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WOOD
WORKING
MODEL
MAKING
AMATEUR
MECHANICS
ETC. ETC.

Hobbies AND PRACTICAL WIRELESS

2^D

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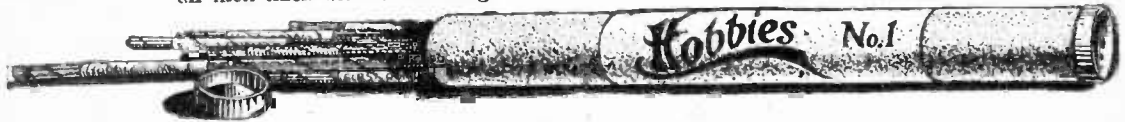
*Something New in Two Valves
& Lightweight
Transportable!*



FULL DETAILS INSIDE

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Hobbies Fretsaws can be used for all sorts of jobs in woodwork. They are strong and sharp, being made and tempered under a special process from suitable steel. An essential part of a woodworker's kit and superior to any foreign saw made of wire. They will cut wood an inch thick without breaking.



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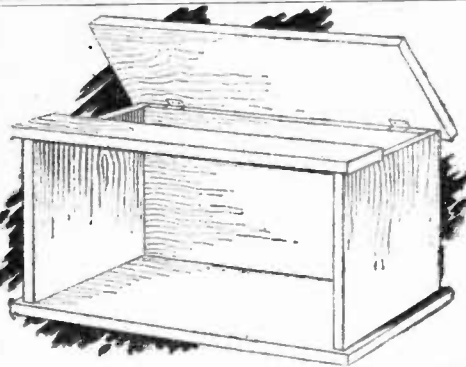
use **HOBBIES
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BLUE LABEL 4d. Per Doz.
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Parcels of mahogany are supplied with all boards cut and planed ready to put together. American-type Cabinets for panels as shown. Illustrated instructions with each. Base board and panel supports also supplied.

No. 6	Panel 16 x 8	7/3
No. 7	" 12 x 6	4/-
No. 8	" 9 x 6	3/3
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No. 11	" 24 x 8	12/-

Postage extra on each.

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Having made the Cabinet, any amateur can be assured of a brilliant french-polish finish by using **HOBBIES' LIGHTNING POLISH** or the **LIGHTNING COLOUR POLISH**. Both are simple to use and supplied with full instructions. The colour polish stains as well as polishes, but both bring up a rich surface to the wood. Sample bottle of either estate oak or mahogany for colour with instructions price 2/-, post free 2/6.

TRANSFER DECORATION

You can add beauty to your cabinets by decorating them with some of the pretty colour transfers shown in Hobbies General Catalogue. These are easy to fix and are obtainable in great variety of shapes and sizes.

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Moulding and fancy beading add distinction to any cabinet work. There is a special 24-page Catalogue illustrating these, which every cabinet maker should have. Supplied free on application, and giving a wide range of decorations.

Leaflets are obtainable free on any of the above materials. Call for one at any Hobbies Branch or write Dereham.

HOBBIES LIMITED, DEREHAM, NORFOLK

or call at a Branch in London, Glasgow, Manchester, Birmingham, Leeds, Southampton, Sheffield, and Brighton.



Vol. 73. No. 1,897

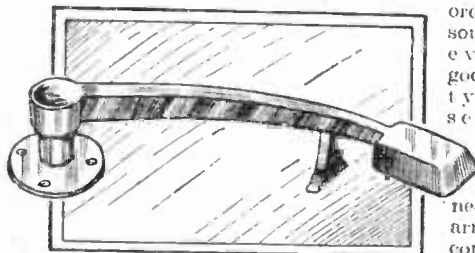
Published Every Wednesday

FEBRUARY 27th, 1932

THIS WEEK'S CLEVER IDEAS

A Neat Gramophone Pick-Up.

IT is now generally recognised that electrically-recorded gramophone records can only be heard at their best when an electrical reproducing device is used. The

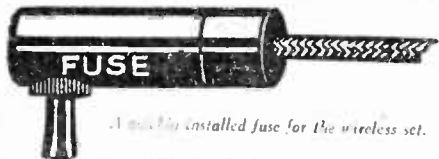


A neat gramophone pick-up.

ordinary sound-box, even of good quality, has serious drawbacks. The neat tone-arm here combines also a pick-up enabling the record to be amplified by the wireless set and reproduced through the loud-speaker. It is moulded as one complete unit in fabrolite, and the leads are carried through. It costs 27s. 6d.

An Improved Oil-Can.

EVERY user of an oil-can has experienced the annoyance of a leaking oil-can caused by the mislaying of the nozzle protector cap. An inventor has provided a simple remedy. A threaded holder is



A simple installed fuse for the wireless set.

fitted at the base of the spout to which the cap can be screwed when your oil-can is in use. The can is made in two sizes retailing at 6d. and 1s. respectively.

A Fuse for the Wireless Set.

MOST wireless amateurs to-day incorporate a fuse in their set. This simple precaution saves pounds in valves. The Wander Fuse made by Belling and Lee, Ltd., contains 150 M.A. fuse, and is designed for use in the H.T. negative lead. It lies flat on the battery and occupies no more room than a wander-plug. It costs 1s. 6d., and is, of course, intended for battery-operated sets. It is supplied in black or, when used in the grid positive lead, in red.

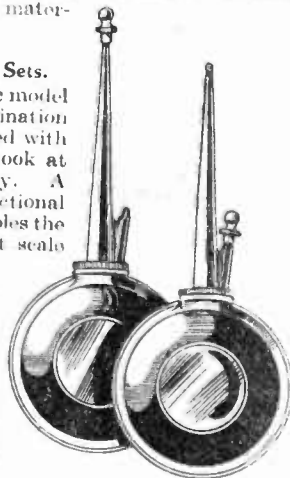
The address of the manufacturers of items mentioned on this page can be obtained on application to the Editor.

Firework Making at Home.

A NEW amateur's chemical manufacturing outfit for the home (it costs 20s.) enables any amateur to make fireworks, furniture polish, cements and glass, hair-cream, etc., etc. The set includes a chemical balance, a thermometer, materials, and instructions.

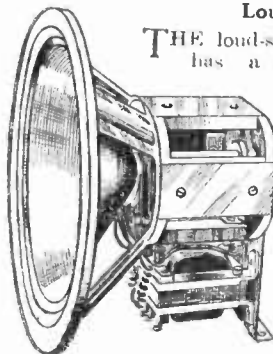
Aeroplane Construction Sets.

THE building of realistic model aeroplanes has a fascination for those who are satisfied with something attractive to look at but which does not fly. A new series of constructional sets, costing 3s. each, enables the home constructor to erect scale models of the world-famous "Gipsy Moth" and the "Comper-Swift," which recently broke the England-Australia record. These constructional sets are complete with everything necessary and all the parts are correctly coloured. Accurate plans are, of course, included.



New oil-cans with nozzle retainers.

A New Moving-Coil Permanent Magnet Loud-speaker Unit.



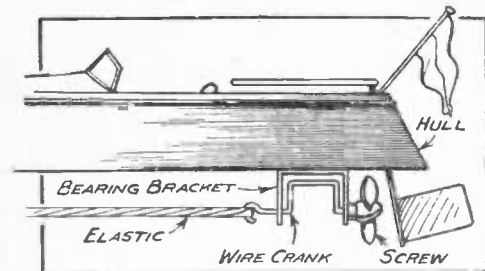
A new wireless loud-speaker with transformer incorporated.

THE loud-speaker unit illustrated here has a speech transformer incorporated in it, and has terminals providing for alternative ratios to match up with the valve used in the output stage. The construction is robust and the cone, speech coil and suspension are arranged to give a truly parallel action without distress. Such a unit has decided advantages when space in the set is restricted.

NOTES AND NOTIONS from our READERS

A Winding Key for Model Boats.

READERS who possess elastic-propelled boats have no doubt experienced difficulty in winding the elastic. The usual method is to unhook the elastic from the hook in the stern, attach it to a small winding

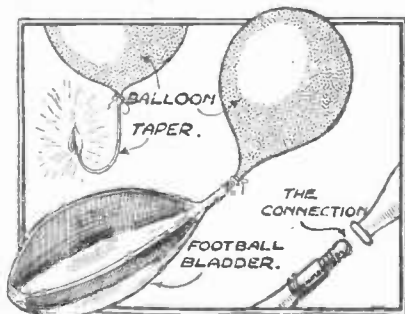


A winding key for a model boat.

key, and thus do the necessary winding in this manner. A much more simplified method is that shown in the diagram. Fix a small bracket to the bottom of the boat, insert the propeller shaft through it, and bend a small crank in the shaft as shown. This will then facilitate the winding process.—G. HERBERT (2, Hempton Road, Deddington, Oxon).

Simple Fire Balloons.

FIRST obtain a large toy balloon and fill it with coal gas. As the pressure in the mains is not enough to distend the rubber, fill a football bladder with gas and force the gas into the balloon by connecting it to the bladder. Tie the balloon and attach a bent taper to it as shown. Light the taper, taking great care not to set the balloon on fire and launch it into the air. The balloon will rise and drift away. In a few minutes the taper will have burnt up close to the rubber, when the



How to make simple fire balloons.

THAT DODGE OF YOURS?

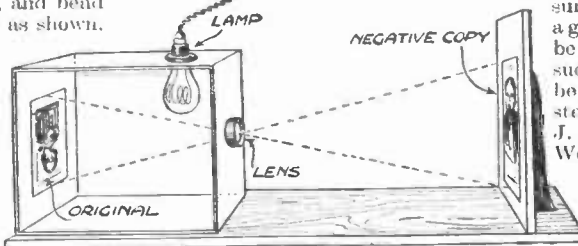
Why not pass it on to us? We pay Five Shillings for every item published on this page. Mark your envelope "Notes and Notions." Put your name and address on every item. Every notion sent in MUST be original.

whole balloon will blaze up.—A. POLLAR (8, Arran Place, Ardrossan).

Use Your Projector for Copying Photographs.

YOU can convert your "Hobbies" Projector (described in December 26th issue) into a copying camera in a few minutes. Take a look at the sketch, you see the photograph to be copied

upside down in the back of the lantern, the rays pass through a suitable lens and are then focused on to a printing frame containing Bromide or Gaslight



An apparatus for copying photographs.

paper. To ensure correct exposure a postcard should be cut into several pieces and experimented with until the correct exposure is ascertained.

THIS WEEK'S MENTAL NUT—No. 6.

THREE books will be awarded each week for the first three correct solutions opened. Mark envelopes "Mental Nut"—No. 6.

A MAN placed three sovereigns and one shilling into a bag. How much should be paid for permission to draw one coin from it? It is, of course, understood that you are likely to draw any one of the four coins.

Answer to Last Week's Problem.

A and B share the land in the proportion of 3 to 4—but is in the proportion of four-twelfths to three-twelfths, which is the same as 4 to 3. Therefore, A takes four-sevenths of the 100 acres and B three-sevenths.

A whole postcard (Bromide or Gaslight, of course) should now be placed in the frame, the result when developed will turn out to be a negative. This negative should now be placed in

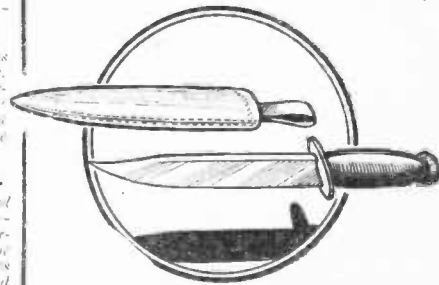


A novel idea for a watch dial.

the back of the lantern and again projected, the result will be a perfect copy of the original. You may take as many copies as you wish. Just a little advice: Use a good lens, be sure that your picture is sharp, use a good light (two if possible). Don't be disappointed if at first you don't succeed, the copy may appear to be blurred. If this occurs try stopping the lens down a little.—J. WANLESS (63, Mount Pleasant, Wooley Terrace, Crook, Durham).

A Novel Idea for Watch Dial.

ALL that is needed is paper, pen and indian ink, compasses, lead pencil and rubber. Cut a piece of paper the same size as the dial and make a hole in the centre for the hands. When you have decided on an idea for your sketch, draw it lightly in pencil and then go over it with indian ink. When dry it can be cleaned up with the rubber, and gummed over the original dial. If you draw an old alarm clock on the dial you will have to shorten the hands. These are easily cut with a pair of scissors.—F. HOLDROFT (Acres Wood, Staffs).



A piece of leather shaped and stitched as shown here will make a useful sheath for a knife.

THE LISTENER THREE-VALVE RECEIVER

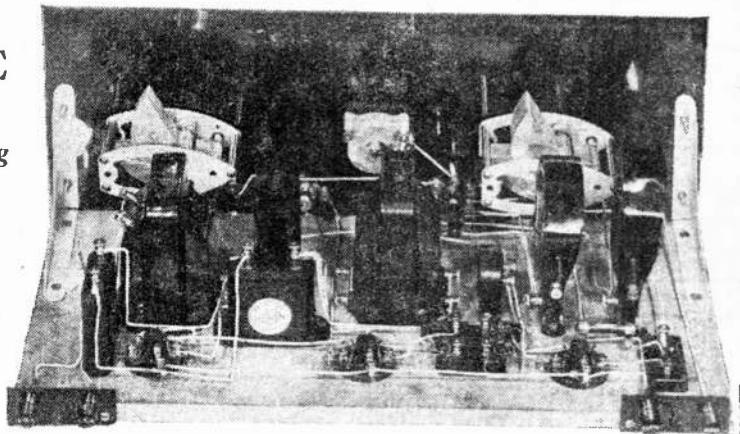
A fine and selective Pentode Set, giving pure reception and ample volume.

By F. J. CAMM

THE great advantage of using components which are of one make is that the critical components are matched one against the other. A great deal of trouble in wireless sets is caused by using transformers which are unsuited for the valves, or chokes and coils which do not "fit" the circuit. This three-valve set, it will be seen from the list of components below, has been almost entirely designed around Lissen components. It is a three-valver employing a pentode valve in the last stage, and it gives great volume and pure reception on most of the English broadcasting programmes and many of the foreign stations.

Construction.

The actual construction of the set is not difficult. It will be seen that a .0001 reaction condenser is placed in the aerial lead, and that resistance capacity coupling is included between the first and second valve. The layout



An internal view of the Listener Three-Valve Set.

of the components can be followed from the photograph at the top of this page and the panel layout is shown in the photograph on the next page.

Assembly.

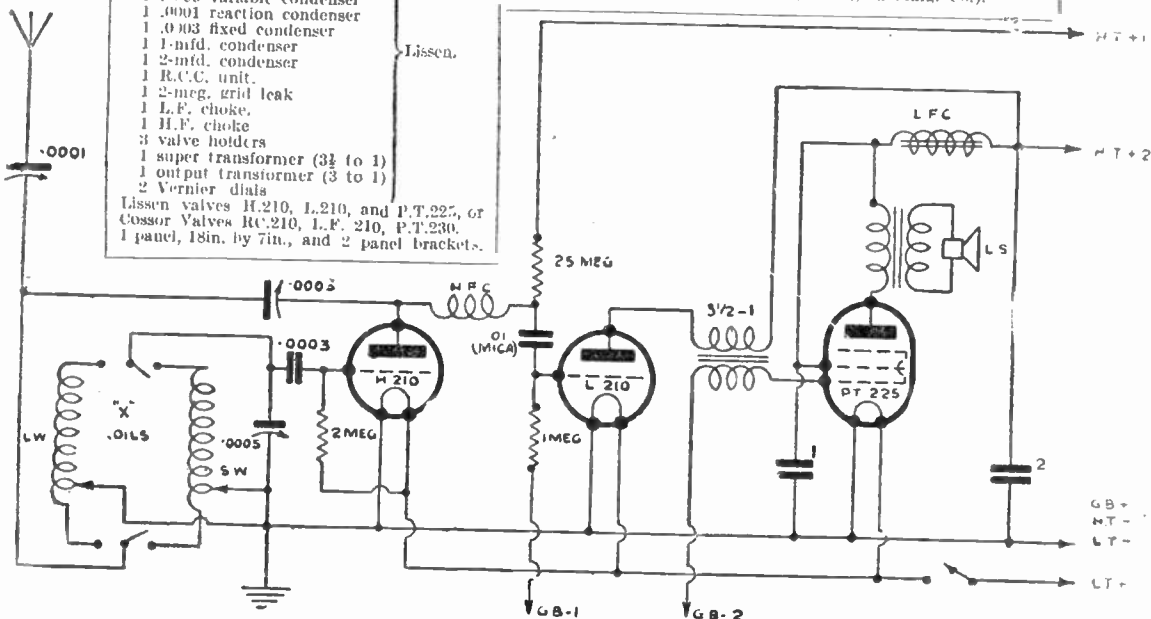
The first thing to do is to get together the components mentioned below. Drill the panel and secure to the baseboard by means of the two brackets. Next screw down the three valve-holders, the two transformers (noting that 3½ to 1 ratio is placed between the first and second valves), and fix the two condensers, the

LIST OF COMPONENTS.

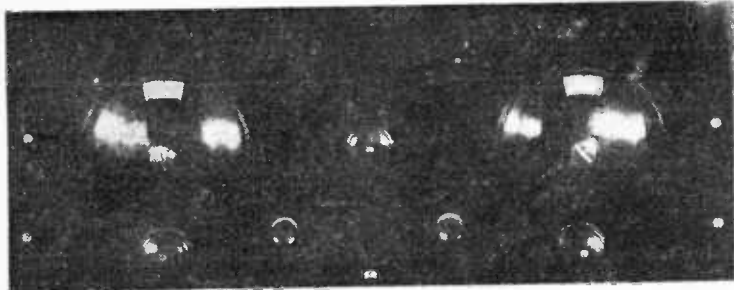
- 1 Lissenagon X Coil, No. 60
- 1 Lissenagon X Coil, No. 250
- 2 coil sockets
- 1 filament switch
- 1 2-pole 2-way switch
- 1 .0003 variable condenser
- 1 .0005 variable condenser
- 1 .0001 reaction condenser
- 1 .0003 fixed condenser
- 1 1-mfd. condenser
- 1 2-mfd. condenser
- 1 R.C.C. unit.
- 1 2-meg. grid leak
- 1 L.F. choke.
- 1 H.F. choke
- 3 valve holders
- 1 super transformer (3½ to 1)
- 1 output transformer (3 to 1)
- 2 Vernier dials

Lissen valves H.210, L.210, and P.T.225, or
Cosmor Valves RC.210, L.F. 210, P.T.230.
1 panel, 18in. by 7in., and 2 panel brackets.

- 1 baseboard, 18in. by 9in.
- 1 clip aerial, earth, L.S., and L.S.— terminals.
- 1 Glazite wire, 20ft.
- 1 Byldurone Cabinet (J. J. Eastick and Sons).
- 2 terminal mounts.
- 1 Cameo Cabinet (Carrington Mfg. Co.).



Theoretical circuit of the Listener Three-Valve Set.

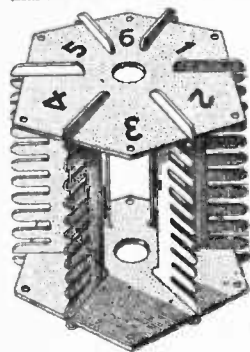


Mark out the panel as shown in this illustration.

"on-off" switch, the wavechange switch and the reaction condenser to the panel. The .0005-mfd. and the .0003-mfd. condensers have slow-motion dials of a very efficient type, providing for slow motion, but fairly quick adjustment. Follow the maker's instructions regarding the fitting of these.

Wiring Up.

Before fixing the remainder of the components, screw down the two valve-holders, and wire up the wave-change switch. It will be noticed that this has six terminals, one of them being connected by a tag to the centre pole. Fix the switch in such a way that this tag is at the top, connect the first terminal to the right of the tag to one side of the short-wave coil holder; terminal No. 2 next to it to one terminal of the long-wave coil-holder; terminals No. 3 to the other side of the short-wave coil-holder, No. 5 to the other side of the long-wave coil-holder, the tag to the moving plates of the reaction condenser and terminal No. 4 to the fixed plates of the .0005 condenser. Next, fix down the resistance-capacity unit and wire up this, then the .0003 variable condenser, and the "on-off" switch.



The EWEBEC Coil Former assembled.

completed coil former illustrated on this page.

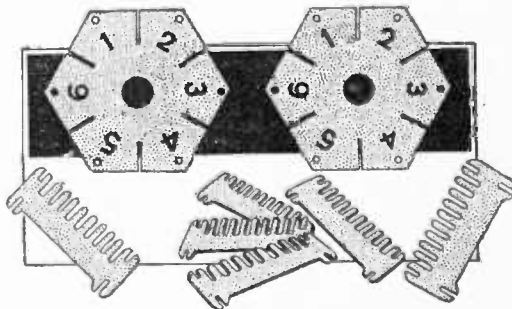
A set of parts for making one of these coil formers costs only 1.44, post free, and by means of them one is enabled to make extremely neat coils. It only takes a few seconds to assemble one of these formers. The top and bottom discs are numbered and the parts are assembled by taking one hexagon and one slotted spacer, and sliding the slotted spacer into the hexagon between numbers one and two. The spacer is inserted with the straight edge outside, if a single layer coil is required. Having assembled the first spacer, take the other hexagon and slide it into the other end of the slotted spacer already in position again using the slot between the

THE EWEBEC UNIVERSAL COIL FORMER

READERS who make their own coils will be interested in the new "Ewebec" Universal Coil Former, which will enable anyone to wind a coil to suit a given wavelength in a few minutes. These coil formers consist of hexagonal discs, in which are cut six slots, and six comb-shape pieces suitably slotted to assemble into the

numbers one and two. Now take another slotted spacer and insert it opposite the one already in position, when the remaining four spacers can be inserted.

It will be seen that it is possible for a few pence to make a complete series of coils suitable for all wavelengths. Such coils will have an extremely low loss and when incorporated in the set look extremely neat. They are obtainable from an advertiser in this issue. —F. J. C.



The component parts of the EWEBEC Universal Coil Former.

Completing Assembly.

You may now screw down the remainder of the components (which will not now be in the way), and complete the wiring. It is important to note the connections of the pentode valve, as many wireless constructors go wrong. In the circuit diagram the fifth-pin of the pentode valve (the side terminal on the Lissen valve or the centre-pin in the base of the valve if Cossor valves are used) is in the low-frequency choke lead, and is the upper of the two grid con-

nections there shown.

Battery Leads.

The low tension, high tension, and grid bias leads should be made direct to the components by means of a Belling-Leo five-way battery cord, the only terminals on the back of the set being the aerial, earth, and loud-speaker. It will be noted that the loud-speaker terminals are not marked "Positive" or "Negative": in this circuit it does not matter which way round they are connected. A Lissenagon No. 60 Coil is used for the short waves, and a No. 250 for the long waves.

Valve Connections.

If a Cossor pentode valve is used in the last stage it will be necessary to use a five-pin valve-holder in connection with it. As I have already said, this set is an ideal one for a reader to make up if he does not wish to be continually experimenting. It embodies modern refinements, leaves nothing to be desired in regard to the number of stations received, gives ample volume and pure reception, is cheap to make, and is, in fact, a real listener's set.

MAKE YOUR OWN PRINTING BLOCKS FROM LINOLEUM

(Concluded from page 515, February 20th issue.)

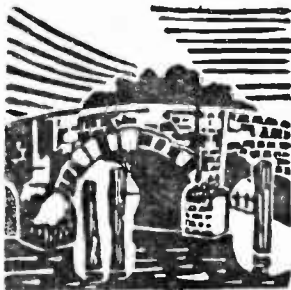


Fig. 6.—Views for Christmas cards are quite simple to prepare.

ANOTHER way of tracing is to insert carbon paper between the tracing and the block, going round the lines of the design with a hard pencil.

Anyone who is experienced can dispense with tracing altogether and draw with a brush and ink on to the block itself.

Cutting a Block.

Whichever part of the design is left in relief after the cutting is done receives the ink and is the printing surface. Two useful designs are shown in Figs. 5 and 6.

Begin by cutting round the edges of the drawing with a pocket knife or a V-shaped tool (Fig. 7). Avoid fraying the canvas at the base of the lino as happens when the cutting is too deep.

The lino is inclined to break when the large surfaces are gouged away, but clean cutting round the edges of the design is very important.

Large waste areas should be well cleared away. If much lino remains it is apt to collect ink which, if not wiped off, appears on the proof.

Wash all ink and white paint from the block before taking a print.

Printing.

Choose a fine quality thin Japanese paper as the thicker makes are almost unprintable by hand.

Cut the paper (allowing a margin round the block) for as many prints as required.

Moisten each piece separately with a damp sponge, and put under pressure. It is a good plan to do this overnight.

The ink when rolled out on glass or slate should be applied evenly to the face of the block with the rubber roller or a dabber (see Fig. 8).

Lay either thin, oiled, stencil paper or newspaper over the printing paper before the rubbing is commenced.

This is done with an all-over movement so that the ink shows through the paper with an even blackness.

Some students prefer to rub with the fingers or palm of the hand, but apart from rubbing tools already

mentioned, the rubber-covered roller or an agate burnisher (Fig. 9) can once again be used with good results.

The print should be carefully pulled from the block and pinned up to dry.

Every time a print is made the block must be re-inked.

Methylated spirit will remove any ink left on the block after printing.

A Note on Colour Printing.

Any colour blocks required are taken from the first or key block. Two or four cuts known as register marks (for use in the fitting together of each colour) are made with a gouge, in each corner of the lino.

It is not always necessary to cut a separate block for every colour if the colour patches are small and far apart.

Each colour fits into a certain part of the design and the rubbing is made as already described.

Blocks should be all the same size. If a hole the size of the block is cut in a piece of strong cardboard every block can be fitted into this when printing.

Small pieces of cardboard to each corner are useful as a guide when laying down the printing paper.

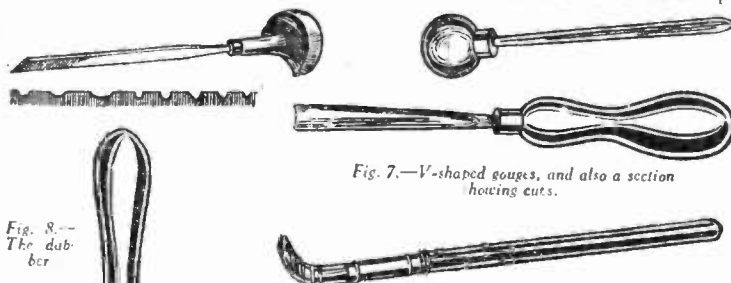


Fig. 7.—V-shaped gouges, and also a section showing cuts.

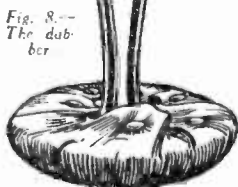


Fig. 8.—The dabber.



Fig. 9.—An agate burnisher.

Mounting and Framing.

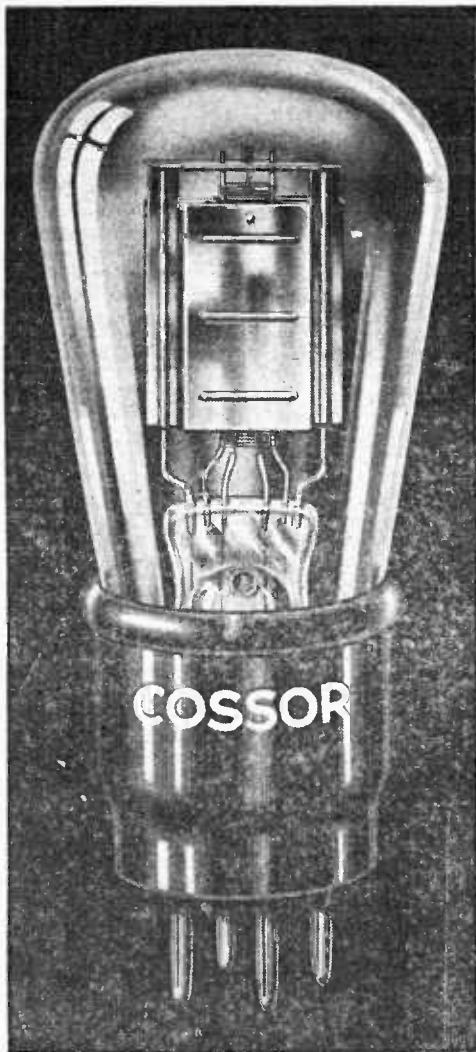
Trim the print, leaving a margin of half an inch at the top and sides and one inch at the bottom.

The extra depth at the base bears the signature of the artist, if the proof is a successful one.

A lay-over mount of unequal margin is then cut to the size required.



Fig. 5.—Design for a linocut, cut in outline.



COSSOR 2-VOLT VALVES

Type	Filament Amperes	Anode Volts	Imped.	Asp. Factor	Minimum Cond. (µm)	Price
*215 S.G.	.15	120-150	300,000	330	1.10	20/-
*220 S.G.	.2	120-150	200,000	320	1.00	20/-
*220 V.S.G.	.2	120-150	110,000	—	1.6	20/-
210 R.C.	1	75-130	50,000	40	0.8	8/6
*210 H.L.	1	75-150	22,000	24	1.10	8/6
*210 H.F.	1	75-150	15,800	24	1.5	8/6
*210 DET.	1	75-150	13,000	15	1.15	8/6
210 L.F.	1	75-150	10,000	14	1.4	8/6
220 P.	.15	75-150	4,000	9	2.25	10/6
220 P.-A.	.2	75-150	4,000	8	2.00	10/6
230 X.P.	3	100-150	4,000	16	4.00	10/6
230 H.P.T.	3	100-150	1,500	4.5	3.00	13/6
230 P.T.	3	100-150	—	—	1.8	20/-
219 D.G.	1	75-100	27,000	5.1	0.19	20/-

* These Valves can be supplied with or without Metallised Bulbs.

Specified for HOBBIES—

“Powerful 3”
“Listener 3”
“Portapent 2”

COSSOR

BECAUSE of their outstanding efficiency and consistency Cossor Valves have been chosen by the designers of the Hobbies Sets described in this number. Due to their special constructional features—Mica Bridge Mounting and Multi-point Suspension—Cossor Valves ensure maximum results. Take no risks—use Cossor for every Receiver.

—the valves with the MICA BRIDGE that ensures maximum efficiency

Here are the types you need:—

“POWERFUL 3” “LISTENER 3”

Cossor 210 DET 210 R.C.
Cossor 210 L.F. 210 L.F.
Cossor 220 P 230 P.T.

“PORTAPENT 2”

210 DET
230 P.T.

British made by
A. C. COSSOR
Ltd, Highbury
Grove, London,
N.5.

To A. C. COSSOR LTD., Melody Dept., Highbury Grove, London, N.5.
Please send me free of charge a copy of the 72-page
“Cossor Valve and Wireless Book,” No. 11.

Name
Address

©9877

H. 27/2/32.

UNDERSTANDING YOUR VALVES

By Percy Ray

Quite a number of readers fail to understand the descriptive notes dealing with the capabilities of the valves. This article will lay bare all the facts relating to them. Read it!

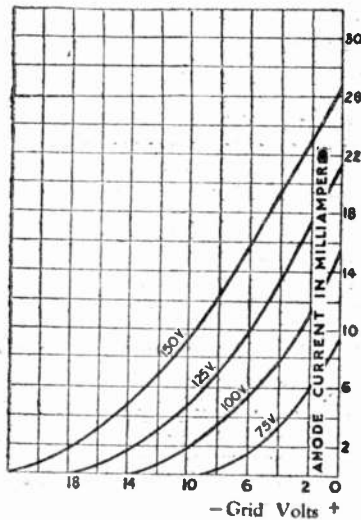


Fig. 1.—Characteristic curve of a low impedance medium slope valve.

It is probably true to say that there is nothing more confusing to the average listener than a valve maker's catalogue. A perusal of the descriptive notes usually shows that an "H.F." valve is suitable as a detector or L.F. amplifier, that an "L.F." valve is a good detector or L.F. amplifier, and that an "H.T."

its high tension current when a signal is applied to its grid, but it must not alter the nature of the signal so applied by becoming overloaded, which would cause distortion. Fig. 1 shows a valve of low impedance. A glance at the "150" curve will show that it is practically straight from 8 m/A to just over 26 m/A, or, in other words, the incoming signal can swing up and down over a nominally straight line that is 18 m/A long without touching the curve portion which causes the valve to distort very badly. This long, straight portion indicates that it is a low impedance valve capable of handling large signals. Reference to Fig. 2 shows that this valve is entirely different, and that the "150" line is only straight between $\frac{1}{2}$ and $2\frac{1}{2}$ m/A. From this it will be seen that the total swing is only $1\frac{1}{2}$ m/A, and that therefore the valve will handle very little volume before distortion sets in. The reader will ask, "Why not always use low impedance valves?" The answer is that a low impedance valve has a small amplification factor and a high impedance valve a large amplification factor. The amplification factor (sometimes called "magnification factor") of a valve is the influence that a signal applied to the grid has over the H.T. current. Take the original case of the 5,000 ohm valve referred to above. It will be remembered that it took a variation of 20 volts high tension to vary the high tension current 4 m/A. If the anode voltage is left alone and 2 volts grid bias applied to the grid, it will be found that the same change of 4 m/A takes place. Therefore 2 volts applied to the grid has as much influence as 20 volts applied to the anode; if 20 is divided by 2 the answer is 10, which is the amplification factor of the valve, or the amount of influence that the grid has over the anode. The valve shown at

type is suitable for almost anything, providing that the associated components have the necessary characteristics.

The only additional information is a list of characteristics, including impedance, mutual conductance and so on, together with a complicated-looking curve. It is undoubtedly true that any valve will work in almost any position if the circuit is suitable. It is equally true that there is only one valve for any particular valve holder. Valve characteristics and curves are very easy to understand, and once mastered will be of inestimable value to the constructor. The writer ventures to suggest that a lot of confusion has been caused by attempts to illustrate valve functions by analogies of cisterns, water pipes and taps; a valve is a part of a wireless set and will never be understood if it is dissociated from these surroundings. In the following simple explanation the fundamental meaning of the terms simply presented together with its influence on surrounding components.

Impedance.

Impedance indicates the capability of a valve to handle large or small volume, the lower the figure of impedance the more undistorted output—the volume of pure signals that the valve will give. Impedance is arrived at by measuring the corresponding change of high-tension current that will result from changing the high-tension voltage; for example suppose that a valve has the anode, or plate, connected to 110 volts and that the current drawn from the battery is 11 m/A, also if the anode voltage is reduced to 90 there is a reduction in the amount of H.F. current used to the extent of 4 m/A. From this it will be seen that a change of 20 volts on the anode has reduced the amount of current drawn through the valve by 4 m/A. Such results would be obtained from a valve having an impedance of 5,000 ohms. If the same experiment was tried with a high impedance valve, the change resulting would be very much smaller; in the case of a screened-grid valve only a fraction of a milliamp.

Low Impedance Valves.

The job that a valve is required to do is to change

Fig. 2 has an amplification factor of 40, and will therefore amplify a signal four times as much as the valve shown at Fig. 1, with amplification factor of 10; but with the high amplification factor there is a corresponding rise in impedance, and consequently the valve will not handle as much volume as the valve with the lower factor.

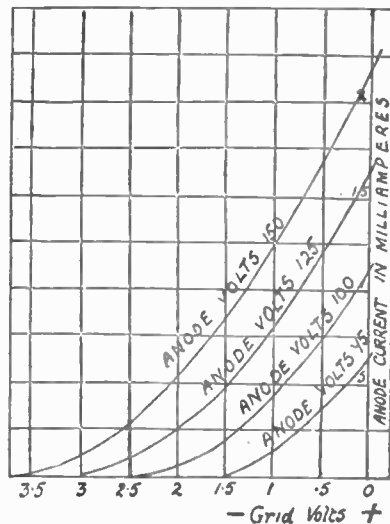
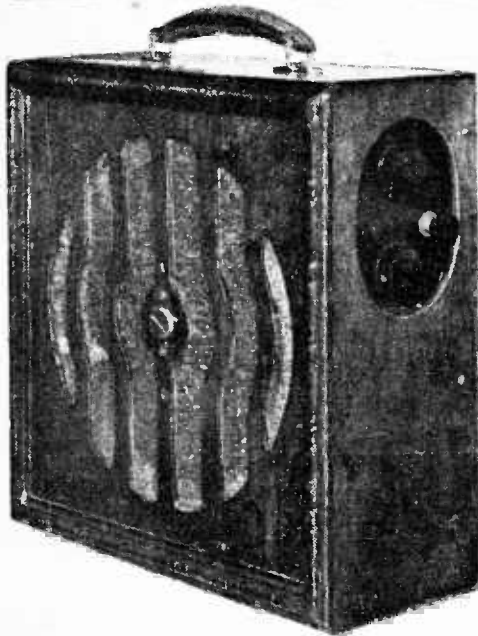


Fig. 2.—Characteristic curve of a very high impedance valve.

(To be continued.)



A photograph of the finished set showing the case and tuning knobs.

A GAIN HOBBIES is in the forefront with a new radio receiver of outstanding merit. This time it is a self-contained two-valver of advanced design, embodying many novel features. These include dual-range tuning, and pentode power-amplification. The complete set is extremely small, measuring only 12½ in. x 12½ in. x 5½ in., and, unlike many receivers of this type, is very light in weight; standard parts of good quality are used throughout. In spite of this the total cost, including the pentode power valve, is extremely reasonable.

The Circuit.

Before proceeding with the construction let us examine the general layout of the receiver. Firstly, it must be explained that there is no aerial in the cabinet, so that, strictly, we cannot call the set a "portable." However, being so very compact and light, it is really much more easily transported than the average 3 or 4-valve so-called "portable." It requires but a moment to attach it to any existing aerial and earth or to throw a wire over a tree and another along the ground when in the open. This latter arrangement will be found quite satisfactory as an aerial and earth when within a few miles of a regional station.

Most sets nowadays require an H.T. voltage of 100 or more, and as you know, a 100-volt H.T. battery is no light weight, apart from its bulk. It was for this reason that we decided to experiment with only 60 volts. Under these conditions the power from the average 2-valver is considerably reduced. What were we to do? Well, after some experimenting we decided to use a pentode. "But," you will say, "surely a pentode requires power from a mains unit or at least a 120-

"HOBBIES" INTRODUCES

Here is the set you have been waiting for. about. Compact, light in weight, yet giving full

You may obtain a blueprint of this set for 1/- from "Hobbies," Geo. Newnes, Ltd., 8-11, Southampton Street, Strand, London, W.C.2. Ask for Blueprint No. 8.

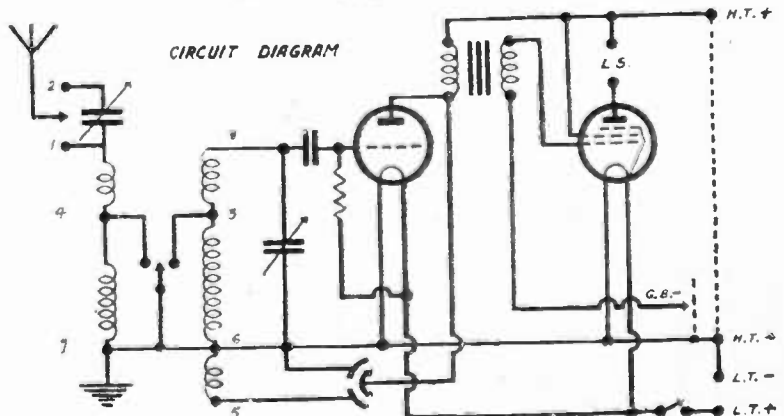
volt battery?" This is certainly the general impression, but one modern pentode at any rate is an exception. It is the Cossor, costing 20s. In the "Portapent" this remarkable valve works very successfully off 75 volts! We obtained the additional 15 volts in rather an ingenious way. Two 9-volt grid bias batteries were connected in series with the 60-volt H.T. battery and tucked in a spare corner of the cabinet, the last cell being used as grid bias.

The Case and Fittings.

The first part to construct is the cabinet or case. This is quite conventional, and details are given in Figs.

LIST OF COMPONENTS. "Hobbies" Portable Two.

- One .0005 mfd. Polar Compax tuning Condenser.
- One .0003 mfd. Polar differential reaction condenser.
- Two valve holders, one 4-pin and one 5-pin, Benjamin anti-micro.
- One Dario 3-1 small type transformer.
- One .0003 Telsn fixed condenser with grid leak clips.
- One 2-mg. Telsn grid leak. Wire for connections.
- One Lissen on-off filament switch.
- One three-point wave-change switch, Telsn, Lissen.
- One Telsn dual range aerial coil.
- One panel 4½ in. x 4½ in. x 7½ in. Baseboard, as per plan.
- Battery coils. One terminal mount.
- Two Clix terminals, aerial and earth.
- Four Clix waver plugs. Two Clix spade terminals.
- One detector valve, Cossor.
- One Cossor pentode valve, PT 230.
- Two 9-volt grid bias batteries, Lissen.
- One 2-volt L.T. accumulator, British Jelly-cell "Non-Spill."
- One loud-speaker unit, Ormond four pole.
- One Cone, 2½ in. deep by 10 in. diameter (not including mount.)
- One cabinet (with grilled front), "Byblurone."
- One leather carrying handle.
- One Lissen 60-volt H.T. battery.



The circuit diagram.

THE "PORTAPENT TWO"

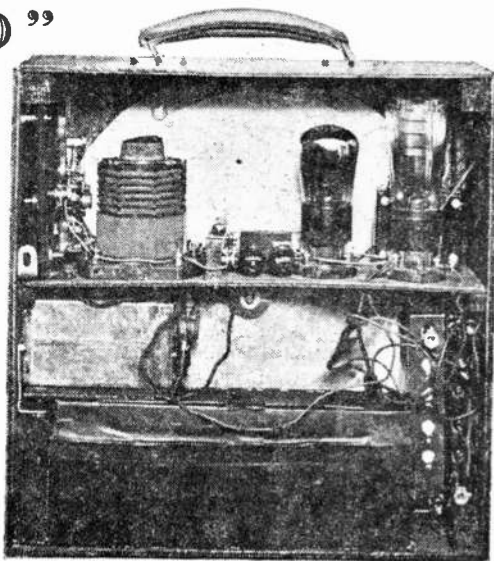
A self-contained two-valver you can carry loud-speaker volume for a moderate outlay.

Designed by "SPAGHETTI"

1 and 2. It is modelled on the lines of the usual loud-speaker case, and should have a grilled front with a centre bar to which the loud-speaker unit may be screwed. If you prefer, you may purchase one of the many excellent loud-speaker cases on the market. The one illustrated cost only 3s., but make sure the inside measurements are not less than those in Fig. 1. The case must be fitted with supports for the shelf, which acts as a baseboard, also the back should be hinged and drilled with a hole to pass the aerial and earth lead through. An oval piece is cut from one end, as in Fig. 2. This is in order to recess the controls, which are mounted on a small panel fitted with brackets to the end of the baseboard. Before inserting the panel and baseboard, the cone and speaker unit should be fitted. The unit is screwed to the centre of the grille, a hole being cut for the control knob to pass through. It is best to buy a good cone, ready for fixing. It should be 2½ in. deep and 10 in. diameter (about 1½ in. total diameter including mount.) It should be mounted as high as possible in the case. The leads should be connected to the unit and taken round the edge of the cone. Small wooden blocks should be glued to the inside walls and floor to keep the H.T. and G.B. batteries just clear of the cone. The accumulator should be mounted on a bracket, as in Fig. 1. It is a 20 a.h. British "Jelly-acid Non-spill" accumulator, measuring 1½ in. x 2½ in. x 4½ in. A point to watch is the height of the baseboard supports. This is rather critical, for if the baseboard is too high there will not be room to insert the pentode.

Mounting the Components.

This is perfectly simple if you use the HOBBIES Full Size Blue Print of this set, which you can obtain for 1s. from HOBBIES Blue Print Dept. The positions are clearly marked and should be strictly adhered to, as in so compact a layout there is no room to spare.



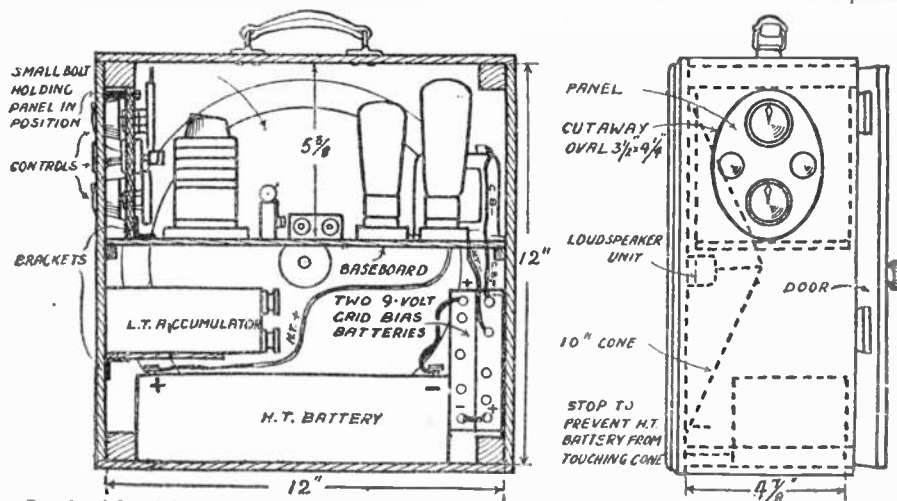
An interior photograph of the set showing the components.

The Wiring.

For the sake of clarity some of the wires are shown on the blue print as crossing the components and also infringing on the cone. In practice they should be taken round the components and kept within the confines of the panel. One or two holes will be necessary to let the battery leads pass through the baseboard. As the space between the panel and coil is rather small, the wiring of this should be carried out before the panel and baseboard are fixed rigidly together. Then the whole should be slid into position in the case and the bolts holding the brackets tightened up. Leaving these bolts loose also facilitates the insertion of the panel.

The wiring of the batteries is somewhat unusual, but we will explain as clearly as possible. The L.T. connections are quite normal, as is the connection to H.T. positive. The negative socket on the H.T. battery, however, is connected to the positive of one of the G.B. bat-

teries. The negative socket of this G.B. battery is then joined to the positive of the other G.B. battery, so that all three are thus in series. The G.B. negative lead from the set is now plugged into the negative socket of the second G.B. battery and the H.T. negative lead is plugged into the next socket to it so that there is 1½ volts difference between them (see Fig. 1). There is no G.B. positive lead. It will be seen that by this arrangement the cells of the grid bias battery, which normally are idle, are used to supplement the H.T.



Figs. 1 and 2.—A front and side view giving details of the construction of the case and the layout of the components.

HOW TO SHARPEN A PAIR OF SCISSORS

By W. S. Rogers

Some useful hints on grinding
and adjusting scissors

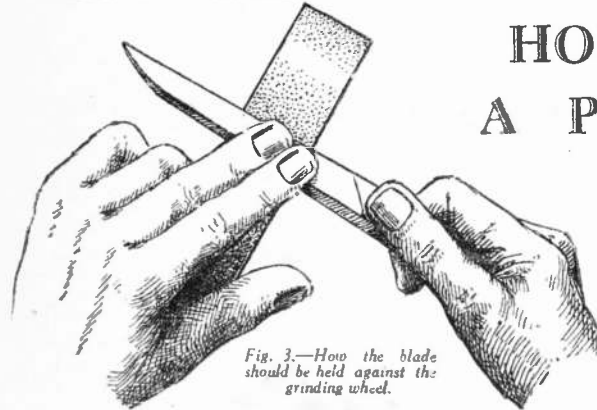


Fig. 3.—How the blade should be held against the grinding wheel.

THE cutting action of a pair of scissors is what is termed "shearing," and in order that this action should be effective the edges of the two blades must pass each other in close contact from end to end of the cutting. To ensure this the blades are slightly hollowed and curved towards each other, so that when nearly half open they appear in side view as in Fig. 1. The pivot at the base of the blade should hold them together closely.

Scissors become blunt usually owing to the pivot becoming loose, in consequence of which the blades wear each other away at the cutting edges, so that in time the two extreme edges fail to meet closely.

Fig. 2 shows an enlarged section of a blade that has become worn in this way, the black dotted lines indicating the original section.

Restoring the Cutting Edge.

To sharpen, therefore, the curved faces of the blades must be ground until the cutting edge is restored to its original condition. This is best done with an emery wheel (or carborundum), and must be done with a clean run from end to end of the blade. (See white dotted line.)

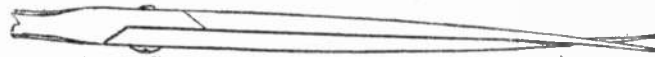


Fig. 1.—The pivot at the base of the blade should hold them together.

Separate the blades by removing the pivot and treat each one similarly. Fig. 3 shows how the blade should be held in the right hand and pressed against the wheel with two fingers of the left hand.

Unless the scissors have been badly treated so as to become notched on the arris A, Fig. 2, there is no need to grind that edge.

Hollow Grinding.

When ground to your satisfaction connect the blades again, screwing home the pivot till they meet on their cutting edges and work together smoothly and with some pressure, which can be felt with the fingers. Then rivet over the end of the pivot screw slightly to prevent its slacking back.

The hollow grinding of the blades must be done by keeping them moving over the wheel with a steady movement from end to end.

If no emery or carborundum wheel be available, a wooden disc covered with emery cloth glued on its face mounted in the lathe will serve for the grinding, in which case it is well to work with two grades, a coarse one first and a finer one for the finishing.



Fig. 2.—An enlarged section of a worn blade.

MOST picturesque, long lasting and substantial small buildings can be made with heather or bracken. Heather lasts the longer. The method is to make hurdles of wire netting, and on them pile the heather or bracken so that when pressed down tightly it is about 6in. thick. Other hurdles are then placed on the top of the material and fastened to the hurdles beneath with bolts. It is, also, with bolts, that the hurdles are made fast to the framework of the houses. When a couple of hurdles have been made and fastened together with the bracken or heather between them they are referred to as mattresses. Of course, they vary in size in accordance with the houses. The rule is, if a house is oblong and, say, 18ft. in length, to make two for each side, one for one end, and two for the other end. The latter two are put on hinges and serve the purpose of doors. Provided the wire netting is of good quality and heavily galvanized, it will last for ten years or longer.

Similar hurdles can be made for the roof, but in this case the bracken or heather should be arranged layer by

INEXPENSIVE AND EASILY-MADE SHEDS

layer and with the root ends pointing upwards. The hurdles, moreover, should be from 6in. to 6in. thicker than those intended for the sides. Or, if it is preferred, the houses can be thatched in the usual way. But this will mean the employing of a professional thatcher, and the roof will not last any the longer, if so long, and will not look any the more picturesque. Besides, the wire netting, if of half-inch or inch mesh, prevents the birds from damaging the roof.

If made of bracken, it is necessary to pull the houses to pieces and renew the bracken every three years, and if made of heather every five years. The houses should be paved with concrete; it is cheap, almost everlasting, and simple to make and put down. In this case the houses are rat-proof if the wire netting is of inch mesh, and both rat and mice-proof if of half-inch mesh. Mice will get through an inch mesh. A garage of wood, 18ft. by 12ft., cannot be built at a much less cost than £25, and to build it at this price means a search for inexpensive materials and hard bargaining. One of heather or bracken of the same size should not cost a penny more than £10.



A JACOBEOAN STOOL

HERE is a handy little stool in the Jacobean style, with padded top of leatherette or tapestry. The set of four legs

(No. 507) may be purchased from Hobbies for 3s., or post free, 3s. 9d. The stool is very simple in construction and should be made up in oak. It can be completed by any amateur possessing such tools as an ordinary small handsaw or tenon saw, a chisel, a brace and twist drill, a plane and a fretsaw.

Leg Work.

The height of the stool to the wooden top is 12½ in., and the top measures 11 in. square. Attention should first be paid to the legs in preparing them for the cross rails. All four are laid side by side on the bench or table, with a piece of wood at the bulb end to hold them level.

Then a distance of 12 in. is marked off at the other end of the legs and a line drawn across, with the try square. By doing this the stool will stand perfectly level. Now take each leg separately and set out the open

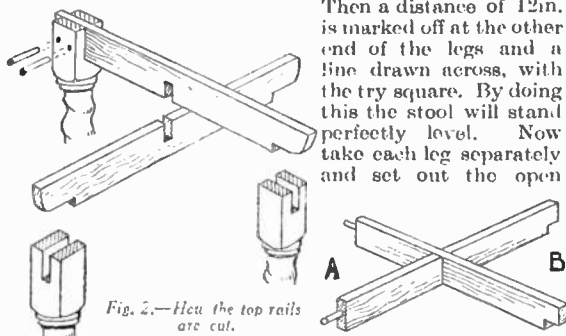


Fig. 2.—How the top rails are cut.

mortise to receive the cross rails. A detail of this mortise is shown in Fig. 2, its length being 1 in. and its width ¾ in.

Draw the lines of the mortise across the end of the leg and then saw down and clear away the interior wood with the chisel. Clean the bottom of the mortise well so that the rails bed properly, and in the cutting down of the sides, keep the saw on the inside of the pencilled line. This will ensure a tight fit when the rail is driven in. Treat each leg like this to make it ready for the rails to be fitted.

The Frame.

The two top rails measure 13 in. long by 1½ in. deep by ¾ in. thick, and are shouldered and shaped at the ends with the fretsaw (Figs. 1 and 2). The rails are reduced in width at the ends to 1 in. so they fit into the open mortises in the legs and are there afterwards pinned with two dowel pins each end.

The half-cut-through slots in the middle of the rails

must be carefully cut so that when they are finally glued together the tops will be quite level and ready to receive the top of the stool.

The lower cross rails are halved together in the middle in a similar manner. There are two methods of fixing to the legs, and at A Fig. 3 is shown the ordinary dowelled joint, while at B is shown the tenon and mortise joint. The latter gives greater strength and rigidity. If the rails are dowelled their length will be 9 in., but if tenoned, their length will be 10½ in. A ¾ in. tenon will be allowed for at each end. The width of these rails is 1½ in. and their thickness ¾ in. Run holes ¾ in. deep into the ends of the rails and drive in ¾ in. diam. hardwood dowels. Then drill the holes into the square portions of the legs after marking the positions and squaring them across. These holes should just exceed ¾ in. in depth.

In assembling, each pair of legs should have the lower rails dowelled into them, then these rails may be put together and the halvings glued. Finally, the two top rails should have their halvings glued together and the ends then driven into the mortises in the tops of the legs. The dowel pins should be marked out and the holes bored for them, and the pins driven in before the glue of the tenons has set hard.

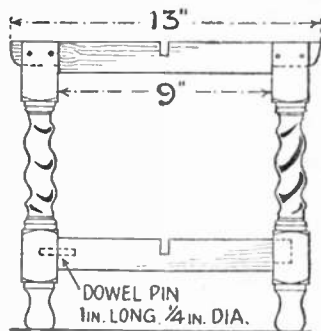


Fig. 1.—A side view with fixing details.

The Top.

This is a 11 in. square piece of ¾ in. wood. Draw diagonals and bore countersunk holes for the screws into the cross rails. Plane away the sharp edges of the top before the padding is added. First nail the covering material to the underside of one of the edges of the top with broad-headed tacks, then bring it up over the horsehair stuffing and tack it to this side underneath.

Finally, the four edges of the stool should be finished round with brass-headed nails (see Fig. 5). The woodwork may be stained to the depth required with Hobbies oak stain and finished with Lightning Polish, or the legs and the rails may simply be brushed over with clear varnish on top of the stain.

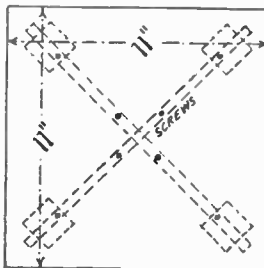


Fig. 4.—A plan of the top with position of legs and cross-rails.

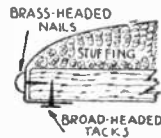
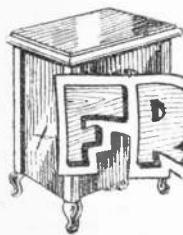


Fig. 5.—A section through the stuffed top.



For the FRETWORKER A CLOCK-CASE

A STRIKING little hanging clock suitable for any room in the house can easily be made from the patterns printed this week in the centre pages. A picture of the finished article is given herewith, and the only tools required are the usual fretwork set. Wood $\frac{3}{8}$ in. in thickness is used—with the exception of a single $\frac{1}{4}$ in. overlay—and almost any common fretwood is suitable. To save the worker trouble, a parcel is made up by Hobbies Ltd., consisting of mahogany for the main work and a piece of whitewood for the overlay as a contrast. Moreover, a clock which just fits in the case shown is obtainable from the same source as the wood. The patterns themselves are quite clear

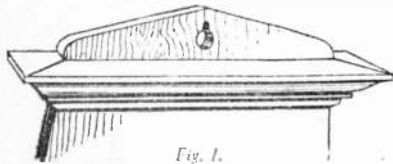


Fig. 1.

in outline, and there is really no need to paste them down to the wood. Trace off the parts which are shown full size, and measure up the other pieces drawn to scale. The overlay is shown in solid black in its actual position on the back. It must, however, be taken away from the back itself as a pattern and pasted down to a piece of thinner wood. The back only has the two interior frets—the large opening for the back of the clock, and the small hole at the top by which to hang the article.

Saving the Patterns.

The clock-case itself is held in a projecting cabinet surrounding the barrel movement. This is made up as a hollow framework of two sides, a top and bottom, which are glued to the back and screwed on from behind for additional strength. If the shape of the parts is marked direct on to the wood, it saves the trouble of cleaning off the paper remains, and at the same time leaves the printed patterns still in hand to study up where the various dotted lines are shown. If the patterns, however, are pasted to the wood, the position of the various adjoining parts must be indicated by

pricking a hole before the paper remains are cleaned off. The only addition to the back, beyond the overlay, is a length of No. 303 moulding which is glued up its narrow edge. The ends are mitred, and to turn them round another short piece of moulding is fitted on (see Fig. 1).

The clock-case itself is shown in detail at Fig. 2.

The two sides of the case are alike, a floor is added beneath them, and the top put above. The back edge of all four parts is flush, and the inside corners can be strengthened up with small blocking pieces.

The floor projects beyond the sides and the front edge very slightly, whilst the top overlaps $\frac{1}{4}$ in. to allow for the No. 303 moulding to be glued up beneath.

The Clock-Case.

Down the centre of the box frame is a partition which holds the metal barrel of the clock movement. This partition is set $\frac{1}{4}$ in. from the front edge of the sides, and, like the other parts, can be strengthened with blocks. The front of the clock is a plain piece with a central circle cut from it just large enough to take the barrel of the clock itself. Notice which edge is at the top in the pattern, because this will bring the circular opening in line with the other two behind it. The box can be made up in this sequence and completed before it is glued and screwed to the back itself. It is set midway between the edges and $\frac{1}{4}$ in. upwards from the lowermost point of the back.

As mentioned, the underside of the box frame is decorated with some No. 303 moulding, glued with its longest side beneath the top. An ornamental bracket—shown solid black on the patterns—is put central under the box frame to help to strengthen the shelf.

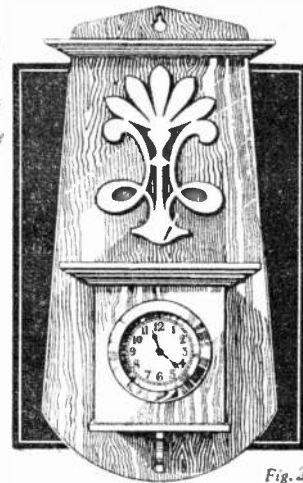


Fig. 2.

TWO COMPETITION RESULTS

MUCH interest was shown in the recent Crossword Puzzle for members of Hobbies League, and there were several who managed to get it correct. The winner was drawn for, and turned out to be G. Morrison (No. 2297), of Clifton Road, Aberdeen. His prize, the A. I. Fret-machine, value 50s., has been dispatched. For those who entered and did not win, we show the correct solution. Many entrants showed No. 1 as FASCIAS and No. 23 as REJOINT, but otherwise the majority were correct.



READERS from all over the world took part in the Overseas Competition in the issue of September last year. The contest, however, did not close until the beginning of this year, and the placing of the most popular article naturally took a good deal of careful sifting. The four prizewinners were G. C. Newton, of Mayfield, New South Wales; Chia Kwi Lim, of Buloh Kasap, Johore; U Chit Po, Kyatpyin P.O., Upper Burma, and L. Barubas, Pietermaritzburg, South Africa.

No. 1897

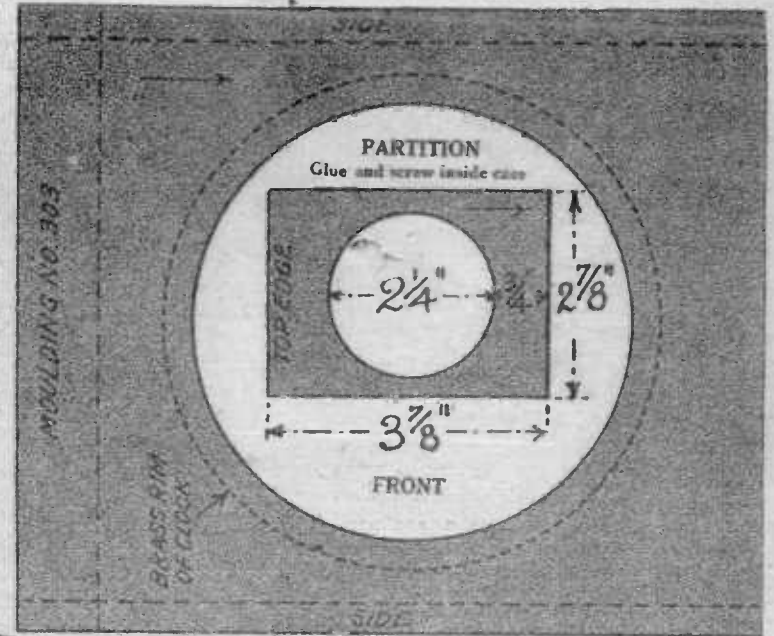
Hobbies DESIGN

For instructions on making see page 548.

A HANGING CLOCK

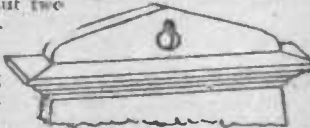
Cut the main parts in mahogany $\frac{1}{2}$ in. thick, and the fretted overlay in $\frac{1}{2}$ in. whitewood. The clock case is built from the main back and fancy moulding (No. 303) put round the top. Dotted lines on the patterns indicate exactly where other parts join on.

Good quality mahogany and whitewood, with a length of moulding, is supplied in the required sizes and thicknesses for 1s. 5d., postage 4d. A suitable and visible 30-hour clock movement (No. 5502) costs 7s., or a cheaper one at 3s. 3d. Postage is 3d. extra on either, but only 6d. on wood and clock together.

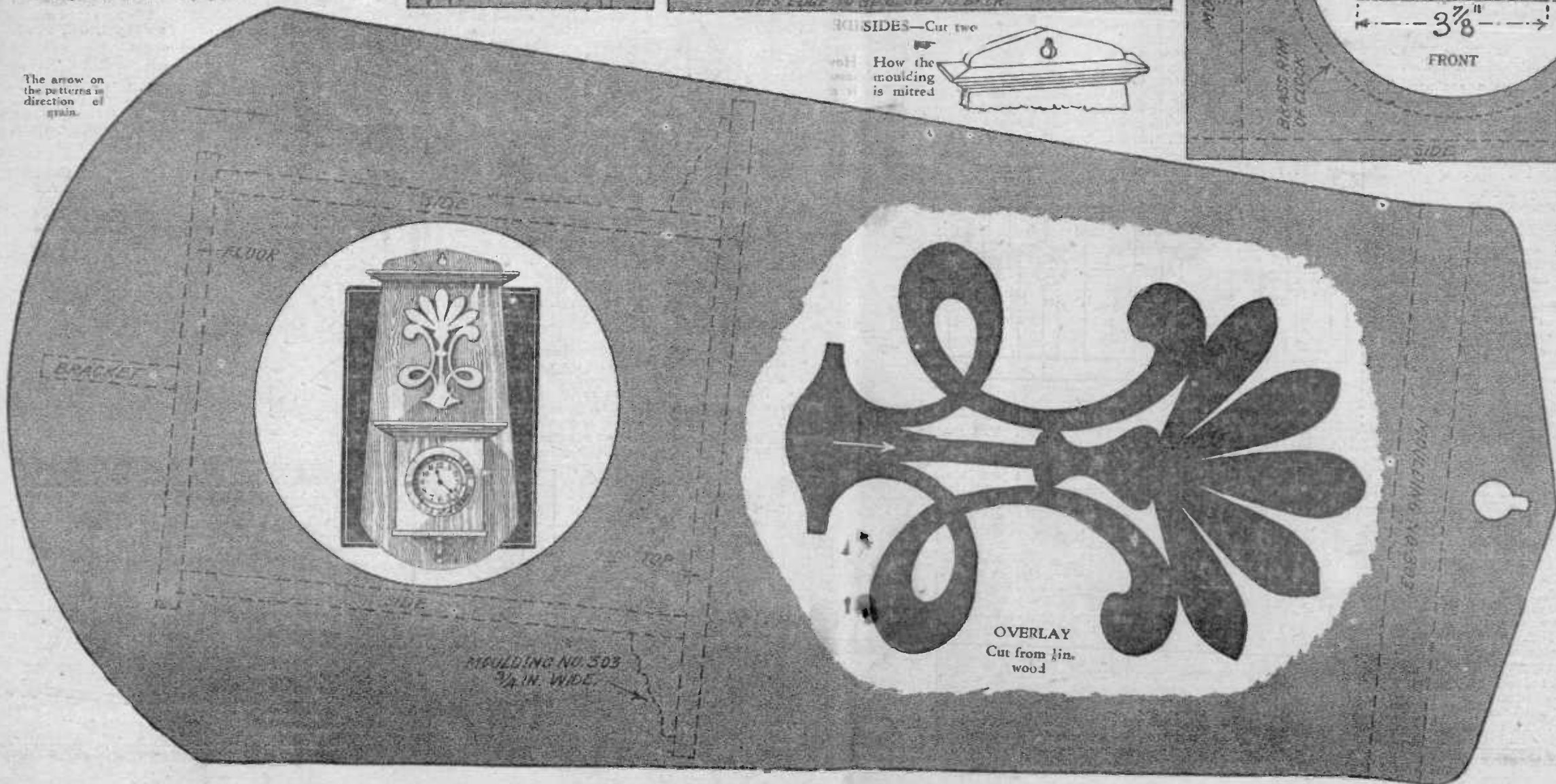


ALL SIDES—Cut two

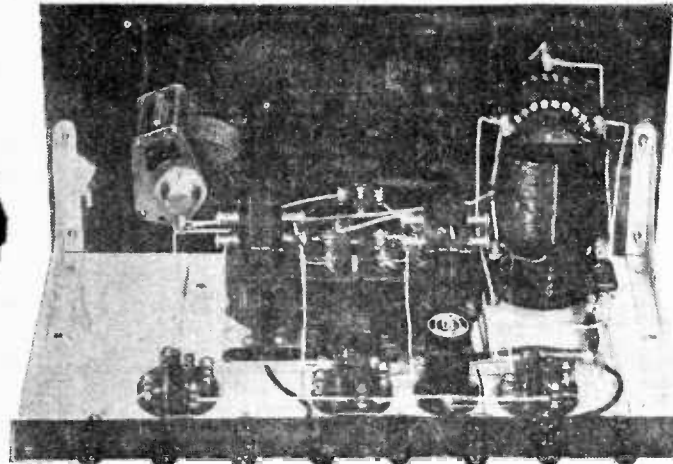
How the moulding is mitred



The arrow on the patterns in direction of grain.



OVERLAY
Cut from $\frac{1}{2}$ in. wood



An internal view of the powerful three-valver.

THIS Three-Valver employs a commercial Dual-Range Tuning Unit of rather unusual design. The more orthodox type of Dual-Range coil requires a separate condenser for reaction control

LIST OF COMPONENTS

- One British General Tuning Unit.
- One .0005 variable condenser (Ormond).
- Two Ormond L.F. Transformers.
- One H.F. choke (Telsen).
- Two .0002 fixed condensers (Ormond).
- One .5 mfd. fixed condenser (T.C.C.).
- One 2 mfd. fixed condenser (T.C.C.).
- One "on-off" switch (Ormond).
- One 2-megohm grid leak and holder (Lissen Telsen, etc.).
- Three valve-holders (Ormond).
- One Spaghetti resistance 20,000 (Lissen).
- One Spaghetti resistance 10,000 (Lissen).
- Eight terminals (Belling-Lee).
- Ebonite panel, 15in. x 7in. (Resiston).
- Wooden baseboard, 15in. x 9in.
- Cameo Cabinet.
- Cossor Valves, Det., L.F.210, and 220P.
- Ormond Speaker, balanced armature.

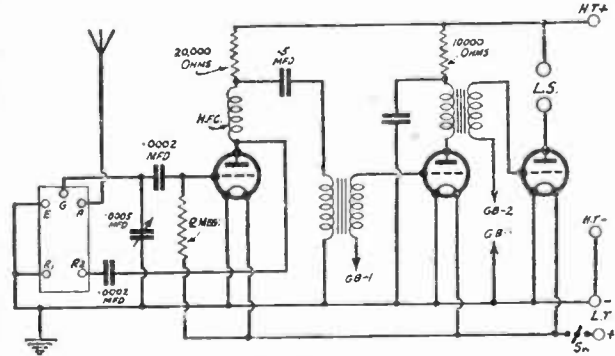
purposes, but in this unit (which is made by the British General Manufacturing Co.) the reaction control is incorporated. A glance at the wiring diagram will show that the circuit arrangements include a parallel-fed transformer which not only enables the maximum inductance of the primary to be used (owing to the D.C. component being eliminated), but by its decoupling effect enables a common H.T. source to be used. The next point of interest is the decoupling of the first L.F. valve. The value of the decoupling resistance used here will suit the ordinary two-volt valve if used with a H.T. battery of 120-150 volts. It may require modification if used with different types of valves.

Obtain the complete list of components before commencing the construction, in order that the baseboard may be arranged before screwing down. This avoids cramping or overcrowding, and will enable the lay-out of the components to be

A POWERFUL THREE-VALVER EASY TO MAKE AND SIMPLE TO OPERATE

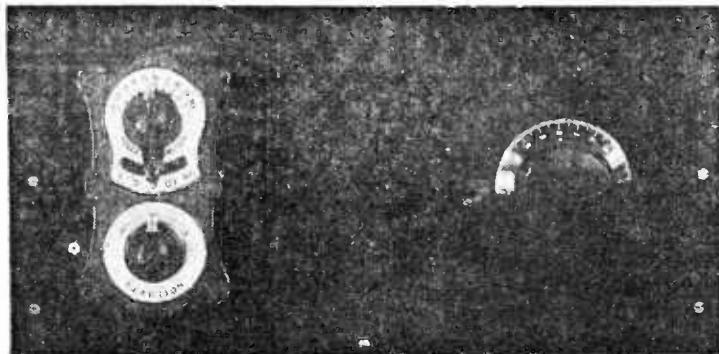
faithfully followed, and the wiring will be found easier. Drill the panel as shown, the template supplied with the unit being used to get the correct spacing of the control holes. Any type of tuning condenser may be used, provided it is of the correct capacity, and some form of slow-motion control is advisable. There are a number of different makes on the market now which may be used here. Carry out the wiring of the set, paying particular attention to the two Spaghetti resistances. Do not get these in the

wrong positions. Use the Cossor valves listed on this page. Having completed the wiring, you can test out the receiver. In the first valve-holder (that is the detector valve-holder nearest the aerial terminal) use the Cossor Detector valve. In the next holder use the Cossor



THEORETICAL CIRCUIT

L.F. valve, and in the last holder the small power type of valve (the Cossor 220P). The H.T. battery may be made up from two standard 60 volt units, or in any other manner to get the required 120-150 volts. The higher voltage will enable you to get louder signals without distortion. The grid bias



You can easily mark out the panel by inspecting this illustration.

ENAMELLING THAT BIKE

MAKE YOUR BICYCLE LOOK AS GOOD AS NEW

By A. N. Gaunt

Now is the time to get your bicycle out of "dry dock" and give it a thorough overhaul.



Fig. 1.—The frame should be cleaned with turpentine before commencing the enamelling.

"baked" in an oven between the coating operations. Such a method, of course, is entirely beyond the average cyclist.

Enamelling the Frame.

But although the hardness and smoothness of the stove finish cannot be exactly equalled by the amateur, it is possible to approach it very closely. A knowledge of the best methods, coupled with systematic and careful working, helps very greatly. To obtain tip-top results, it is always necessary to strip the machine—not only because a stripped frame makes for easier working, but also because this enables it to be hung up during the enamelling. The frame can then be easily turned round, and there is much greater surety that no small corners are overlooked. Small unenamelled parts prepare the way for flaking and chipping at a later date; therefore, any idea which promotes the avoidance of the fault is worth pursuing.

It is possible to produce a passable finish by enamelling over the old surface, first smoothing it with emery paper and pumice stone. But to approach the real stove-on finish, the old enamel should be removed and the new coats applied to the bare steel. The task of removing the old enamel can be very greatly simplified with the help of a little potash. If (say) a pennyworth of this is dissolved in a cupful of water, and the liquid then rubbed over the frame,

the old coats will be softened sufficiently for them to be scraped off with an old knife. The bare steel should next be cleaned with turpentine, see Fig. 1, well wiped, and smoothed with emery cloth.

The Best Enamels.

Cellulose enamels are best, and it is a fallacy to believe that this kind cannot be removed from the hands without difficulty. A drop or two of liquid metal-polish will remove any spots almost instantly. It is by no means necessary to restrict the colour to black. The tendency to-day is to use bright enamels, and thus enhance the appearance of the mount. Enamelling should be done with a soft brush, see Fig. 2. A stiff-haired one is liable to produce lines.

The work should also be undertaken indoors, in a warm room free from dust. A running edge of enamel is not essential—indeed, the thinner the coat (within reason) the smoother it is likely to be, and it is unwise to keep the brush more than moderately full. Before the frame is left to dry (still in a warm and dustless position) take care to wipe away any enamel that has found its way to the threads which take the bearing-cups at the steering-head and bottom-bracket, see Fig. 3. To foster quick drying to a hard,

smooth finish, a good plan is to sling the frame up near the ceiling in the kitchen, where it will receive warm currents of air.

When the first coat has thoroughly hardened (at least a day later), the second application of enamel should be preceded by a rubbing-down with very fine emery paper. Finishing the frame of the bike with transfers adds to its appearance.

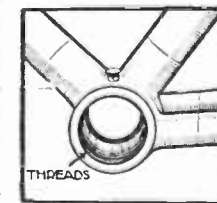


Fig. 3.—Wipe the bearings and brackets free from enamel before leaving the bike to dry.

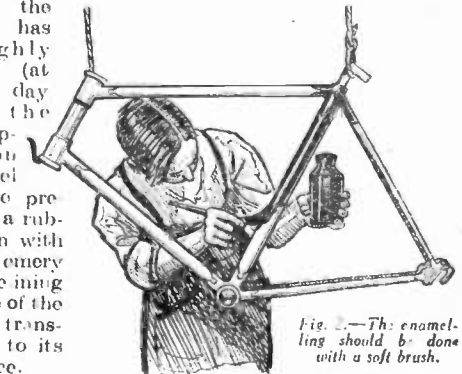


Fig. 2.—The enamelling should be done with a soft brush.

battery should be chosen so that the correct value of bias may be applied to the L.F. valves, the valve-maker's instructions being carefully followed in this respect.

The Loud-speaker.

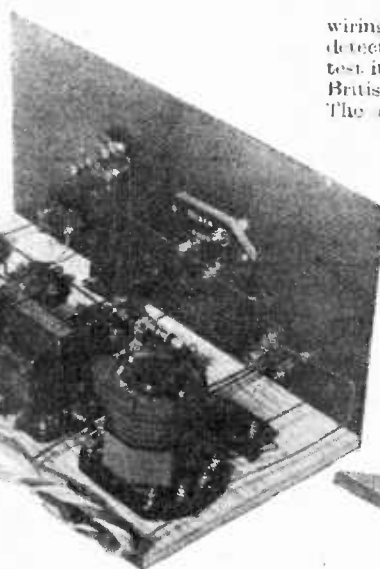
Use a good balanced armature type of loud-speaker for best quality results, although the ordinary cone type of speaker will give good results. If the speaker is of the boxed-in type and gives results which are on the "boomy" side, or you think the signals are rather too much on the bass side, an improvement can be effected by increasing the size of the condenser feeding the transformer. The

value given (namely .5 mfd.) is the best suited to the particular transformer to give a slight resonance in the bass register. A value of 2 mfd. will give a straighter curve, but unless a good moving-coil speaker is used the bass notes may not be heard enough to suit some listeners.

With a standard aerial it should be possible to hear at least a dozen stations (home and foreign) on both wave-bands, such stations as Hilversum, Radio-Paris, and other high-powered Continental stations being received at quite good loud-speaker strength in most parts of the country.

OUR TESTS OF THE TELSEN VICTOR THREE

It is certainly a remarkable modern achievement in radio manufacture that a complete kit of parts (excluding, of course, valves, loud speaker, and



An internal view of the Telsen Victor Three—a clean, neat and efficient set.

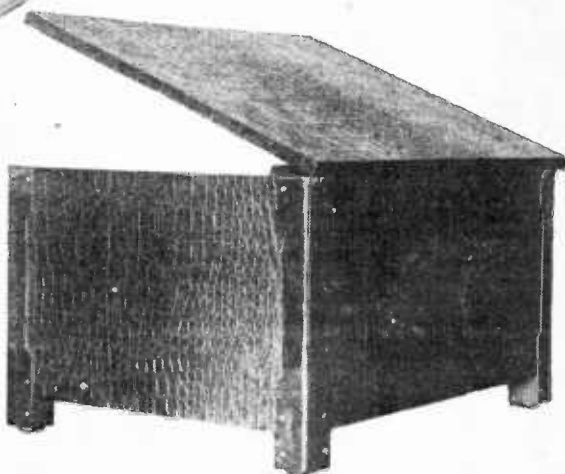
batteries), can be marketed for the low sum of 39s. 6d. It is all the more remarkable to find that the quality has not suffered; both the appearance of the set and the reproduction obtained from it being of a very high order. The set itself is shown in the photograph above, which indicates how easy it is for any amateur to erect the set. In point of fact, it takes about two hours to do so, and it is extremely simple to operate. There is one variable tuning condenser, and one reaction knob for adjusting volume. You need no knowledge of wireless at all to make the set, which is a simple, straight three-valve receiver. The components being of one make are matched, and the kit includes a silver oxidized panel, baseboard, screws, wire, battery cord, terminals, and all of the components seen in the photograph above. The panel is already drilled, and all connections are clearly shown on the blue print supplied with the kit, together with full constructional details and a point-to-point

wiring chart. The circuit is, of course, the popular detector and two low-frequency arrangement. Under test in London we found that it brought in many of the British stations, and a goodly proportion of the foreigners. The set incorporates the Telsen Variable selectivity Aerial Coil, which enables the set to be adjusted for best reception according to local conditions, and it also prevents valve overload caused by neighbouring transmissions which on other sets frequently gives rise to distortion.

Another simple device eliminates the interference of medium-wave stations.

Messrs. J. J. Eastick & Sons have put up a special set of parts for making one of their "Bydharone" cabinets to suit it. These cabinets, as will be seen from the illustration below, are covered in imitation crocodile leather. It takes less than ten minutes to erect the cabinet.

F. J. C.

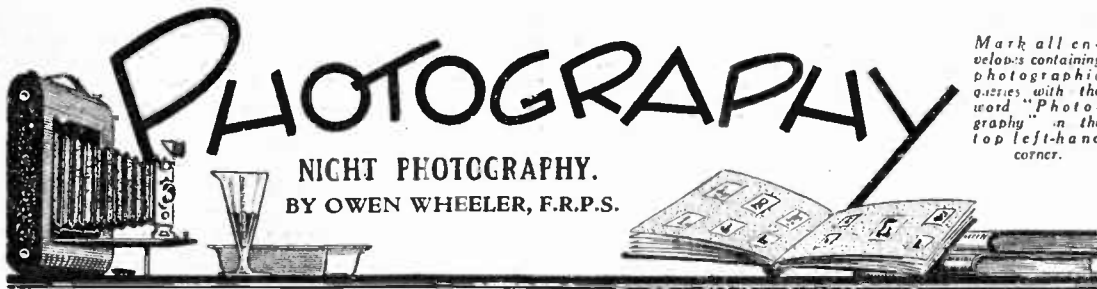


The splendid "Bydharone" cabinet for the Telsen Victor Three, which any amateur can erect. It is supplied by J. J. Eastick & Sons.

OUR WIRELESS BLUE PRINT SERVICE

You can now obtain the following blue print wiring diagrams from the Publisher, HOBBIES, George Newnes, Ltd., 5-11, Southampton Street, Strand, W.C.2. Other blue prints are in preparation.

Blue Print No. 1. "Hobbies" Crystal Set	Post Free.	6d.	Blue Print No. 5. "Hobbies" Long Distance Four Valver	Post Free.	1/-
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Blue Print No. 4. "Hobbies" Round-the-World-Three	1/-		Blue Print No. 8. "Hobbies" Portapent Two	1/-	



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

EVERYONE who calls himself a photographer ought to have a shot at night photography, and, if he hits the mark, there is quite a good chance that he may make a hobby of it. Technically speaking, it is not really difficult when one has mastered two or three peculiarities, and, if you are anything of an artist, there are wonderful pictures to be made with the help of even ordinary street lighting, to say nothing of special opportunities in the way of "flood-light" and other extraordinary illumination. I am not touching that part of the subject, but am just giving a few hints on the technical side, and illustrating them by a very simple example.

Equipment.

With special lenses and ultra-rapid plates it is possible to take instantaneous night photographs where the lighting is particularly brilliant, but the average worker dealing with the average night subject must reckon to count his exposure in minutes rather than in small fractions of a second. Consequently he will need a tripod, and the firmer it is the better. Film, and more particularly the new Verichromo film, can be used, but I personally prefer backed plates, my favourite brand being the Imperial Special Rapid Ortho. The accompanying photograph of a grocer's shop-window was taken on a plate of that make, the lens being a 6in. Wray Lustrar $f/6.3$, stopped to $f/11$. I mention this because some people seem to think that a much larger aperture than this is almost essential for night photography. The exposure I gave was about 6 minutes, and the negative, which I developed with Rytol, is quite good. I used an old half-plate, square-form camera on a stout stand and took no notice of passing cars and pedestrians, neither of which lingered long enough to make any appreciable difference, although I fancy one car did leave a slight streak of light on my plate. At any rate, the streak is there, and I cannot see how it could have happened otherwise. The detail in the negative—much of it has, of course, disappeared in the block—is excellent, the labels on most of the cheeses, etc.,

being plainly legible with a magnifying-glass. The more powerful electric lights naturally show some halation, but nothing to what there would have been if an unbacked plate had been used.

Focusing.

Before setting out it is as well to have an idea of your camera extension at infinity, with the lens you are going to use, as you will probably find it well to spend as little time as possible in focusing. Bystanders and passers-by are apt to pass remarks, or even play tricks, on the nocturnal photographer, and with his head under the focusing cloth he is at a disadvantage! A focusing magnifier is very desirable, and so, when the time comes for stopping down, use a torch, as without it you may make a hopeless muddle of your aperture. If it is a dirty night—and some very fine night photography has been done in the rain—a waterproof focusing cloth, or a friend with a big umbrella, is a necessity.

Exposure.

It is no sort of use trying to make rules about exposure at night. Experience is the only safe guide, but, after a few trials with different kinds of lighting, one should make few mistakes.

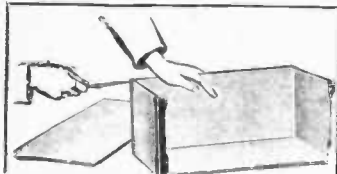


A good example of night photography.

The shop-window illustrated was pretty correctly exposed, but there are many night subjects for which 6 or 7 minutes at $f/11$ would be barely half enough. As a rule, the exposure should be kept within about that time, if possible, where there is traffic, and, if it cannot be done at $f/11$, one must get what detail and depth one can at $f/8$. Of course, if you are photographing from a window, or are otherwise not likely to be "moved on" or interrupted, it does not matter much how long you give, and you can cap and uncap your lens half a dozen times if cars or people get in the way. The chief trouble about night exposures, especially where you want to get detail in the lights as well as, to some extent, in the shadows, is the practical certainty that parts of the picture will be considerably over or under exposed, however careful you are. This is shown in

(Continued on page 556.)

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 "LISTENER 3,"
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NIGHT PHOTOGRAPHY (continued from page 554).

the illustration, where everything but the windows and door is "overdone" and comes out in the negative as almost clear glass. In such cases you must compromise, or help to correct the balance by some such printing dodge as I shall mention presently.

Precautions.

It goes without saying that a clean, dry lens is necessary, even more necessary than in daylight photography, since a smear, or the moisture of a damp evening collecting on the glass, may appreciably affect the quality of a negative in which the shadow detail, if there is any, is generally very delicate. Care must be taken, too, not to let the light from any near-by lamp shine into the lens, the latter being shielded just as it would have to be if one were photographing by daytime "against the sun." You must expect some halation if there are any very powerful lamps actually in the picture, but a wool-backed plate reduces it greatly, and a little of it is rather natural than otherwise.

Experts in night photography seem to lean to slow development with a dilute solution, but, if the exposure is fairly right, the normal strength of a good all-round

clean-working developer such as Rytol should give you all there is to be got without lingering delay, and without bringing up the high lights too strongly. A desensitiser is useful, as it enables development to be watched by ordinary candle-light and checked at just the right moment.

In the case of the illustration, while there is a sufficiency of shadow detail visible in the negative, almost all of it prints out if the exposure is long enough to bring out the objects in the lighted windows satisfactorily. A distinct improvement was effected in the following simple fashion. A print on bromide paper was made in the ordinary way and the windows cut out with a sharp knife. The mask thus formed was held in front of the negative while the latter was exposed, with bromide paper behind it, to an electric lamp for six seconds. The mask was then dispensed with and a supplemental exposure made for three seconds only. This meant that the window got nine seconds and the rest only three. Still more detail in the shadows was obtainable by shortening the supplemental exposure, but the result then looked too much like a daylight photograph to be effective.

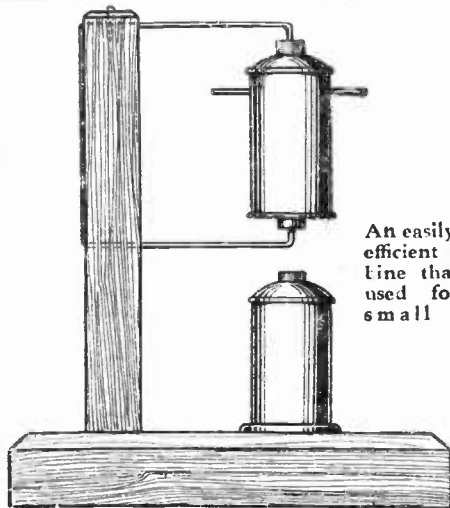


Fig. 1.—A side view of the steam turbine.

QUITE recently the inventor of the great turbine engine known under the name of Parson's Marine Turbine, declared that his invention was not really new, for the idea was known in Egypt some 3,000 years ago.

Of course, such an ancient model was very simple indeed, and something like its simplicity is involved in the model illustrated. Any boy can make it quite easily, for it is made from resourceful material.

The base should be made of some hard wood measuring 7 in. by 4 in. by 1 in., and the edge is chamfered to give a neat appearance. Into this base must be fixed a stout post or support. To secure it strongly, make a mortice and tenon joint, with a small shoulder to give rigidity. The support should be 1 in. by 3/4 in., but its length is dependent upon the size of the boiler and lamp used.

The Boiler.

The most satisfactory boiler and lamp is made from a brasso tin; the small size is quite suitable. The one for the lamp must have its perforated cap extracted, and then it can be filled with cotton wool to hold the

An easily made and efficient steam turbine that can be used for criving small models.

A SIMPLE STEAM TURBINE By "Schemer"

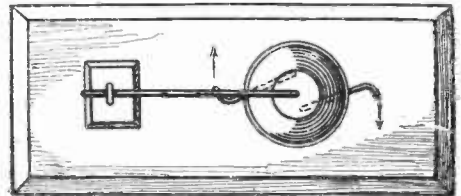
methylated spirit. The motor or turbine has to spin or revolve about its own axis, and to strengthen the points of suspension two small conical dishes are soldered on, one on the cap and one underneath; these must be fixed centrally and in alignment with the vertical centre of the boiler. Note that the cap can still be unscrewed with its added conical inverted head to permit of refilling of water for boiling. Next comes the fixing of the jets. As will be seen from the plan of the turbine, they are really placed facing the same way but on either side of the boiler, and they look opposite to one another. After a little consideration you will notice they are helping each other to go one way round. The jets are made from small gauge copper tube and soldered into position.

The Boiler Support.

A stout wire support is now bent to shape to carry the boiler. A saw cut in the head of the support is made to guide the top centre, and this is secured by a staple, as shown in Figs. 1 and 2. The depth of the vertical section of the wire is determined by the length or height of the boiler, and the bottom centre passes through the support by a tight fitting hole. The two centres having already been pointed, are bent up and down, respectively, so as to fit into their conical centre washers at the top and bottom.

All you have to do now is to unscrew cap of boiler, fill it half full with water, screw up again, light the lamp and await results. The turbine will soon start to revolve. The principle involved is due to reaction; what really happens is that the steam in both jets plays on the air as it rushes out, the air offers a resistance, so the boiler, due to its central suspension, rotates backwards. This is called a reactionary turbine.

Fig. 2.—A plan view of the turbine showing the direction in which the boiler is rotated.



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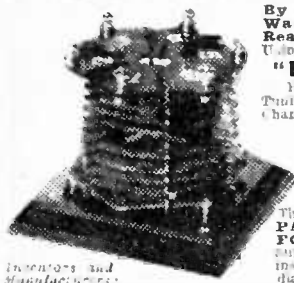
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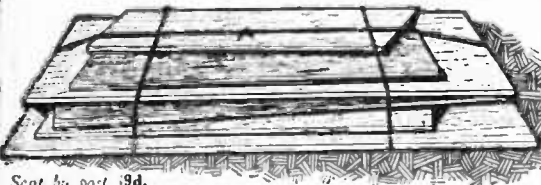
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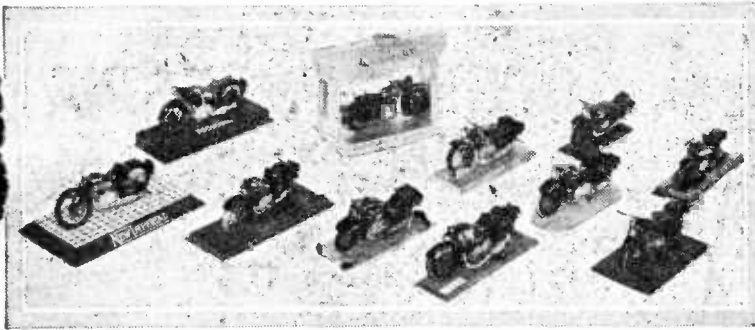
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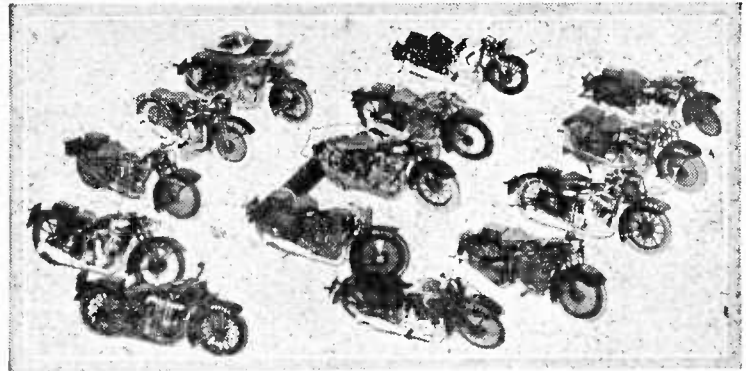
SOME OF THE PRIZE-WINNING "NEW IMPERIAL" MODELS

Some idea of the great amount of detail work of the competitors in our recent competition can be realised by looking at these two photographs.

"NEW IMPERIAL" CONSOLATION PRIZEWINNERS

(Concluded from p. 535, Feb. 20 issue.)

A. Chester, 74, Southlands Rd., Rodwell, Weymouth, Dorset; L. Godfrey, 23a, Lenham Rd., Thornton Heath, Surrey; S. Green, 9, Quarry Rd., Pontypridd, S. Wales; W. Burch, 27, Beckton Rd., Canning Town, London; E. Dutilor, 29, Rue Germiny, Quebec; F. Tarr, Rushford Mills, Chagford, Devon; S. Johnson, 2, Elmswood Rd., Egremont, Walsley, Cheshire; C. Hitchens, 2, Waterside Cottages, Churchfields, Salisbury, Wilts; J. Cresswell, 7, Greave St., Ripley, Derby; N. Davies, 52, Bonvilston Rd., Coedpenmaen, Pontypridd; George Cooper, 2, Chapel Court, Green Street, Aberdare; John P. Lehard, Cae Canol, Beddgelert, N. Wales; T. H.H., 1, Boat House Yard, Cleham, Shrewsbury; A. Williams, 3, Woodcote Hall, Epsom.



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	E	13	C	14	I		
15	E			V		17	
		18		E		F	19
21	O	A	H		A		
23		L			M		
25		I			I		

- GLUES.
- Across.
- Short for April.
 - One who pries.
 - Royal Artillery (abbr.).
 - Female deer.
 - Carnie animal.
 - Plural of "claim".
 - Behind "Lida".
 - Reverse "Ah".
 - Ventilates.
 - Curtail "reserves".
 - A high card.
 - Bitter plant.
 - A friend.
 - Wipe your shoes on these.
 - To caper.
 - The power of vision.
- Down.
- Bowmen.
 - Short for Pomeranian.
 - What an editor does.
 - Past tense of "ride".
 - To sink.
 - Pincky.
 - Unrefined metal.
 - One's lives.
 - Short for Archibald.
 - Decour.
 - Singular of "teeth".
 - A banner.
 - A nuisance.
 - Well known tree.
 - Paddle steamer (abbr.).

1	P		2	R	3	4	
5	A		6	E	7		8
9	L		10	S			
11	A			T	12	O	T
	E	13	C	14	I		
15	E			V		17	
		18		E		F	19
21	O	A	H		A		
23		L			M		
25		I			I		

Name YOU MAY SEND ANY NUMBER OF ATTEMPTS Name

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Post your entries to reach us not later than Friday, March 11th, 1932, addressed "Hobbies," "Crosswords," No. 23, Competition Dept., 39, King Street, Covent Garden, W.C.2.

RULES.

- Attempts must be on coupons from this or next week's "Hobbies."
- Postage stamp value 1/4d. must be pinned to each coupon.
- In the event of (1) the prize will be equally divided.
- Employe(s) (or members of their families) of George Newnes, Ltd., or its associated companies, are not allowed to compete.
- The Editor's decision is final in all matters relating to this competition.

REALISTIC TOY LOCOMOTIVES AND HOW TO MAKE THEM-5

By E. W. Twining

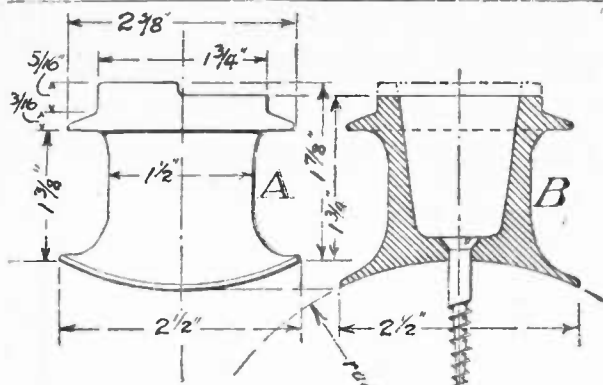


Fig. 9.—The G.W.R. chimney.

THE chimney of the L.M.S. model is shown as a side elevation at A and in section across the engine at B (Fig. 8). The second sketch B is given so as to indicate the curvature required to ensure that the chimney saddles down correctly on to the smokebox, and to make clear how the chimney of both engines, as well as the safety-valve casing of the G.W.R. model, will be fixed to the smokeboxes and boiler respectively. The method is quite simple: the foundry pattern is made with a print projecting above the top of the chimney. A core-box is also made, in two halves, hollow and of the exact size and shape of the required core. One end of the box is made to correspond in diameter with the print on the pattern. In this box the foundryman will form the core, which core is dried and baked and placed in the impression in the sand mould left by the print on the pattern. When the metal is poured into the mould it will run around the core, thus leaving the casting hollow. From this it will be seen that the print on the top of the chimney is required only to give such cylindrical impression in the sand that it will support the corresponding cylindrical part of the core, the object of the lower or tapered part of the core being to form the inside of the chimney. When the casting is taken from the mould the core, being of fine sand, is dug out, leaving the casting hollow, but with a bottom to the recess.

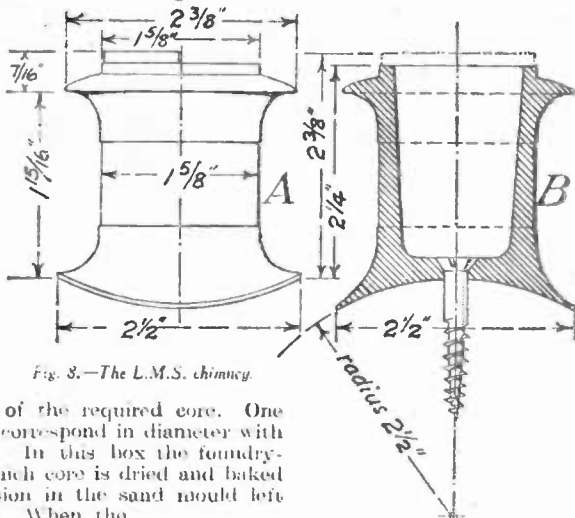


Fig. 8.—The L.M.S. chimney.

a smooth appearance, is light and we want all the weight possible in the propelled model in order to give the necessary adhesion between the wheels and the rails.

The chimney for the Great Western engine is shown in Fig. 9, the same reference letters being used for the two views as in Fig. 8, the whole description being applicable to both except for the fact that the G.W.R. chimney must be cast in the best red gunmetal and that fling off the roughness of the casting will not result in a quite good enough finish. The tops of the real Great Western chimneys are of bright copper, and gun-metal is the best to imitate this, besides which, being polished, it must be smooth and true, so that the model chimney must be turned in the lathe, holding it on the jaws of a self-centring chuck. Finish with finest emery cloth and then with metal polish. The cylindrical part of the chimney above the base had better be turned as well, though there is no need to give a high polish to this

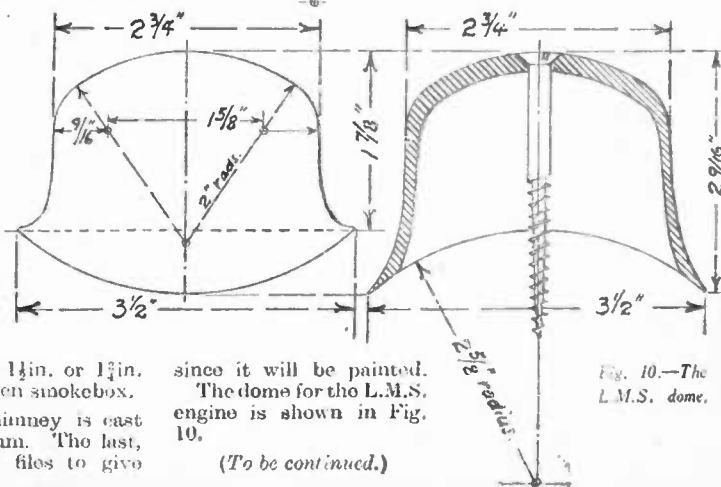


Fig. 10.—The L.M.S. dome.

Fixing the Chimney.

To fix the chimney a hole is drilled through the bottom, counter-sunk and a 1/4 in. or 1/2 in. wood-screw passed through into the wooden smokebox.

The metal in which the L.M.S. chimney is cast may be either brass, iron, or aluminum. The last, although rather nice to finish off with files to give

since it will be painted. The dome for the L.M.S. engine is shown in Fig. 10.

(To be continued.)

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"HOBBIES" CROSSWORDS No. 20 RESULT

Correct Solution.

Ten correct coupons were submitted and the Cash Prize of £5 has therefore been divided amongst the following readers—

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102 Shaftesbury Avenue, Southampton.
SANDYS, A.,
415, Fulham Palace Road, S.W.6.
SPEDDEN, C.,
35, Rock Lane West, Rock Ferry.
THORPE, H.,
21, Dalmeny Avenue, N.7.
WATERMAN, W.,
38, Kenton Park Crescent, Kenton.

Payments will be sent in due course.

Another Easy Puzzle appears on page 558.



THE ROCKET POST

By P. L. Pemberton

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

WE are all very proud of the great development of aerial posts and of the speed and punctuality with which mail matter is whirled from one country to another. Much money, labour and ingenuity have been expended in developing the world's air routes, while even greater extensions are planned. And all the time there are men working quietly and hopefully

on a scheme which, if successful, will render all this effort and organization obsolete, and make the aeroplane itself look positively silly. The new development threatens from both Europe and America, where several enthusiastic scientists are working independently on the education of the rocket. No, not the familiar rocket of bonfire nights, which expends itself in a cascade of glorious coloured sparks, but such a one as shall speed inconspicuously, purposefully and precisely through the higher ether, and with such velocity that it will be out of sight before the listening earth has time to raise its head. Nor is it intended that such rockets, with their load of mail, shall fall at last, haphazard, in the midst of an unsuspecting community, or pierce the roofs of the addressees: such might come under the heading of threatening letters!

The latest stamp portrait of the Prince of Wales, on a recent Newfoundland issue.

Rockets Provided with Parachutes.

To guard against unduly adventurous delivery, the post rockets will be provided with parachutes attached to their heads, which will open when the motive power is spent, and thus enable the machine to make a graceful and harmless descent. This all sounds like a joke, but it is not.

News comes from Austria of the experimental trajectory of such a rocket from the summit of a hill towards the town of Semriach, some two miles away. It came to earth rather wide of the mark it is true, but with parachute extended, and with its load of 333 letters and postcards, which were enclosed in a metal cylinder, undamaged. It appears to have lain on the ground for an hour or so before it was found. Instructions attached to the rocket requested the finder to take the mail to the nearest post office; and this was done. Hereabouts the interest of stamp collectors is aroused, or will be when it is explained that each letter was franked with the usual Austrian stamp and a rocket post stamp which had been specially printed for the experiment. The letters were forwarded from the post office at Semriach through the usual channels, and delivered in various parts of the country by quite ordinary postmen, who were ignorant of their trajectory send-off.

Rocket Post Stamps.

The rocket post stamps, which, of course, can only be regarded as curiosities, since they are quite unofficial, depict the business end of a rocket, pointing upwards, and are inscribed "R1"—which is the name by which the machine is known. They were obliterated with an oblong rectangular postmark with the inscription "R 1.9.1X.1931." The Austrian stamp, which alone ensured

the co-operation of the post office, bears the ordinary postmark of Semriach.

The mechanism of the post rocket is a complicated affair. On the upper end is the head with the spraying apparatus, oven, turbine, relays, etc. In the middle is the fuel supply, and on the lower end is the stabilising rudder. The intended course of the rocket is regulated by relays connected with the turbine and the oxygen container, which function as the rocket deviates from its proper flying course. The most advanced experimenter is Mr. Oberth, a German, who is working on a rocket which he hopes will carry over 1,000 letters from Berlin to New York in half an hour. He claims that by using a motive power of benzine and liquid oxygen, and flying at a height of thirty miles above the earth, he will be able to control the fall of the rocket within two or three miles after a transit of 3,000 miles, and that he will be able to time its arrival with a precision of seconds. Who shall say that this is impossible? We must always remember that the earliest experiments with flying machines were regarded by the world with amused derision.

Princess Elizabeth on a Stamp.

Newfoundland, with its new set of pictorial stamps, has found a way to the hearts of vast multitudes by including a value with a charming portrait of little Princess Elizabeth. This is the 6 cents, which will probably become a "best seller." The portrait is half-length and is flanked with sprays of rose and thistle. In addition to the King, who appears on the 2c., portraits of the Queen and the Prince of Wales are shown on the 3c. and 4c. respectively. The last mentioned, by the way, has appeared on three earlier issues of Newfoundland; first on the 3c. of 1897, as a



plump, curly-headed child; then on the 3c. of 1911, as a very youthful midshipman, and again in 1928, as a full-grown man.

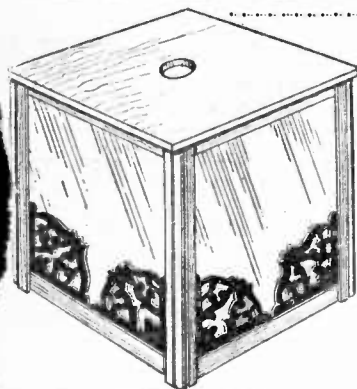
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AN EASILY-MADE HALL LANTERN

ANY fellow with a few woodwork tools can quite easily turn out the attractive electric hall lantern illustrated in less than one hour, and this is made possible by adopting an easy method of construction. The top of the lantern is cut from wood $\frac{1}{2}$ in. thick, 9 in. square, as indicated by Fig. 1. Mark off a hole $1\frac{1}{8}$ in. diameter in the centre, as shown, which allows for fixing on to the standard electric lamp-holder. Take care to get the hole cut dead in the centre in order that the lantern will hang level. The top is made in $\frac{1}{2}$ in. faced plywood, to allow for fixing on to the lamp-holder, and plywood is to be recommended for strength.

The Glass Sides.

Having made the top, the next thing to do is to cut eight pieces of oak, $\frac{3}{8}$ in. thick by $\frac{1}{2}$ in. wide by 8 in. long. These strips are required at the top and bottom of the lantern sides. Four pieces of grooved corner moulding in oak (No. 45) are required with $\frac{3}{8}$ in. grooves, cut off 10 in. long. The four strips are glued into position on the bottom edge into the grooves of the moulding. Next slide a piece of glass into the grooves which form the sides, the size of each piece of glass being 9 in. by 8 in., and obtainable from Hobbes. The four pieces of strip are then fixed into the grooves at the top (Fig. 2), a little

glue being applied to make a firm job.

The top of the lantern is fixed on by means of glue and small screws driven through from the top into the corner moulding. A useful size screw to use for this is No. 2, $\frac{1}{2}$ in., long, four being required—one in each end of the corner moulding. An attractive finish is obtained by making use of Hobbies ornamental freis at each corner as shown in the finished lantern. These are already cut, and only need a thin film of glue along the edge in order to make a good fixing in the corners. Finish off by giving the woodwork a coat of stain, and use a small brush, on account of the corners to be dealt with. The completed lantern is held on the lamp-holder in the ordinary manner, and a 20-watt or 40-watt lamp will be ample to light up the hall in an efficient and attractive manner.

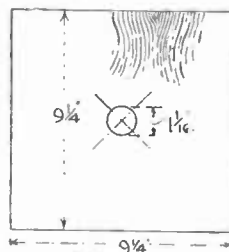


Fig. 1.—How to cut the top.

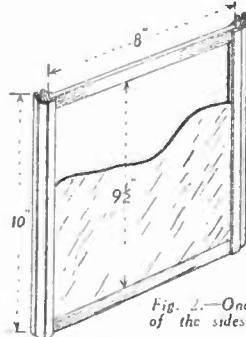


Fig. 2.—One of the sides.

PROFITS FROM CALENDAR-MAKING

READERS who question whether they can make money with the fretsaw must read the following notes on how a reader made 308 calendars from cut-out pictures, and realized a profit of between £3 and £4. Mr. W. Allen, of Luton, is an ardent worker with an A1 machine, and the photograph herewith shows him getting ready for the Christmas trade a month or two ago. The notes which he sends with it are probably helpful to those readers who do this class of work, and will also yield useful hints for those who have not yet taken it up.

"The work should be done," Mr. Allen says, "with an A1 machine, using No. 0 saws and running at high speed. High-speed running combined with slow cutting ensures a very smooth edge without saw-marks. If the top arm is moved slightly it will allow the saw to cut the wood on the bevel a little.



lean the edges with a file. If sandpaper is used, cut 6 in. strips of wood $\frac{1}{2}$ in. thick and $\frac{1}{2}$ in. wide and glue pieces of Grade 0 sandpaper on each side.

"The best method of mounting," Mr. Allen points out, "is to use the No. 48 grooved moulding blacked all over before the calendar is mounted in it. Also black the edges of the calendar carefully. This process takes a good half-hour, and last year I made and disposed of 308 calendars, making a profit of £3 to £4. All these were sold privately at prices from 4d. to 1s. 'Dates am Good,' 'All Out,' 'Family Ties,' and all trump indicators I sell at 9d. each. 'That's Torn it,' 'An All-weather Court,' and 'On Tour,' at 8d., 'The Huntsman,' 'Golfer,' etc., 6d. At a rough estimate I make 100 per-cent. profit on all at 6d. I have placed fifty in a stationers on sale or return at 2d. in the shilling discount."

FRETWORK Hints & Tips

Use for a Disused Fountain Pen.

A BROKEN fountain pen may not be so useless as it seems. If it is a large one the case and cap can be made into a suitable container for a number of fretsaw blades. The smaller pens, of course, are not long enough. All you have to do is to take out the nib and inner tube and you have a long, hollow compartment which will hold three or four dozen fretsaw blades, according to their grade. The cap and clip can be screwed on as before and the whole thing kept in the tool box, or clipped on your pocket.

(Submitted by Lawrence Wilde, of Brighouse, Yorks.)

Cut Leather with a Fretsaw.

IF you do your own boot and shoe repairs try cutting the leather with the fretsaw instead of with a knife. This is particularly helpful in cutting out the sole from the large piece of leather without waste. It naturally cuts much better if the leather is hard and the work should be done on a fretwork cutting table in the usual way. The blade must not be forced through the work too fast or moved up and down so quickly as to become hot.

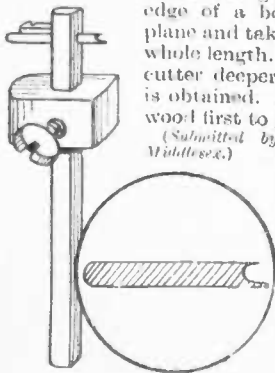
(Submitted by Arnold Ball, Upper Gornal, Wores.)

Cutting a Bead.

A SIMPLE method of making a bead plane out of a cutting gauge is to shape the marking knife to the shape required. Take the knife out and file it round, to the shape shown in the enlarged detail. Then, instead of putting it back the same way, put it in again as shown. This will provide a cutter so that

when the gauge is drawn along the edge of a board the metal acts as a plane and takes off a shaving of wood the whole length. By gradually working the cutter deeper a bead, or moulded edge, is obtained. Try it on a piece of waste wood first to get the pressure right.

(Submitted by William Wooster, of Southall, Middlesex.)

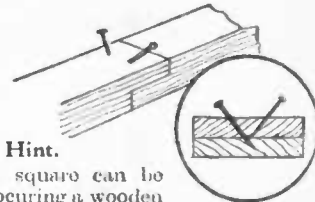


Extra Strength in Nails.

FEW people get the utmost strength out of their nails, because they drive them in straight. A better plan is to put them in on the slope in alternate directions, as can be plainly seen in the picture. They thus obtain

a much better grip and make it almost impossible for the wood to be separated again, even if glue is not used. The detail in the circle is a section of the work illustrating the angle of the nails through the work.

(Submitted by R. Sheppard, Staple Hill, Bristol.)



A Set-Square Hint.

A USEFUL wooden square can be easily made by procuring a wooden

set-square from any artist's material shop and gluing a piece of 1/2 in. square strip-wood along one of the edges, and quite flush with it. Cut the strip off flush with the ends of the square and you have an excellent marking or squaring tool for right-angles or mitres of 45.

(Submitted by J. D. F. Anilo, Kensington, London.)

Non-Skid Fretmachines.

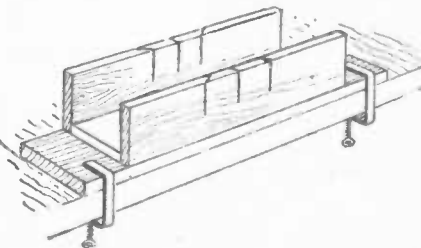
OWNERS of a fretma hine who do not wish to screw them to the floor, can prevent it sliding by adding small circular shoe heel rubbers. A block of 1/2 in. wood is first screwed under the foot, and then the rubber is screwed on upwards from beneath. A ladies size is best, and out 1 1/2 in. in diameter, and the wooden block a little larger.

Fixing a Mitre Block.

WHEN using a mitre block there is a tendency for it to slip backwards and forwards slightly. A way to prevent this is to get a piece of wood about 3 in. longer than the mitre block but the same width. Screw it to the under-side of the block, with an equal projection at either end. The whole thing can then be held down to the edge of a table—as shown in the illustration—by means of two light 2 in. steel cramps. These fix over the projecting portion, and are prevented from

damaging the under-side of the table by placing a small piece of wood over the head.

(Submitted by George Chatterton, Pontefract.)



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This Week's Mental Nut Prize Winners.

BOOKS this week are awarded to H. J. Bambridge, 76, Moundesley Road, N. Walsham, Norfolk; S. A. Bull, 80, Leicester Street, Nottingham; and J. V. Kidgar, 495, Coventry Road, Small Heath, Birmingham, whose solutions of Mental Nut No. 3 were the first correct ones to be opened. Another problem appears this week on page 538. By the way, solutions should be received at this office not later than the Monday immediately following date of issue.

A Photo Frame for "Hobbies League" Certificate.

SO many readers have written to me asking for a special design for a frame for the "Hobbies League" Certificate that next week's Free Gift Design Sheet will be for a very attractive frame for that purpose.

Correspondence.

NOTICE that a considerable amount of correspondence intended for the Editor is still being sent to Messrs Hobbies Ltd., Bercham, Norfolk. Quite frequently this occasions delay, for which I am unjustly blamed by the reader. Make a note of my address: it is at the top of this page. One or two readers also are addressing queries to me which do not contain their full names and addresses. This rule must be observed.

Our Wireless Programme.

MANY thanks to the hundreds of readers who have written to me in appreciation of our Wireless features. Although HOBBIES is a general paper devoted to every practical hobby, I realize that many thousands of my readers divide their interest between wireless and many other subjects. The several improvements in wireless components introduced within the past three months has made it necessary for me to produce designs of modern

receivers. If there is any special wireless difficulty you want solved please address a query to me. It will be answered speedily.

What Articles Would You Like?

If there is an article on a particular subject you would like dealt with in HOBBIES please write and tell me what that subject is, for such requests are particularly helpful to me in plotting future programmes. It is only in very exceptional cases that I am not

NEXT WEEK.

FREE DESIGN SHEET
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MANY WIRELESS
FEATURES

Stamps, Model Aeroplanes,
Coins, etc., etc.

able to comply with a reader's request for information.

Readers' Queries.

WHEN were oranges first introduced into England? "How many postage stamps are there in the world?" "How many pennies were minted in 1921?"; these queries but a faint impression of the diverse nature of the queries daily received from readers. In all cases the information is forthcoming at once.

QUERIES AND REPLIES.

Seven Wonders of the World.

These were, P. D. (Aylesbury), the Pyramids of Egypt, the Hanging Gardens of Babylon, the statue of Jupiter at Olympia executed by Phidias, the Mausoleum erected by Artemisia to the memory of her husband Mausolus, the Colossus of Rhodes, the Pharos of Alexandria, and the Temple of Diana at Ephesus.

French Correspondent Required.

Mr. Donald N. Warr, 60, Stratford Road, Sparkhill, Birmingham, wishes to exchange letters with a French reader in their respective languages to enable both to improve their knowledge of foreign languages. Mr. Warr is 16 years of age, and is interested in any sport, and also chemistry.

Query Regarding Our £1 Three-Valver.

We note that you have fitted your Economy Three with a gram phone pick-up, E. C. H. D. (Hornsey), but do not altogether recommend this addition, as certain refinements which are not included in so cheap a set are usually necessary. We think that with your present arrangement of the pick-up you are overloading the set in spite of the volume controls. We suggest, however, that you would have more success using the last two valves only, i.e., join the pick-up to the grid of the second valve. The usual decoupling device of a 25,000 ohm resistance and 2 mfd. condenser should be tried as well. The connections to your transformers are not really peculiar since reversing both the primary and the secondary connections gives much the same conditions as normal. Reversing one set of connections only, would, of course, make a difference and is often done to cure low frequency howl or "motor-boating," in fact, you might try reversing the connections to the primary only of the second transformer as a remedy for your pick-up trouble.

"Our Round-the-World Three"

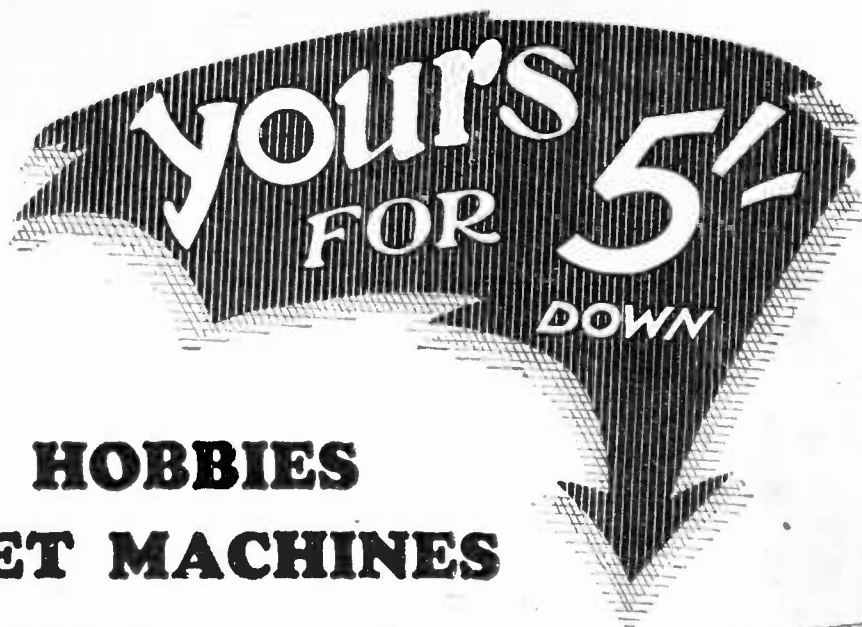
Component Correction. With reference to the list of components given on page 428 of our issue dated January 23rd, 1932, Messrs. Varley are mentioned as being able to supply the A.F.5 transformer. We would like to inform readers that this transformer is obtainable from Messrs. Ferranti, Ltd. A suitable transformer for this particular set supplied by Messrs. Varley is the DP3.

Cement for Leaded Lights.

The most reliable waterproof cement for leaded lights, L. A. (Llandudno), is made from red- and white-lead mixed with linseed oil. When the work is finished, it is usual to brush over all the cemented edges with dry lamp-black. The cement generally used is old smudge or old lead-coloured paint, stiffened by the addition of a little red-lead. It rubs not be too stiff, otherwise it cannot be rubbed into the joints so as to fill up all spaces between the lead and the glass. Sometimes stiff red-lead paint, darkened with a little lamp-black, is used.

"Inductive Telephone" Query.

Owing to the very small power which is radiated by the "Inductive Telephone" type of transmitter, we do not think you will obtain anything like the range you propose, G. C. V. (High Belangton). With the frames described the apparatus is ideal for communication through the wall of a house without the use of wires or for demonstrations from room to room, but to increase the range larger frames and some form of amplifier will be necessary. We suggest you might care to try two frames each 6ft. square and connect the receiver to a wireless set as an amplifier as described in the article (December 19th, 1931). About 100 turns on the receiver and 30 on the transmitter would be suitable. For two-way telephony both frames should have 100 turns, but this would, of course, mean two ear and mouth-piece sets and two amplifiers. The range depends entirely on the efficiency of the various components and their relative suitability. It is for this reason that we cannot give any guarantee of a particular range.



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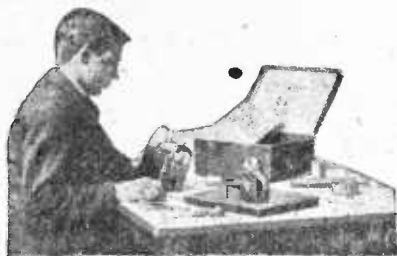
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