make this clear. By having a hole near, one can often save drawing the saw back a long way. Put the holes near the top of all acute angles and at points where one is likely to cut in to save going a long way round.

A helpful diagram is given at Fig. 9, which incorporates most of the angles and curves one comes across in cutting. The best position for making the drill holes is given in each case, the dotted lines indicating the direction in which the saw will approach the pattern. Many workers use a bit too small for the sawblade they are using. The bit naturally breaks through the wood, leaving a torn hole, and the end of the sawblade may get bent or broken if it is pushed through. Better, therefore, to use a larger bit to allow the saw to pass through easily. An excellent plan, too, is to use an awl to clean the hole on the reverse side. Push it through from the underside and turn it quickly in the hole, so that it makes the edges smooth and the passage of the sawblade straightforward.

Fig. 9.—A pattern showing the best place for the drill holes. The dotted lines indicate the commencing direction of the saw.

A word may be said about the drill itself. The modern tool is made of all metal, fitted with a bobbin which turns the twisted stem at enormous speed and drills holes quickly and clean. Another form of drill is provided with two barrel weights (see Fig. 10), which give an even greater speed. The weights act as a balance, and by an ingenious device maintain a high rate of continuous drilling, even when the bobbin is being drawn upwards. These drills bore a hole about the size of a pin's head, but a larger drill is obtainable which is known as the High Speed Drill, holding bits which have a cutting edge to make a hole up to $\frac{3}{16}$in. in diameter. The bits are made of hardened steel with sharpened edges, which will cut a good many thousand holes before they are worn out. They are quite cheap, costing only 1d. each from Hobbies Ltd., or 12 in a case, 10d. Most drills also have a packet of spare bits supplied with them. Those for a hand drill have square shanks—those for fitting a machine are round.

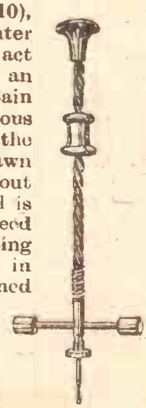


Fig. 10.—A modern type of drill, with barrel weights to maintain great speed.

AMATEUR CARPENTRY (*continued from page 574.*)

The work, of course, may be left in its natural state, but most people who make it would prefer to finish it in the same shade as the rest of the furniture in the room in which it is to be used. This is quite easily done by using an oak dye to stain the wood down to the shade required, and then finally polishing it with Lightning Polish, or giving it a dull, glossy appearance by means of waxine. If the overmantel is to be left in its natural state it is preferable to treat the wood with a dressing of raw linseed oil. It is rubbed well into the wood with a piece of rag, which will bring out the grain and slightly darken the wood itself. By repeated rubbing a dull gloss is obtained, but the linseed oil should not be applied too thickly. The best plan probably is to stain the wood to a fumed oak shade, and leave it with a dull polish. The face can be treated with a rubber, but the inside of the fretted work must be done with a fine brush.

HOW TO REMEMBER

By J. Stephen

FOR those whose memories play them sad tricks a system of mnemonics has been devised by an American professor of psychology which has met with much success. It is built up on the following two principles of that science.

First, whatever we learn must be related to something we know already. This principle is called technically, the "doctrine of apperception."

Secondly, thoughts once vividly brought together in consciousness tend to persist. This is the principle of "association."

With this in mind a list of fifty words is given in the following order: Air, Bar, Car. Deer, Ear, Fur, Gar, Hair, Indicator, Acorn, Ambrosia, Arab, Arc, Almond, Ape, Aloof, Aching, Arch, Alkali, Bun, Boa, Bib, Boric, Bed, Bee, Beef, Bug, Bunch, Biloxi, Can, Cocoa, Cub, Comic, Card, Cane, Calf, Cog, Cash, Cacti, Dun, Dahlia, Daub, Diabetic, Diamond, Dice, Dwarf, Dog, Dish, Delphi, Emulsion.

The System Explained.

As will be seen, the first nine words of the system begin with letters of the alphabet inn umerical order. For example, A is No. 1 of alphabet (Air); B is No. 2 (Bar); C is No. 3 (Car); D is No. 4 (Deer), and so on. In the first nine mnemonics the final R has no significance whatever.

Final N always represents zero, including and after the tenth mnemonic. For example, the tenth is Acorn, the twentieth Bun, the thirtieth is Can, fortieth Dun, and fiftieth Emulsion.

Including and after the tenth mnemonic, for the numerals either the initial or final A stands for 1, B for 2, C for 3, D for 4, E for 5, F for 6, G for 7, H for 8, I for 9, and N for zero. For example, the 11th mnemonic is Ambrosia; the twentieth is Bun; the twenty-fifth is Bee, and so on.

The above facts make it easy to fix permanently in mind the whole list of mnemonics, each in its proper number or order. After accomplishing this, picture with as vivid imagination as possible what each mnemonic stands for. The picture for Air might be a tank of compressed air; Bar, a bar of pig-iron; Car, a tramcar, arranging one's imagery to suit individual needs. It is essential that each picture should stand out completely and clearly. After an hour of undisturbed, concentrated study it should be easy to fix the list in one's mind.

A Simple Experiment.

Ask a friend to write and to number twenty-five to thirty names of simple objects such as floor, tree, door, dog, clock, flower, etc., just common names known to us all. Such words are easy to memorize after they have been read over once, very slowly, with the number of each word given as it is read, and after each word has been pictured with a mnemonic in consecutive order.

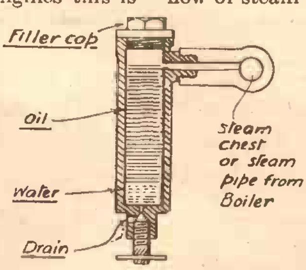
When the first word has been read, say for sake of illustration, "floor," immediately imagine strongly some picture connecting Air—mnemonic No. 1—with floor. Perhaps an air tank in the middle of the floor will be visualized. After definitely fixing this picture, instruct the friend to proceed to the next word by saying "All right."

Suppose the second word is "dog." Thereupon think of a dog as being struck with an iron bar (Bar being mnemonic No. 2). Proceed in this way all through the list. Afterwards, when recalling a word, first ask for its number. If you say "Give No. 2," this makes you think of Bar, and bar makes you think of dog. Thus you may repeat after one hearing a list of simple names in any order, backward or forward.

To a person who does not understand the use of this device the performance seems to be more wonderful than the facts of everyday experience. The ability thus acquired to repeat after one slow reading, in any order requested, a list of simple words is quite startling to the uninitiated, and will enable anyone practising the system to give lots of fun at social gatherings.

OILING MODEL STEAM ENGINE CYLINDERS

THE best way to lubricate the internals of a steam engine cylinder is to introduce the oil with the steam from the boiler. In large engines this is accomplished in two ways: (1) by a mechanical pump; (2) by a displacement lubricator. The latter arrangement is very simple indeed, and may be made in a still more simple form for a small model. All that is needed is a container with a steam-tight cap, filled with oil and fixed to the steam chest or some part of the steam pipe-line between the boiler and the engine. The "Roscoe" or displacement lubricator works by virtue of the fact that oil is lighter than water and that steam condenses into water. When the lubricator is filled nothing happens until steam is turned on. Then a small quantity of steam in the lubricator condenses this water, and being heavier than the oil sinks to the bottom of the container, displacing an equal quantity of oil. This oil finds its way into the steam pipe and is carried by the flow of steam to the pistons and slide valves. The hole at the exit of the lubricator should be small to prevent a too rapid action; and to get rid of the water after the run, the lubricator should be fitted with a drain at the bottom, as shown in the diagram.



How the cylinders are oiled.

There are special high temperature oils more suited to use in steam cylinders, and one of these oils should be employed in preference to ordinary machine oil. These cylinder oils are thick and if a steam engine quality is not readily obtainable use a motor-car cylinder oil instead.

Both the drain valve and the filler cap should be perfectly tight when the engine is working, as the pressure in the lubricator is the same as that working the engine.

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Some Valuable Hints to Model Boat Builders.

MODEL YACHTS: THEIR SPARS AND RIGGING

By V. D. Broughton

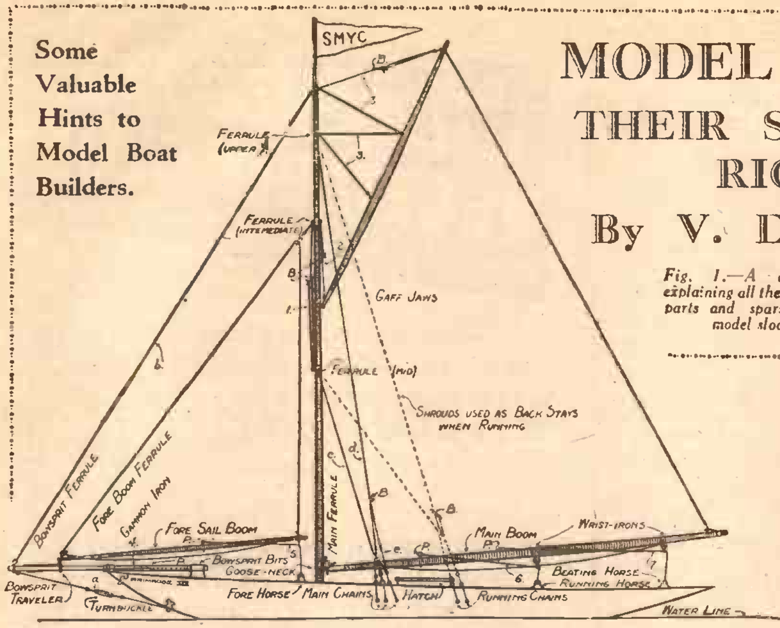

Fig. 1.—A diagram explaining all the various parts and spars of a model sloop.

THERE are a number of rigs available for model yachts, but for real sailing nothing can beat a "Sloop rig," without any fancy trimmings such as top-sails, flying jibs, etc. As already explained in a previous article, which appeared in HOBBIES of December 20th, 1930, a number of suits of sails and spars to suit varying weather conditions is much to be preferred to reefing, adding extra bits of rag and other makeshifts. A Sloop has two sails, Main and Fore, as shown in Fig. 1, and has all the advantages of a Cutter, with less gear to handle and adjust.

Spars Required.

In Figs. 1 and 2 all the spars and rigging are shown, together with the necessary fittings.

The Standing rigging (*i.e.*, the stays, etc.) is mostly made of wire with the exception of the "lanyards" for "setting" up the Shrouds.

The following spars are required (see Fig. 1):—

Mast — and Flag mast, Main Boom, Gaff, Bowsprit, Fore-sail Boom. The standing rigging marked by letters in sketch are (a) Bob-stay, (b) Fore-stay, (c) and (d) Lower and upper Shrouds (one piece of wire), looped through the double "Dead-eye" and lead to the upper and mid Ferrules respectively.

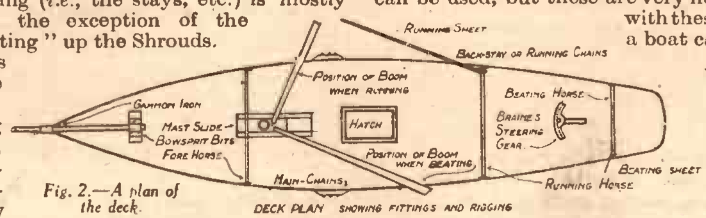

Fig. 2.—A plan of the deck

There are two pairs of these on the starboard and port sides.

All the above are of wire and from one to four strands is necessary, according to the size of the boat. Two, three, or four wires can be "laid up" into a cable with a little practice, but when seven or more wires go to form a cable, special apparatus is required for the purpose.

The Bob-stay is best made of a single strand of comparatively thick brass wire looped through the eyes on the Bowsprit Ferrule and Gammon iron, and having a Turn-buckle in the centre of its length. As this remains a permanent fixture on the boat it is as well to scarf (*i.e.*, taper off the ends) and silver-solder the joint.

The last item on the list of "Standing rigging" (e) is the lanyards for setting up the shrouds. These consist of a length of plaited cord ("Bobbin" or fishing line). Twisted line will give endless trouble, as it is sure to twist and boggle when wet, if not before.

The "Running Rigging."

This is shown by figures and is made of plaited cord similar to (e) and consists of (1) Fore-sail halliards, (2) Throat halliards, (3) Peak halliards, (4) Fore-sail outhawl, (5) Fore-sail sheet, (6) Main Running sheet, (7) Main Beating sheet.

The construction of the spars offers a large number of alternative methods of construction. If money is no obstacle, undoubtedly tubular aluminium spars are the best, and can be obtained practically in any thickness, diameter and degree of taper required. "Duralumin," an aluminium alloy, is even superior, as the strength of this material equals that of mild steel, whilst its weight is even less than pure aluminium. Straight, solid spars can be used, but these are very heavy, and a boat fitted with these will be out-classed by a boat carrying lighter spars.

Wooden Spars.

These spars can be made in halves, hollowed out, as shown at the top of Fig. 3, leaving solid portions spaced at intervals, especially where ferrules, eyes, etc., are to be attached.

The best timbers to be used, in order of preference, are silver spruce, larch, clear Baltic deal, Siberian pine; and the best portion of the tree is just beneath the sapwood. Whatever timber is used, wood with a straight grain, with the growth rings fairly close together, should be selected.

Excellent timber can sometimes be picked up almost for the asking from boat-makers who make oars for river racing boats, or bits of broken oars can sometimes be obtained from the same source.

The diameter of a hollow Mast-Gaff or Foresail Boom should be about 1/80 of its height, measured from the water-line or the length of the Gaff and F.S. Boom, whilst the Main Boom should be about 1/50 of its length. The

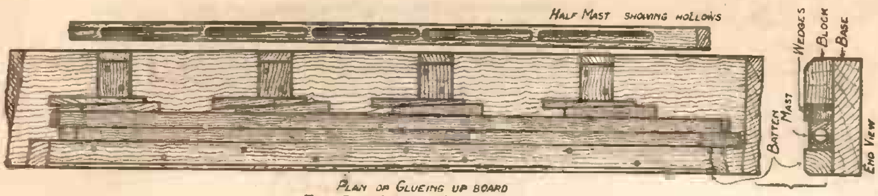

Fig. 3.—A plan of the gluing board.

reason for the extra thickness of the main boom is that when running before the wind the strain applied by the Running Sheet is applied just in the middle of its length, whilst it is not practical to stay it in any way. This extra weight is less important than with a mast, as the weight is nearer the water-line and therefore has less tendency to cause the boat to heel.

The foot of the mast up to the top of the Goose-neck ferrule, should be left solid and fitted with a ferrule, slotted, to fit over the Mast-step-rack, both of which are shown in Fig. 5. The rack itself is made of a bit of Duralumin sheet riveted between two slips of hardwood, which in turn are screwed to the bottom of the boat. The pin shown at the bottom of the mast drops into the slots in the Mast-step-rack.

This, combined with the slide shown in Fig. 4, enables the position of the mast, fore and aft, to be adjusted to suit the trim of the sails. To return to the construction of a dug-out hollow spar. The timber having been obtained, it is sawn out and planed up about five-eighths of the maximum thickness and to the finished width and taper in the other sense.

Then, by means of a gouge, the pockets are hollowed out, taking care to leave the bridge pieces correctly positioned so that when glued together they will correspond and form solid diaphragms.

A Gluing Up Board.

A gluing up board, shown in Fig. 3, will have to be made. This should have a good solid baseboard, say 1½in. thick by 6in. wide for a six-foot mast, and for smaller masts in proportion, but never less than about 4 × ⅝in. The batten along its edge and the baseboard itself must both be planed up dead true or the mast will not be straight when finished. The blocks

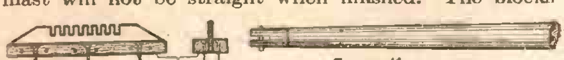

Fig. 5.—The pin shown at the bottom of the mast drops into slots in the mast step-rack.

for wedging should be spaced from 6 to 4in. apart, according to the size being dealt with, and the double wedges about two-thirds as long.

It is advisable to glue as well as screw the blocks and batten to the base, as when the double wedges are driven home they will exert enormous pressure and perhaps distort the batten. The mast will now be 1¼ times its maximum diameter for its full length on one section, and correctly tapered on the other section. When thoroughly dry, the mast must be planed up square for its whole length, taking care that no more is taken off one side than the other.

Making the Join.

As it may be difficult to see the joint if well glued up it is advisable to mix a little Indian ink with the cement or glue to insure the joint being visible. Don't use ordinary ink, it will discolour the wood. Having made the mast a true, square section throughout its length, next take off the corners, making it into a true octagon, and so on, till no visible corners remain visible.

Another method of making a spar consists of wrapping and gluing thin veneer round a taper mandril and then removing the latter. This is a comparatively easy method of construction, but, according to the length of the spar being made, requires from three to six people to roll it (see Fig. 6).

The Bowsprit.

As will be seen in Fig. 1, pins (marked P) are provided to adjust the Fore, Main and Running Sheets, and the pin-racks are shown in the Bowsprit and Boom for their reception.

In the case of the Bowsprit there is no serious objection to this method, but, although handy, it is rather liable to weaken the spar in the case of the boom.

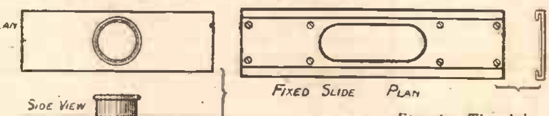

Fig. 4.—The slide shown here enables the position of the mast fore and-aft to be adjusted to suit the trim of the sails.

It is therefore preferable to have the after-pin-racks on the deck and to lead the Sheets through eyes on the Goose-neck ferrule, as will be described in a subsequent article on "Fittings."

Bowsers are not suitable for the adjustment of Sheets, as these are not subject to a constant strain, and alternate tightening and slacking off are liable to cause a Bowser to shift and alter the adjustment.

In the case of Booms, Gaffs, etc., which should taper both ways, spars made by the following method have to be spliced in the middle. A bit of solid wood about 15 diameters long is tapered each way from the middle and the two halves of the hollow spar are planed off at a slant and the three pieces glued together. It is advisable to arrange the joint in such a position that a ferrule or eye is to be lashed on in the middle and two small ferrules or lashings are placed near the ends of the splice. Whatever method is employed to make the spars—of solid wood, dug-out or wrapped veneer—the method of finishing is the same. All are first glass-papered by twisting the spar round either by hand, in a drill brace or in a lathe, and then finished by glass-papering lengthways—they should then be french polished and finally given two coats of Outside Copal Varnish applied thinly.

Fixing Eyes to Masts and Spars.

There are three methods of fixing Eyes, etc., to Masts and Spars. One is to solder the eyes on to a split ferrule and clamp the latter round the spar, another is to make a little conical hump on the spar by wrapping a thin piece of veneer round the spar and gluing it thereto, and a third method is to bind them on with thin copper wire (5 or 10 ampere tinned copper fuse wire, obtainable from electrical supply stores and then soldering the whole together.

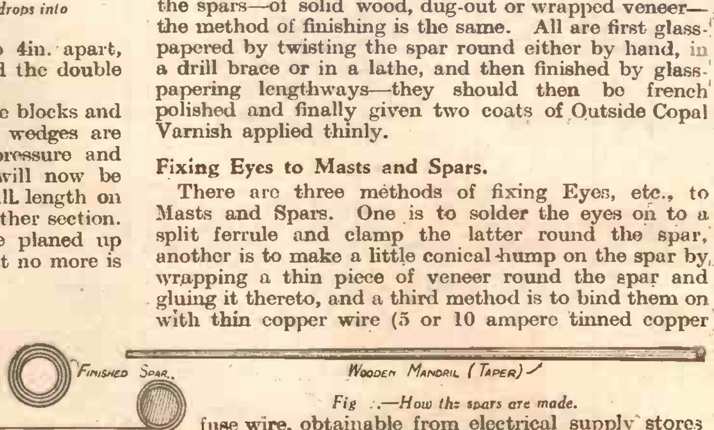

Fig .—How the spars are made.

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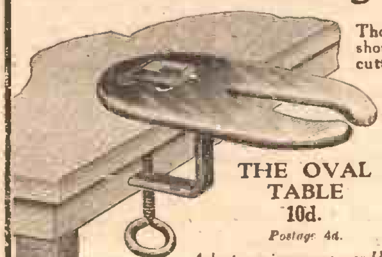

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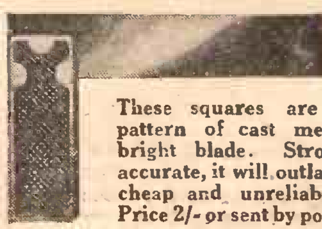

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REGENT FITTINGS CO., NOBBY, 120, Old Street, LONDON, E.C.1.

Mark all envelopes containing stamp queries with the word "Stamps" in the top left-hand corner.

MORE ARTISTS' MISTAKES.

By P. L. Pemberton.

IN a recent article I described some slips made by artists in designing stamps, and as the subject is one that always arouses interest—the mistakes of others are an unfailing source of pleasure—I will go through my note-book and drag into the light some more of the curious errors that occur in stamp designs.

Nautical subjects always seem to present difficulties, and few of the ships that have appeared on stamps would pass the critical examination of a mariner. A ship with crowded sail is perhaps too poetical an object to be considered literally by your true artist, and he sometimes paints it as he thinks it ought to look rather than as experience has shown that it should be. "Ships, dim discovered, dropping from the skies," said the poet in quite another connection, but the line might have been inspired by a peep into the stamp album. Let us take, for instance, the two stamps issued in the United States in 1925, in commemoration of the Norse - American centenary. The lower value is a delightful work of art.

German stamp showing miners at work. The kneeling figure is using his hammer in his left hand

Mistakes in Ship Designs.

Set in a red frame appears a finely engraved view of a sailing ship, printed in black. The effect is tasteful and pleasing—if you are a landlubber. But show it to a crusted tar, or even to the steward of the Margate boat, and he will immediately ask you how the fore-sails are supported. To this you will reply that the picture represents a sloop—to be precise, the sloop *Restaurationen*—and that in such craft it is evident that some of the sails are normally supported by the winds of heaven. You will then be told that a sloop should be cutter rigged, whereas this is square-rigged, that it might be intended for a lopsided brigantine with one mast missing, but that it is more likely to be what the boatswain's mate saw in his nightmare after a hectic shore-leave. The fact that the flag is flying against the wind would lend colour to this suggestion. Why is it, by the way, that ships on stamps are so often shown with the flags streaming in a direction contrary to that of the wind as evidenced by the billowing of the sails and the course of the ship?

Dominican Republic which nearly caused a war with Hayti.

Deliberate Errors.

If the false delineation of ships is due to carelessness or ignorance, the same cannot be said of the errors appearing on the maps that adorn some stamps. There are three examples which all point to a deliberate intention on the part of the artist to magnify the area of his own country at the expense of his neighbour's. One of these led to an international "situation." The Dominican Republic shares with Hayti the West Indian island which is named after the latter. In 1900 a set of stamps was issued showing a map of the island in which the Dominican Republic pushed its sister state almost into the sea. The Haytians were so incensed at this presumptuous cartography that they made most serious diplomatic protests, which, it is averred, even contained a hint of war; the offending stamps were withdrawn after flouting the actualities for less than a year. A somewhat similar situation arose when the current Irish 2d. stamp was issued. This shows a map of Ireland which is quite blank, and, as the Ulstermen complained, is calculated to give the impression that the Irish Free State covers the whole island. However, since everyone knows that that is not the case, and since no untruthful boundary line is drawn, the objection was never taken seriously. A more deliberate misrepresentation is made on the 14 kop. stamp issued by Russia, in 1927, as one of a set commemorating the 10th anniversary of the Bolshevist revolution. A map of a large part of the old world is the feature of this stamp, and Russia, printed in red, is shown straddling over nearly the whole of it; the effect is produced by drawing those parts not claimed by the Soviet on a smaller scale.

U.S. Norse-American centennial stamp showing a sloop that is not a sloop.

Rapid Growth of a Beard.

It would not be fair to blame the

stamp designer for the curious anomaly arising on the Columbus issue of the United States, since the drawings are taken from celebrated pictures. Nevertheless, it is amusing to note that the famous discoverer is shown, on the lowest value, standing on the deck of his ship and gazing at the land. On the 2 cents he is seen landing with his followers, and though only a few hours at most could have elapsed between these two events, he has apparently grown a beard in the interval, for he appears clean-shaven in the first and unmistakably hirsute in the second! The stamps issued by Germany in 1921, during the inflation period, are obviously intended to be fanciful, yet the artist responsible for that design, which shows miners pursuing their arduous work, probably did not intend that the kneeling figure should wield the hammer in his left hand. The design was re-issued two years later, though reversed as in a mirror, and here we find that the hammer has been transferred to the right hand.

Greek stamp with portrait which should read Lodewijk Gustaaf van Heiden.

William Tell's Son and the Apple.

Every collector is familiar with the low-value Swiss stamps showing William Tell's son. In his left hand he holds the apple from which the triumphant arrow is seen protruding; with his right hand he supports his father's giant bow. As this design was first presented, the string of the bow was shown behind the shaft, an arrangement which offended the technical views of those versed in archery, so the picture was re-drawn with the position reversed. Apparently, however, the point is not capable of exact determination, as in a later re-drawing, which is still current; the string has reverted to its original position.

Sowing Seed Against the Wind.

The well-known Sower design, which was introduced in France in 1903, and which is still in use, has been criticised because the figure is seen sowing seeds against the wind; this, I am told, is quite wrong. The direction, as well as the force, of the wind, is shown by the behaviour of the lady's tresses, which are blowing strongly against the direction in which the seed is being thrown. The objection is a trivial one, as is that in respect of the flag flying from the General Post Office at Stockholm, on the 5 kr. stamp of Sweden. This shows the obsolete flag of Sweden and Norway, which was in use when the stamp was first issued, in 1903. The political separation of Norway and Sweden occurred in 1905, but it was not considered necessary to haul down this particular flag. My last complaint must be a more real one; it was too absurd of the Greeks to refer to Sir Edward Codrington as Sir Codrington, on one of the Navarino commemoration stamps, but it was quite as ridiculous to miscall the Dutch admiral, whose portrait appears on another stamp in the same set. This worthy's name was Lodewijk Gustaaf van Heiden; but the Greeks have a short way with such outlandish pretensions, so he appears on the stamp as Van Der Heyden—a rendering which is neither Dutch, Flemish, nor good red-herring.

DO YOU KNOW?

THAT the new Jubilee Borneo stamps are out?

That the low values to 25c. are magnificently designed and printed?

That the Indian Native State of Alwar issued its own stamps from 1877 to 1902? and—

That during the whole time only two stamps, both in the same design, were used?

That according to Gibbons' catalogue, Salvador, from 1867 to 1930, issued 774 different postage stamps beside a number of postage dues, officials, and other kinds?

That Salvador issued a special stamp for acknowledgment of receipt of the letter?

That most countries now advertise on postmarks?

CONJURING—(*continued from page 586.*)

Changing Paper into a Billiard Ball.

A sheet of coloured paper is held in front of you and both sides are shown to your friends. The paper is then waved up and down with your two hands, meanwhile squeezing it into the palms of both. When the last of the paper is crumpled up you open both your hands and produce a billiard ball which has apparently taken the place of the paper.

The secret is that the billiard ball is a hollow wooden ball painted red, see Fig 7. A glance at Fig 8 will show how the ball is hidden when displaying the paper. It is therefore quite a simple matter to push the paper into the ball while crumpling it up.


Fig. 7.—The hollow billiard ball.

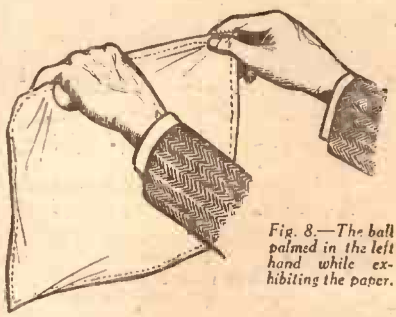


Fig. 8.—The ball palmed in the left hand while exhibiting the paper.

If you cannot make the ball you can purchase it at any magical store for sixpence.

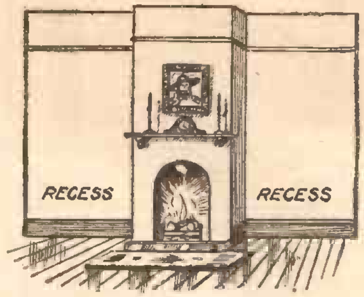
NEXT WEEK!

MAKING SAND-OPERATED TOYS
AN INGENIOUS HARMONOGRAPH
MODEL AEROPLANE TOPICS, ETC., ETC.

SIMPLE SHELVING EASILY ERECTED BY THE HANDYMAN

By W. G. Raffé

An asbestos shelf forms a useful addition to the gas range.

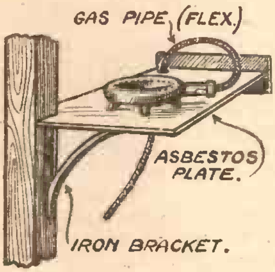


Shelving can always be fitted into recesses without taking up much space.

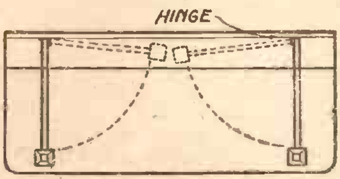
SOMETIMES a piece of furniture, such as a bookcase, won't go into a corner. It would be a pity to cut it down. Don't spoil good furniture; just install some nicely fitted shelving. People who have lots of books, and even papers, need shelves to put them on, to keep them clean and orderly. Every housewife could always "do with another shelf" in the kitchen, or one in the scullery. Even the handyman himself needs shelves, whereupon to keep his tools and his stocks of materials. And sometimes an overdoor shelf in an artisan's living-room comes in very useful, just to place some cherished ornaments where they can be seen, but free of the chance of being knocked over and broken.

Accuracy in Measurements.

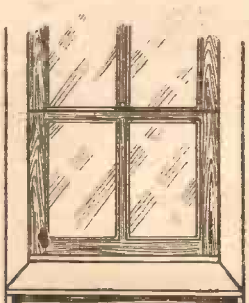
The sketches here shown will suggest but a few of the innumerable places where shelves can be placed. Shelving is an easy and simple job. The greatest need is careful measuring, and just common-sense! *Always measure very carefully.* Never "take for granted" any measurement which seems to be like another. I fitted some temporary shelving into two recesses, one each side of my fireplace. One side was 3ft. 11in. wide, the other 4ft. 0½in., but to the casual eye they looked the same. Next I found a slight difference, of ¼in. one side and ½in. the other, between the distance near the floor and 9ft. up. The walls were not "true." When shelves are fitted, therefore, they must be fitted accurately. Your work may have to be made to fit properly. An old house may have a sloping floor. Hence your upright on one side must be longer than the other. Or both must be cut aslant from back to front. Measure carefully, using also plumb bob and spirit level. Tools and materials need be few, indeed. First measure up and calculate necessary supplies. Machine-planed planks can be bought by the 100ft. run quite cheaply. Some firms specialize in these supplies. If cash won't run to it, buy up good clean packing-cases. Often their wood is planed; but if not, extract all nails and face it up. You need hammer and nails or screws to do the best job. Iron brackets can be purchased at 3d. each



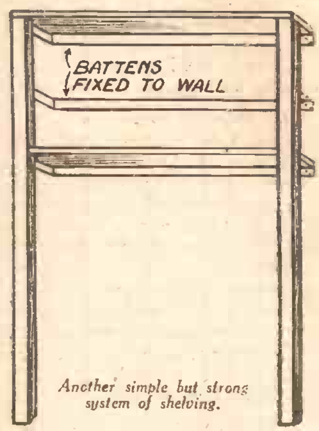
Details of the asbestos shelf shown above.



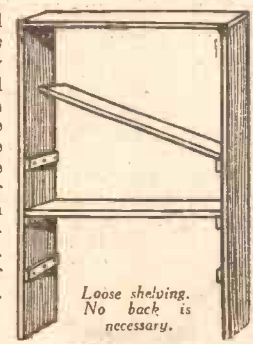
Folding shelves arranged in this way are convenient for temporary use.



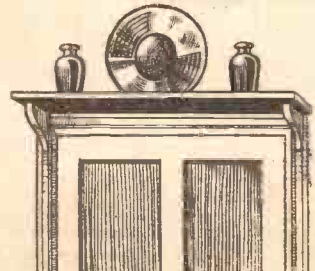
A shelf arranged over a window base.



Another simple but strong system of shelving.

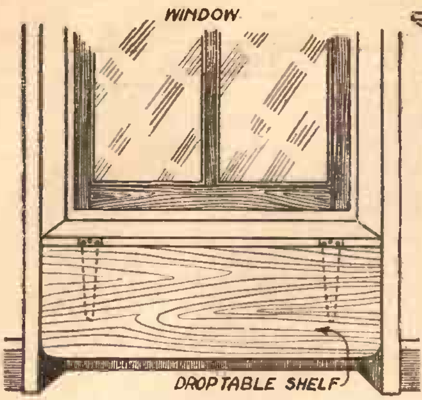


Loose shelving. No back is necessary.

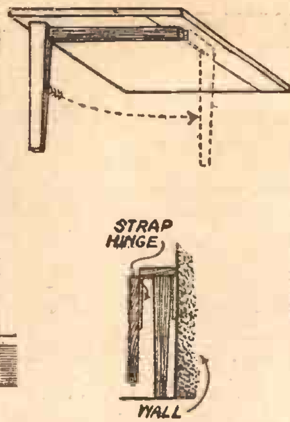


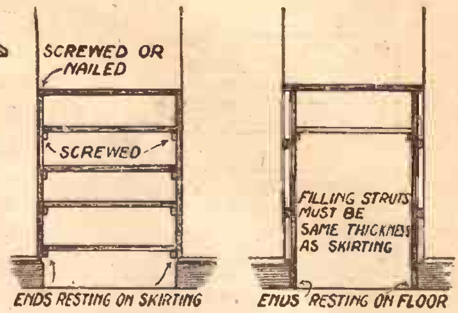
Shelf over a door.

The Diagrams on this and the next page indicate how various systems of shelving can easily be arranged in any home.



A drop shelf





Easily made book-shelves. Two methods are shown.

for single shelves, or small struts can be made. Shelves fitted direct to brick, plaster or cement walls should be fitted with rawlplugs. Where there is a good support, such as an overdoor shelf, screws will do the job.

Filling Shallow Recesses.

A shallow recess can be filled with commodious shelves, *without putting a single nail or screw in the wall.* This method is very useful, as it prevents damage in rented rooms and the shelves can be taken down by hand without tools, in the event of moving. The diagrams show clearly how the uprights are arranged to support the weight, while the shelves keep the uprights in position. For shelving in a recess, a simple draw curtain can be arranged to keep out dust from books.

The wood can be used as bought, clean and new, for scullery or workshop use. For living-room use, it needs to be painted or stained. Usually, the handyman will find it will be best to do all his cutting and fitting in the white, and to do the staining the very last thing. For shelves designed to fit in a recess, however, they can be stained or painted each piece separately, and set up when dry. This makes a better job. Knotting and three coats of paint, finishing white, are often liked for kitchen or scullery. Dark oak or mahogany stain, two coats after sand-papering, will do for a living-room, or for book-shelves anywhere. This work is not being described as a tip-top job possible only to really expert woodworkers, but can be carried out by any handyman.

Strong Wood Must Be Used.

Use timber strong enough to withstand any possible strain. Six-inch planks ¾in. thick, or 9in. planks 1in. thick, will serve most purposes. This measurement, by the way, is taken *before* planing, so the wood is usually ¼in. under the stated sizes when bought machine-planed.

If you make simple shelving for books on a small scale, it can be closed in at the back by tacking on pieces of ply-wood. This makes a cheap item that can be moved about anywhere, and may be stood on floor or table or on the back of the workshop bench.

HOBBIES THREE-VALVER (*continued from page 580*)

The volume control should be adjusted so that the last valve is not overloaded on a powerful signal, and, of course, when receiving a long-distance foreign station, it will require to be set at zero.

Long-Wave Stations.

To receive the long-wave stations, the coils needed are No. 200 for the centre socket, and a No. 100 in each of the other sockets. For the short waves, use one size smaller in each of the outside sockets than is used in the centre one. That is, if a No. 8 is used in the centre, No. 6 should be used in the other two. Remember that the smaller the coil in the socket farthest from the panel, the greater the selectivity.

List of Components.

One ebonite panel, 18in. x 7in.
One baseboard, 18in. x 10in.
One terminal strip, 18in. x 2in.
One variable condenser .0005 with slow motion dial.
One variable reaction condenser .0002.
One .0003 fixed condenser.
One .001 fixed condenser.
One .01 fixed condenser (mica).
One .0001 fixed condenser.
One 2 meg. grid leak with holder.
One fuse-holder with fuse.
One H.F. choke.
One 100,000 ohm anode resistance.
One .5 meg. potentiometer.
One L.F. transformer (2.5 or 3-1 ratio).
One on and off switch.
Nine terminals.
Three baseboard mounting coil-holders.
One anti-microphonic valve-holder.
Two ordinary valve-holders.
Two angle brackets.
Quantity of Glazite, wander plugs, screws, etc.

IMPORTANT NOTICE ! *All correspondence intended for the Editor or Advertisement Manager, MUST be addressed to "Hobbies," Messrs. George Newnes, Ltd., 8-11, Southampton Street, Strand, W.C.2*

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.

Our Model Autogiro.

YOU have only to wait until next week to receive an envelope containing the propeller and driving mechanism necessary to complete our model Autogiro. Don't hastily cut out the parts given with this week's issue, but carefully erect the model and satisfy yourself that it conforms to the drawings given in this issue. If you follow the instructions given you will have a model which cannot be purchased, and, as I said last week, I am enabled to present one of these models to every reader because I have been granted a special licence to have them manufactured by the Cierva Autogiro Co., Ltd., Bush House, Aldwych, London, W.C.2. If you encounter the slightest difficulty in the erection you have only to address a letter to me, when the designer and manufacturer will immediately let you have a reply through the post.

Our Competitions.

ONE or two readers have written asking if it is not possible to hasten the judging of our competitions, and although I must confess that it is a little disappointing sometimes when the results are not published as early as you would wish, I can assure you that every effort is taken here to ensure that the results are made known with the least possible delay. Each issue of HOBBIES goes to press nearly a month before you receive it, and when, as is always the case with our competitions, thousands of entries are received, each of which has to be very carefully examined to ensure that mistakes are not made, you will readily perceive how it is that the judging takes so long. I have, however, still further increased my competition staff, so that future competitions can be more promptly judged, and I hope all those readers who have entered our competitions in the past will accept my apologies and explanation.

Our Fiji Fiddle.

NEXT week's design chart is of a Fiji Horned One-string Fiddle. The one-string fiddle with the horn attachment is the only one-stringed musical instrument properly so described. It is possible to obtain results from it equal to, and in some cases surpassing, those obtainable from the violin, but with this distinct difference: the violin takes years of practice before even passable results in musical accomplishment can be obtained. But with our Fiji fiddle quite passable music can be played by the complete novice after an hour or so of practice. And while I am on the subject of design sheets, I should welcome suggestions from readers as to subjects they would like us to prepare in this form.

FREE
NEXT WEEK!
DESIGN CHART
FOR MAKING
A FIJI
ONE-STRINGED
FIDDLE WITH
HORN
and the Fittings
FOR
OUR MODEL
AUTOGIRO.

REPLIES AND QUERIES.

Cements for Celluloid and Xylonite.

The best cement for celluloid, O. N. (Northampton), is a solution of scrap celluloid in acetone. Another cement for the purpose may be made by dissolving one part of shellac in one part of spirit of camphor and three to four parts of alcohol. This should be applied warm, the broken parts being held together securely until the solvent has evaporated.

Preparing Cardboard for Oil Painting.

In the first instance, W. E. B. (Weybridge), apply a thin coat of paper size to the cardboard. A good size may be prepared by breaking up a cake of glue and covering it with water. Place near a fire and allow to melt.

Painting a New Plaster Ceiling.

First apply two coats of a good water paint, allowing about 48 hours between each coat for the paint to dry hard. Next, give the ceiling two coats of a good oil paint made from white lead and mix with five parts of turps to one part of oil, tinted as required. This is in reply to K. L. (Yeovil).

Making Permanent Magnets.

Any large-size electro magnet operating on a heavy direct current may be used for making permanent magnets, N. C. (East Ham).

Enlarging Holes in Wood.

To enlarge an existing hole, A. S. T. (Bournemouth), with an ordinary wood bit, fit a wooden plug, about 1in. long, with its grain running lengthwise, into the hole. Drill a small hole in the centre of the plug to admit the screw end of the bit. Then drill as usual, as if the wood were solid. When the cutting edge of the bit strikes the plug, it will not cut it easily, as the grain runs lengthwise, and, as the plug does not fit tightly it will be pushed through the hole, guiding the bit.

A Cinematograph Query.

G. C. (Battersea) wants to know why the lines show between the little pictures of the film when the latter is projected through his home cinematograph. This is probably due to the shutter becoming out of phase with the mechanism operating the film, and it is much better to return the instrument to the makers for repair.

The Thickest Hide.

The whale has the thickest hide; in many places its skin is over 2ft. thick, N. J. (Dulwich).

The Growth of Trees.

The growth of trees has been registered, W. O. (Eastbourne), by encircling the trees with an expansible ring. As the ring expands, it operates a mechanism which records the movement on a revolving cylinder. The movement is multiplied by suitable gearing, so relatively slight changes are magnified and made evident.

Cementing Tortoiseshell.

Make a cement, J. M. (Brighton), by baking a small quantity of Canada balsam in the oven. When allowed to become cold, it will set quite hard. Now melt it by the aid of gentle heat, and in it dip the parts of the article to be joined, and bind them with wire until the next day; then remove the wire and shave off the excess of Canada balsam with a sharp penknife.

The Power of a Horse and Horse-power.

The following information is in reply to E. J. G. (London, E.C.1).

When James Watt, having invented a machine far more powerful than any animal, wanted a unit for measuring its output in energy, he went to the horse. He took the strongest English carthorses he could find, and measuring the amount of work they could do in an hour found that the average was equivalent to raising 33,000lb. one foot in one minute. This is called "one horsepower." It is a capacity much above that of the average horse. And yet it is a poor horse that cannot do more actual work than a machine nominally containing the strength of one first-class horse. Watt and his successors have made power so easily obtainable that we are extravagant with it and think nothing of using from three to seven horses to pull a motor-cycle weighing 100lb. or so, and thirty horses to pull a vehicle lighter than a stagecoach. What would a two-horse-power motor have to say if set to pulling one of the old two-horse omnibuses? It might raise a crawl on a level with a perfect surface; on the slightest gradient it would lie down. As a matter of fact, the best dray horses can haul over 2½ tons on a level, hard surface, and a quarter of that up a grade of one in twenty. A surface of loose stones cuts their pulling power in half.

Advertisements are accepted for these columns at the rate of 1d. per word, prepaid.

SALE AND EXCHANGE

Address communications to the Advertisement Manager, "Hobbies," Southampton St., Strand, London, W.C.2.

CINEMATOGRAPH FILMS, Machines, Accessories. Lists Free. Sample Film, 1s.—Filmeries, 57, Lancaster Road, Leytonstone.

TROUSER PRESS FITTINGS.—Wholesale or retail. Also Tools. Lists Free.—British Co., 1, Waterloo Street, E.C.1.

A FIRESIDE FACTORY.—Hobbies Woodcraft Machines for profitable spare time. From 35s. Obtainable on easy payments. Illustrated lists from Hobbies Ltd., Dereham, Norfolk.

A HANDY PARCEL of Fretwood.—From ¼in. to ½in. thick in varying widths of useful size. Enough to do half a dozen jobs. A bargain at 1s. 6d. Post free 2s. 3d. Hobbies Branches or Hobbies Ltd., Dereham, Norfolk.

BRITISH FRETSAWS are strongest, sharpest and best. Used by all the best workers. 4d., 6d. and 9d. a dozen. From all ironmongers or (post extra), Hobbies Ltd., Dereham, Norfolk.

CONJURING Catalogue Free.—Messrs. Vandy, Hastings.

INTERESTED in building models? Get Hobbies list of designs and illustrations of practical easy to build models. Free on request. Hobbies Ltd., Dereham, Norfolk.

GRAMOPHONES, Motors, Fittings, Records. Catalogue free. Cash or terms. Build £12 model for £3. Instructions, 3d.—C. H. Burt, 185, High Street, Deptford, London.

MAKE Money Picture Framing, Tray and Furniture Making. Grand Guide and List. Post Free 6d.—Watkins, Provider, Newport, Mon.

TURNED LEGS for the home carpenter. A variety of sizes and styles at reasonable prices. Particulars free on request. Hobbies Branches or Hobbies Ltd., Dereham, Norfolk.

FRENCH POLISHING MADE EASY.—"Speedaneez" Friction Polish requires no experience, grain filler, oil or spiriting off, merely rub it on. Complete outfit, 1/3, 2/-, 3/- post free.—Speedaneez Products, 214, Walworth Road, S.E.

REPEAT ORDERS every post. (Seven beautiful Coloured Inks, post free, 7½d.; 2 sets, 1s.—Hacketts, 23, July Road, Liverpool.

"HINTS FOR HOME DECORATORS."—Best book obtainable. Full instructions on Painting, Paperhanging, Staining, Graining, Varnishing, Enamelling, Signwriting, Polishing, Colour Washing, etc., and scores of tips, hints and recipes for decorating the home throughout, 144 pages, price 1s. post free.—Texalo Co. (Dept. 32), Blackpool.

STAMPS.

SIX TRIANGULAR STAMPS. 6d. Large List free.—Felix Sykes, New Barnet.

STAMPS FREE! Twenty Unused Colonials, "Neurope."—G. H. Barnett, Limington, Somerset.

FREE.—Collectors early and medium will like my approvals. 50 different to genuine applicants for approvals, sending postage.—Rowden, Wycar, Bedale, Yorks.

ENTIRES FREE. Request stamp approvals. 1000 Mixed Stamps 1/-.—Parson, 509, Filton Avenue, Bristol.

TRANSFERS. Wood Inlay, Floral, Dutch, Japanese, Birds. Selection, 1s. 6d. Includes catalogues.—H. Axon, Jersey, Eng.

AEROPLANE RUBBER. Prices and Samples Free.—Thomas, 79, Upper Tooting Road, London, S.W.17.

TRANSFER GRAINING PAPER. Six 20 × 20in. sheets with directions, 1/9. Oak, Walnut, Mahogany, etc.—Industries, 13, Gordon Avenue, Twickenham.

ART.—MAKE MONEY if you sketch; write for free booklet.—Art Studios, 12, 13, Henrietta Street, Strand, W.C.2.

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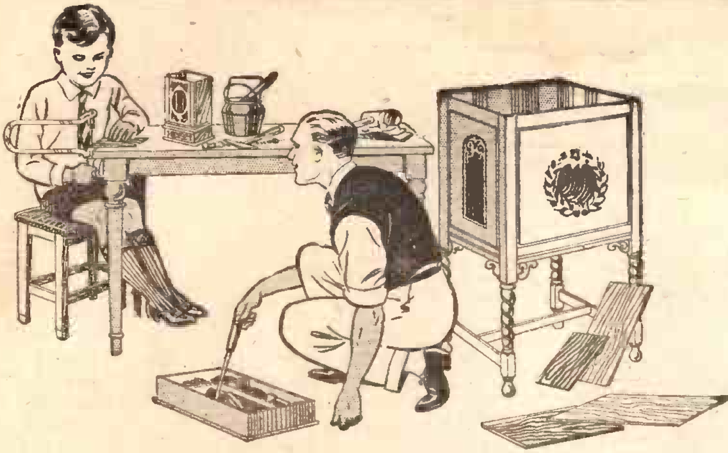

Father and Son find Hobbies fun!

No matter what age, you can get great fun from Hobbies Fret-machines. They provide a factory for the home—You'll enjoy using one and so will Dad. Get him to buy one and let you use it making all kinds of things for the home from Hobbies designs.

Hobbies

FRETWORK MACHINES

FOR 5/- DOWN

35/- to £20.

THE GEM

The latest machine, built as a result of years of experience and containing the latest improvements. It has polished steel frame and arms, with special tensioning device. The machine runs easily, and is particularly light and suitable for transport. Price 35/-.

THE A1

The most popular amateur's machine in the world. Cuts wood up to an inch thick, and will take work up to 19 inches long behind the saw. It is built of steel, is rigid and easy running. Obtainable under easy payment terms. Supplied ready to use with all accessories. Price 5C/- carriage forward.

THE TRIUMPH

A real quality Fretmachine with ball bearing parts, specially large table and tool tray. Its weight holds it more firmly when running, and the saw grips will hold the finest blade. Supplied ready to use, obtainable under easy payments. Cash price, 75/- complete.

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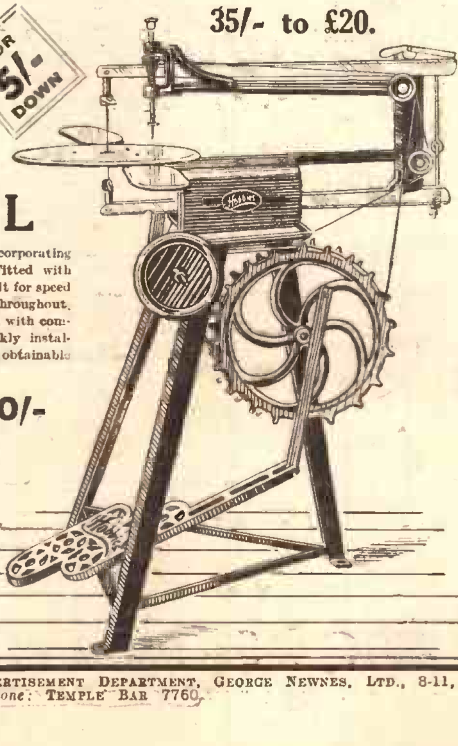

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