The Wireless Constructor

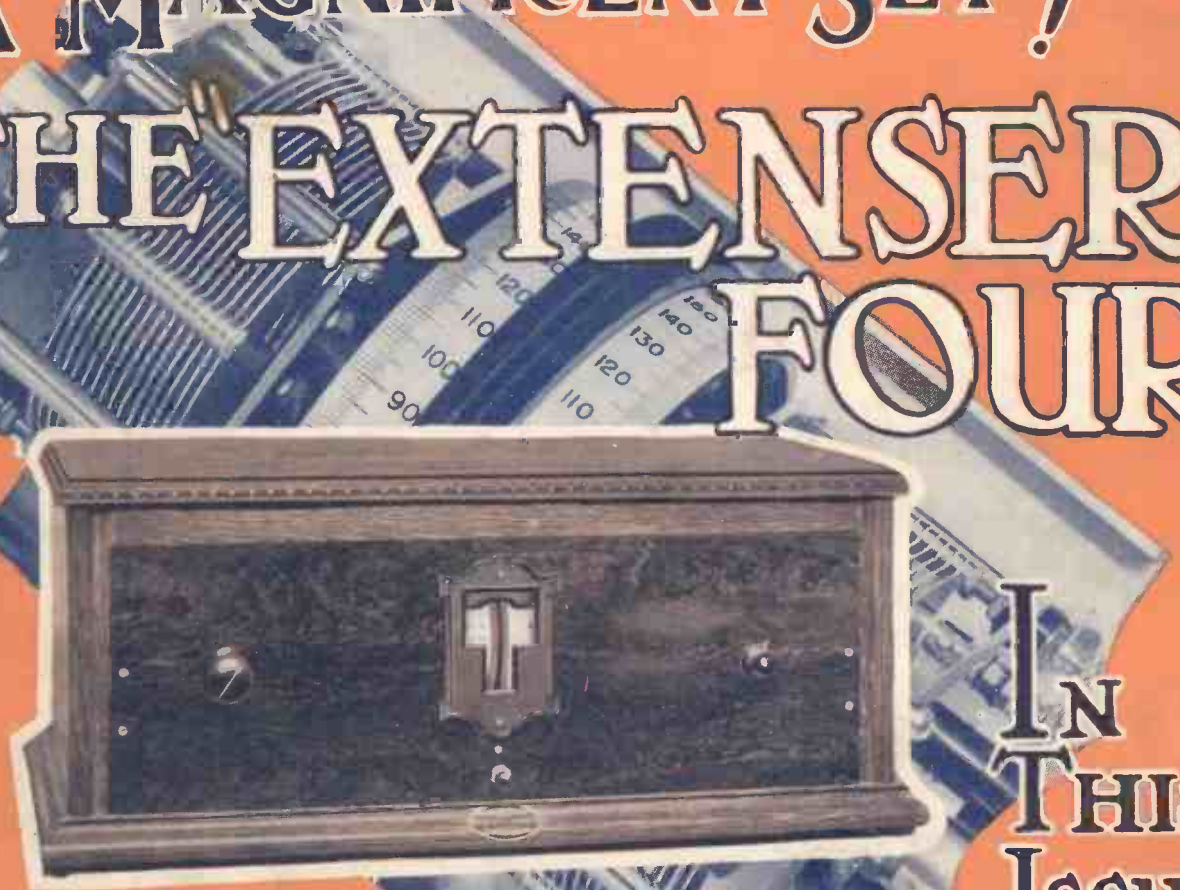
6d

RADIO CONSULTANT-IN-CHIEF CAPT. P. P. ECKERSLEY M.I.E.E.

Vol. XII. JULY, 1931. No. 57.

A MAGNIFICENT SET!

THE "EXTENSER" FOUR



IN THIS ISSUE

If you are overwhelmed by

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take heart and build

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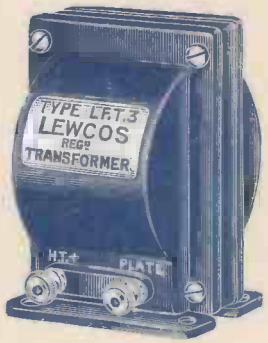
FULL DETAILS INSIDE.

IT CUTS OUT YOUR LOCAL STATION

PRICES OF THE LEWCOS L.F. TRANSFORMERS REDUCED



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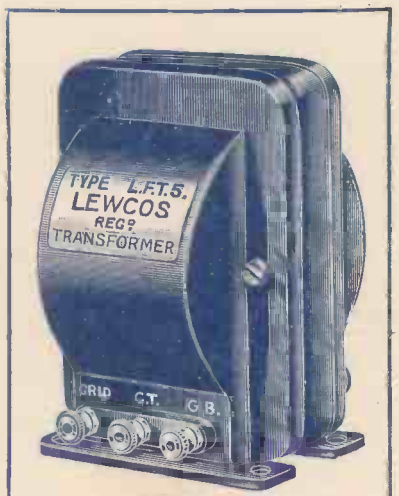
is Specified for the "EXTENSER 4" described in this issue



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by Captain FRANK H. SHAW

IT is significant that of all classes of people, sailors have been deemed the most superstitious. There is a thrilling article dealing with Ocean Spectres and Deep Sea Mysteries in "Cassell's Magazine" for June.

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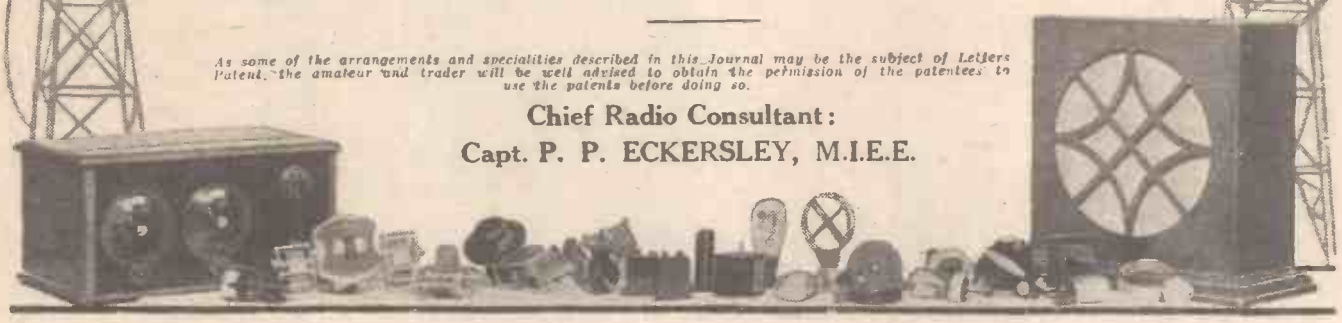
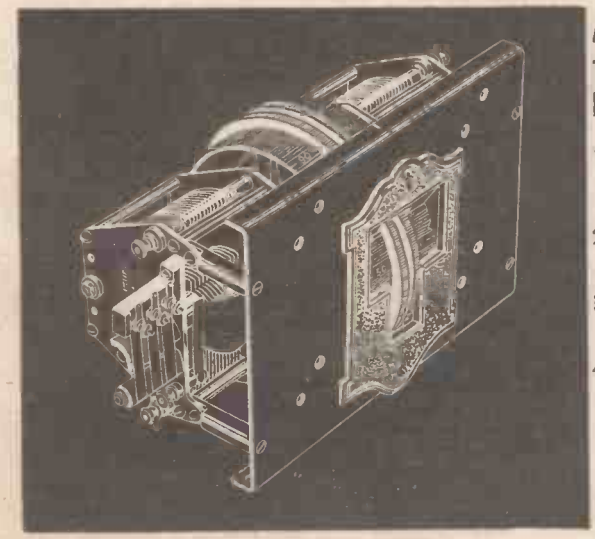
CONTENTS

As some of the arrangements and specialities described in this Journal may be the subject of Letters Patent, the amateur and trader will be well advised to obtain the permission of the patentees to use the patents before doing so.

Chief Radio Consultant:
Capt. P. P. ECKERSLEY, M.I.E.E.



EXTENSER 4



NEW ERA IN RADIO BEGINS

These are the reasons why your choice of Extenser Condenser is unquestionably—CYLDON

1 Sturdy construction, a standard CYLDON feature, and more essential with the Extenser type than others.

2 Any number of CYLDON Extensers may be ganged end on end or side by side if desired.

3 Solid end plates give highly effective screening with mounting for additional screening.

4 Absolutely foolproof and exclusive commutator contact system providing the very necessary adjustment for correctly timed change over from short to long waves, eliminating overlap or time lag.

5 Reinforced one-hole fixing bearing design makes loosening of bearings impossible by turning on the panel.

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7 Four pillar frame construction gives absolute rigidity.

8 Brush wipe contact superceding pig-tail gives complete rotation through 360° in either direction.

9 Finally, the CYLDON Extenser is backed up by the famous CYLDON quality and name.

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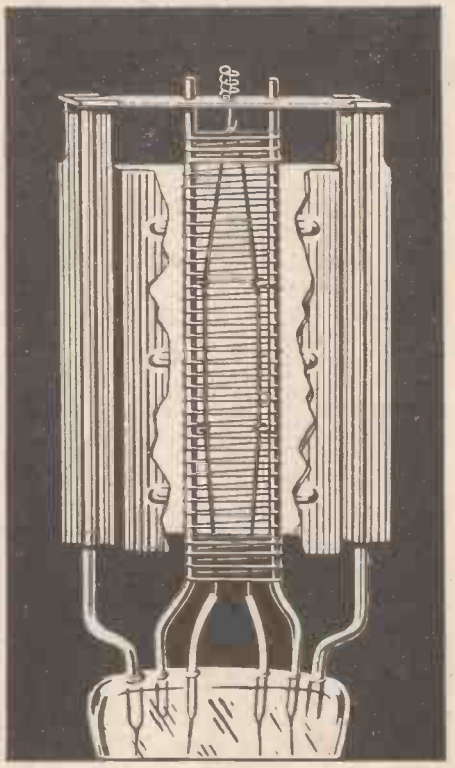
FIVE YEARS GUARANTEE

S.F.B.

Simple facts for Valve Users



Why Cossor Valves retain their filament emission

THE locomotive depends for its power upon a good head of steam. When steam pressure falls the engine inevitably loses speed. In precisely the same way the efficiency of a Wireless Valve is determined by its filament emission.

With some makes of valves adequate electron emission is obtained by heating the filament to a high temperature. But this has the effect of prematurely curtailing its emission and renders the filament readily liable to fracture.

In the special filament developed by Cossor Research Engineers the disadvantages of excessive heat have been entirely eliminated. The Cossor filament operates at such a low temperature that no glow is visible except in a darkened room. As a result the emission is unvarying, long lasting and extremely prolific. Every Cossor Valve, therefore, retains its maximum efficiency throughout the whole of its life—with no falling off in amplification or in quality of reproduction.

Over 50 types of Cossor Valves are available from any Wireless Shop to suit all 2, 4, and 6 volt Battery operated and A.C. Mains Receivers.

Send for one of our novel circular Station Charts, which give identification details of nearly 50 stations, with space for entering your own dial readings. Ask your dealer for a copy, price 2d, or send 2d. stamp to us and head your letter "Station Chart W C."

COSSOR

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♡ 8364

The WIRELESS CONSTRUCTOR

Published by the Amalgamated Press, Ltd., Fleetway House, Farringdon Street, London, E.C.4.

THE EDITOR'S CHAT

In which he reflects on radio progress, and introduces readers to a particularly fine receiver.

YEARS ago, when a four- or five-valve set was necessary if you wanted to bring in even a few foreign stations, when the set itself looked like a nightmare box-of-tricks from a stage magician's outfit, decorated with miniature searchlights, and when one used yard-long handles to the condenser dials, there was some justification for the belief that summer was an "off" season for radio "fans."

The Good Old Days?

Reception was certainly poor in the long summer evenings—as far as distant stations were concerned—and the man who claimed to receive American stations, for example, was usually called a—well, a story-teller.

Some people maintain that radio was a more exciting hobby in those days, but people who still stick to that belief are like elderly gentlemen who shake their heads sadly at the modern generation and say: "Life was better when we were young."

Maybe; but in radio, at any rate, it was very much more expensive and, from the technical point of view, very much more unsatisfactory.

No "Off" Season

No one who has had any experience in handling a really decent, up-to-date set worries about the difficulties of long-distance reception just because of summer-time. The radio "off" season is, in fact, "off"—and it is not likely to return.

Of course, there are people who say radio falls off in interest during the summer because of the long, fine evenings, and the lure of the tennis courts, etc.

A perfectly sound argument—if we had long, fine evenings more or less regularly, but as the English summer is about as reliable as a girl being on time for an appointment that argument seems a little theoretical.

The foregoing is by way of leading you gently by the hand to introduce to your notice the star set of this, the July issue of the WIRELESS CONSTRUCTOR—the "Extenser" Four.

Now this set does not care a tinker's cuss for "long summer evenings." Providing you don't leave it out in those charming thunderstorms we experience on "long summer evenings," and providing you don't do a few other silly things—and by this time it is not anticipated you will—you will find the "Extenser" Four ropes in the distant fellers as easily when it's B.S.T. as when it isn't.

Alternative Continental programmes will definitely be lining up on your aerial waiting to be allowed to demonstrate themselves via your loud speaker. And let me jog your memory and point out that you can take your choice of what's available on the long- and short-wave bands *without* having to resort to a wave-change switch.

The "Extenser" Again!

In a powerful long-distance-getter set like this, with dozens of stations on the short and long waves easily obtainable, the advantages of a straight run round the dial of the "Extenser" become glaringly obvious.

I will leave it at that, with this final remark—daylight does not worry this four-valver.

BRIGHTON'S RADIO EXCHANGE

This is Mr. Sam Youles in his Radio Exchange at Brighton, where he has installed an ingenious programme-popularity tester.

PICK-UP HINTS and TIPS

Interesting notes on some practical aspects of radio-gram reproduction.

By A. BOSWELL.

ONE of the greatest attractions of the commercial radio-gram is the absence of scratch on the electrical reproduction of records, and that, together with the good reproduction of bass notes, forms the two main points that prospective purchasers of radio-gram outfits look out for.

The home-made radio-gram receiver, however, unless a very boomy loud speaker is employed, can hardly be said to be free from scratch, and the presence of this scratch or surface noise, as it is often called, is frequently a source of great worry to the owner of the set.

Good High Notes

But when one comes to reason things out, surely scratch, though in itself not desirable, is a sure sign that the radio-gram is behaving well; as far as the high notes are concerned, anyway? Surface noise on records occurs at a frequency of somewhere about 3,000 to 4,000, and rapidly disappears as you come down to the 2,000 mark. So an outfit that has a certain amount of scratch clearly reproduces musical frequencies of the order of 2,000 to 4,000; and since the scratch is transmitted to the radio-gram receiver via vibrations in the needle, it follows that if the scratch is cut out then a great percentage of the high notes are also cut out.

Simple Scratch Filter

It does not follow that if you use some device for cutting out the scratch that you will *completely* cut out the high notes, because the "modulation" of these high notes is very much greater than that of the surface noise; but it is a fact that the majority of commercial radio-gramophones employ some form of scratch filter, or high-note attenuator, so that this surface noise shall not be noticeable in the loud-speaker reproduction.

A scratch "filter," so-called, can easily be constructed at home merely by the use of a 1-megohm resistance of the variable kind (a megohm potentometer) and a ·01 or ·1 fixed condenser. They are connected in series, so that the arm of the potentiometer varies the resistance in series with the condenser, and the whole lot is placed across the pick-up, or the grid-filament circuit of the set.

Reduction of the value of the resistance increases the effect the condenser has on the circuit, and the high notes are readily bypassed; and with them, of course, goes the scratch.

But do not forget, in considering this problem of surface noise, that the needle you employ may have some bearing on the amount of noise reproduced by the loud speaker.

RECORDS TO TRY

Orchestral

The Song of Songs
Albert Sandler and Orchestra – Columbia

A Night in Venice
Marek Weber and Orchestra – H.M.V.

Vocal

Ave Maria (Cavalleria Rusticana)
Isobel Baillie – – – – – – Columbia

The Little Things of Life
Lewis James – – – – – – Zono.

Humorous Vocal

On a Little Balcony in Spain
Sophie Tucker – – – – Broadcast
Alexander and Mose – – – – H.M.V.

Dance

The Sleepy Town Express
Victor Arden and Phil Ohman and their Orchestra – – – – – H.M.V.

My Canary Has Circles Under His Eyes
Debroy Somers – – – – – Columbia

For instance, I have frequently found that the tungstyle needle, while a good reproducer of bass, is inclined to emphasise the scratch, though perhaps not so much as the ordinary loud-tone needle, and at the same time is inclined to chatter rather uncomfortably on the high notes.

A Swinging Tendency

The tungstyle needle seems to produce a scratch of a lower note, if it may so be called, than the ordinary loud-tone needle, while the "talkie" needle reduces the scratch very considerably, with, of course, reduced "brilliance" of reproduction.

I wonder how many of my readers recognise the importance of having the gramophone turntable dead level? I do not mean that it should not swing up and down, although this obviously is a fault, but I mean that unless the axis of swing of the tone-arm is vertical there will be a tendency for the tone-arm to swing inwards to the centre of the record, or outwards towards the edge.

Unnecessary Wear

This means to say that there is a tendency to press against either on the inside or the outside edge of the record grooves, which pressure has quite a marked result on record wear, and especially bad will be the result of a pick-up arm which makes the needle bear on the outside edge of the grooves, because this is bearing against the inclination of the groove to push the pick-up towards the centre of the record.

If the gramophone cannot be got dead level, any tendency to swing on the part of the pick-up should be made towards the centre; that is, the direction in which the grooves will gradually push the needle.

Storing Your Records

By the way, if you keep your records in some sort of special book or record album be very careful how you store them. They should, of course, be stored edge upwards, not in piles; but even the edge method of storing is liable to result in warping of the records unless the books are really kept perpendicular. I find it very much better, though perhaps not quite so picturesque, if you store the records in their folders on cupboard shelves, the records being fairly tightly packed together on their edges. On no account should the records be allowed to incline, or warping is almost certain to occur.

The "EXTENSER" FOUR

Here it is—the set of your dreams! Magnificent long-distance reach is assured and perfect quality rendered possible by the employment of an H.F., Det., and 2 L.F. circuit of wonderful capabilities.

And, best of all, there is the utter ease of handling, due to Extenserised tuning. There is no bother with wave-changing, of course, but all the long-wavers come in with 3-figure dial readings, and all the ordinary stations with dial readings of less than 100. It is a set to build now and boast about for ever.

Designed and Described by VICTOR KING.

"LEAVE the set tuned in so that I can have the lunch-time music on to-morrow." How often is this or a similar request made to the radio expert of the family? Undoubtedly far, far more often than it should.

A Change Inevitable

Such a state of affairs is absolutely untenable in this age of simplified science. When anyone can learn to fly an aeroplane without the slightest knowledge of what makes the propeller go round, when even a child can handle with success electrical appliances in the home, and when the biggest "mutt" on earth can control a car with perfect ease—why should it require an initiated person to produce music from the comparatively harmless radio receiver?

There is no reason at all. True, in the past a false sense of pride caused many enthusiasts to have as many knobs as possible on their sets so that no one but themselves could possibly hope to find even the local; but that won't wash to-day!

Certainly, in the past there was at least one very real obstacle that made it difficult for an "expert's" set also to fulfil the role of home receiver, but that has now been removed entirely.

The "Extenser" Does It!

I am referring to the old bugbear of two stations to every dial reading, with nothing but wave-change switch positions to differentiate between them. Imagine Mrs. Jones with a two-tuned-circuit set trying to find the Regional programme with one wave-change switch "in" and the other "out." Phew, what a hope!

But now all that has gone, thanks to the Extenser, and simplicity of operation does not have to mean a limited number of stations. Just follow me a little farther in this matter.

What are the requirements for a powerful loud-speaker receiver? Assuming average conditions, the best and, incidentally, almost universal type of receiver for this purpose is a straight four-valver using one screened-grid valve.

To get the necessary selectivity

ACCESSORIES WE CAN RECOMMEND

Valves. One S.G. type, two H.F. type, and one power or super-power (Mazda, Mullard, Marconi, Eta, Osram, Cossor, Lissen, Six-Sixty).

Batteries. 2-, 4-, or 6-volt accumulator, 20 amp. hour actual capacity or larger (Ediswan, Exide, Fuller, Pertrix, Lissen, Oldham).

120 to 150 volts of H.T. batteries, preferably of super capacity (Drydex, Eyer Ready, Pertrix, Grosvenor, Fuller, Lissen, National, Siemens, G.E.C.).

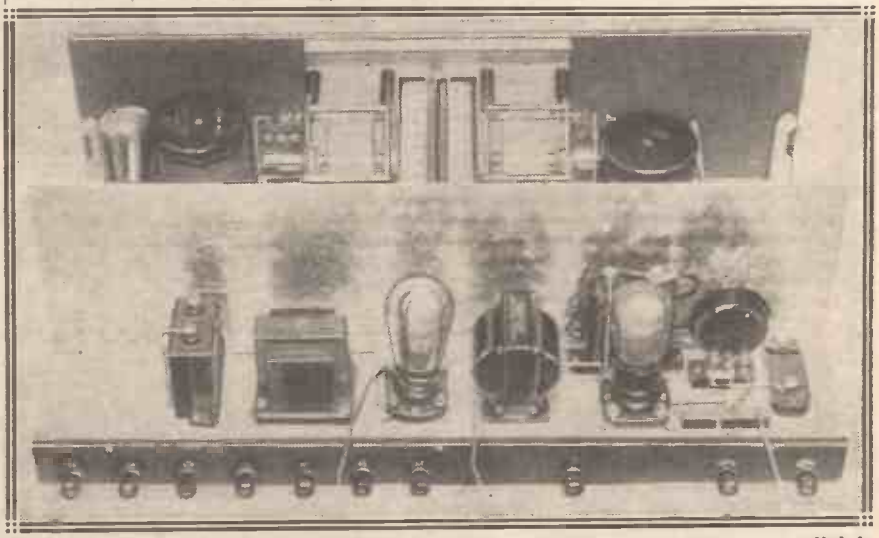
9- or 18-volt grid-bias battery, according to whether power or super-power valve respectively is used (see above).

Mains Unit. For H.T. if desired instead of batteries. Output 150 volts, with suitable taps (Regentone, Westinghouse, Ekco, Tannoy, R.I., Junit, Atlas, Varley).

Coils. Two "Explorer" 6-pin type (Wearite).

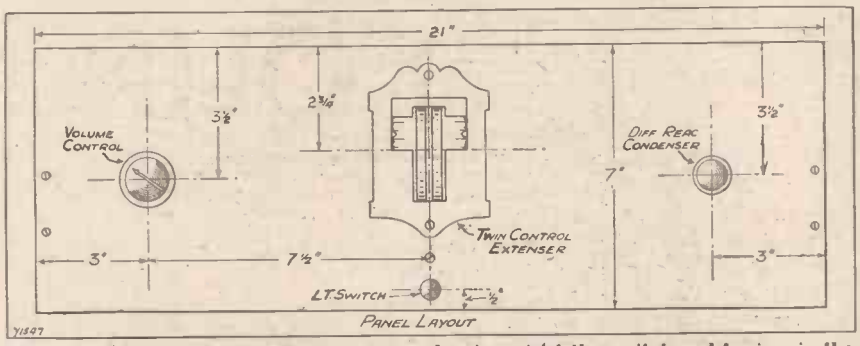
Loud Speaker. (B.T.-H., Celestion, Blue Spot, Amplion, Undy, Ormond, Mullard, Donotone.)

SEPARATED BY SECTIONAL SCREENING



In addition to the screen covering the baseboard an upright screen runs parallel to the panel. The L.F. stages are shown on one side of it, and on the other side are the detector and aerial sections, separated by another central screen.

The "Extenser" Four—*continued*



Being an Extenser set the layout is very pleasing—just the switch and tuning in the centre, with volume and reaction in reserve.

both grid circuits must be tuned, and a reaction condenser is also necessary. An on-off switch goes without saying, and since local reception will be wanted we must add a volume control. That is all, for the wave-change switches are obviated by the use of Extensers.

Power in Plenty

Now let us consider these controls from the point of view of the uninitiated. Since we have powerful H.F. amplification, reaction will not be needed for the reception of local programmes or for that of one or two more powerful distant stations.

For tuning we use Extensers with a double-drum drive, so that they work more or less as one control, and we give definite readings for all stations. The on-off switch is as simple as an ordinary electric-light switch, and the volume control is just turned until the amount of sound suits the ear.

So really all there is to do is to set the Extensers to the desired station and switch on. No one will require more than a five-minute lesson to learn this; so, you see, our suggested long-distance loud-speaker receiver is also a real "family" instrument.

If the requirements outlined are taken and incorporated in a highly efficient design, the net result is an ideal modern set. Exactly such a set is the "Extenser" Four, which I am describing this month.

The circuit you will find quite an easy one to follow, for there is nothing of a "stuntish" nature in it. The whole thing is arranged on "honest-to-goodness" and efficient lines.

The dual-range coils employed are the well-known Explorer ones, which make fit companions for the Extensers. Efficient de-coupling is used throughout, thus making powerful results without any tendency to instability an absolute certainty.

Variable Coupling

I will not spend much time going into details of the circuit, but would like to point out the variable coupling between the aerial and first coil, and also between the S.G.'s plate and the second coil. These compression-type variable condensers, once set for your particular conditions, are left set, and must not be looked upon as controls.

The volume control precedes the first L.F. valve, thus making overloading of either L.F. valves avoidable. The first stage is resistance-capacity coupled, the volume control acting as grid leak, and the second stage transformer-coupled.

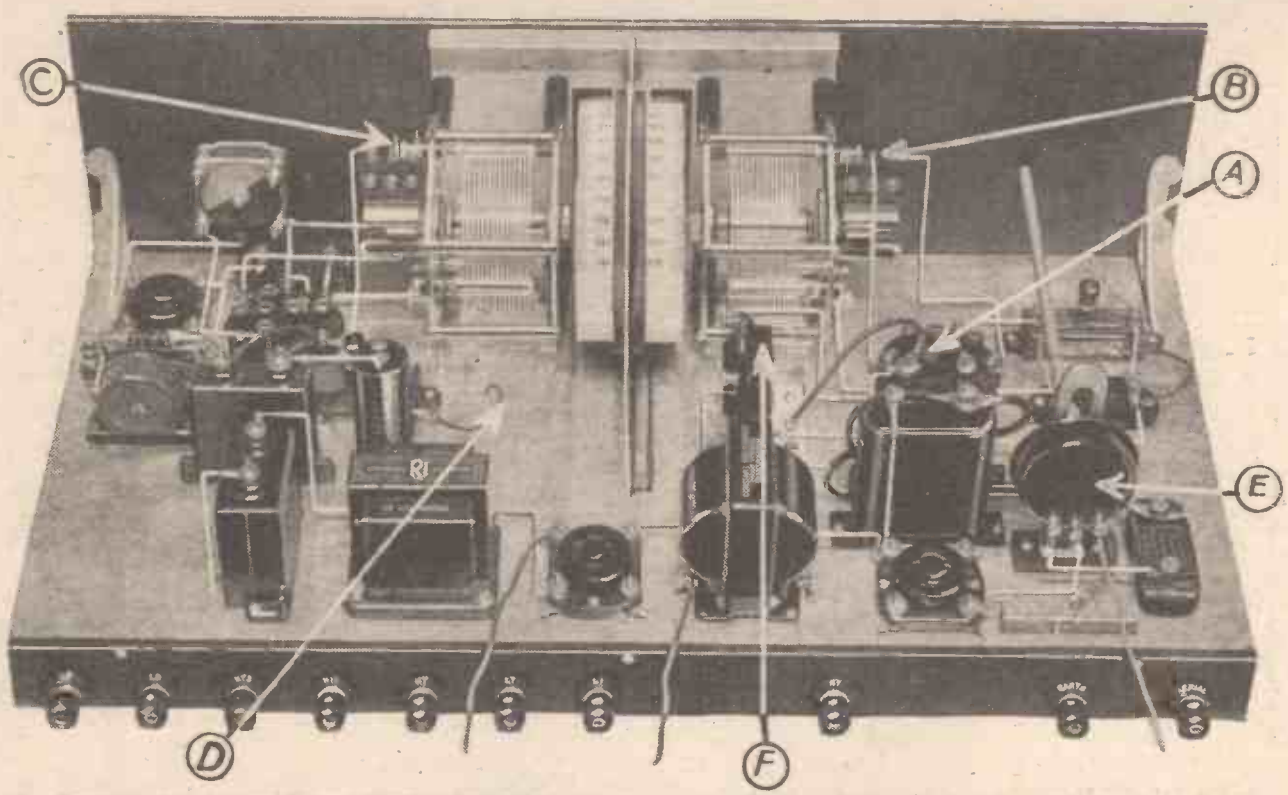
Playing for Safety

You will note that a fuse is incorporated for safety. This, as well as the other points mentioned, are of quite a normal nature, but when you take a look at the layout of the set you will find that there have been

YOUR SHOPPING LIST FOR THE "EXTENSER" FOUR

1 Panel, 21 in. × 7 in. (Goltone, or Permcol, Lissen, Parex, Peto-Scott, Becol, Wearite, etc.).
1 Cabinet for above, with baseboard 10 in. deep (Camco, or Lock, Kay, Gilbert, Pickett, Osborn, etc.).
1 Double-drum ·0005 Extenser (Cyldon).
1 1-meg. volume control with extension handle (Magnum, or Wearite).
1 ·00013-mfd., or larger up to ·0002-mfd., differential reaction condenser (Lotus, or Ready Radio, Igranic, Magnum, Polar, Ormond, Lissen, Dubilier, J.B., Burton, Formo, Wavemaster, Telsen, etc.).
1 L.T. switch (Red Diamond, or Lotus, Igranic, Lissen, Goltone, Ready Radio, Benjamin, Keystone, W.B., Bulgin, Ormond, Magnum, Wearite, Junit, etc.).
1 Pair panel brackets (Magnum, or Peto-Scott, Camco, etc.).
2 Screens (for details see text). (Parex, or Magnum, Peto-Scott, Ready Radio, Wearite, etc.)
1 Piece of copper foil, 21 in. × 10 in. (Parex, or see above).
2 6-pin coil holders (Wearite, or Colvern, Lewcos, Magnum, etc.).
2 ·001-mfd. max. compression-type condensers (Formo, or Lewcos, R.I., Polar, Lissen, Sovereign, etc.).
1 Vertical-type valve holder (Aermonic, or Bulgin, W.B., Junit, etc.).
3 4-pin ordinary sprung valve holders (Benjamin, or Telsen, Clix, Lissen, Lotus, Igranic, W.B., Bulgin, Junit, Formo, Dario, Wearite, Magnum, etc.).
2 H.F. chokes (Telsen and Ready Radio, or Lewcos, R.I., Keystone, Parex, Varley, Lotus, Lissen, Dubilier, Wearite, Magnum, Watmel, etc.).
2 2-mfd. fixed condensers (Ferranti and T.C.C., or Formo, Lissen, Mullard, Igranic, Dubilier, etc.).
2 ·01-mfd. fixed condensers (Dubilier and Mullard, or Ready Radio, Graham Farish, Watmel, Formo, Igranic, Lissen, Telsen, T.C.C., Ediswan, etc.).
1 ·0003-mfd. fixed condenser (Dubilier, or see above).
2 1-mfd. fixed condensers (T.C.C., or Lissen, Dubilier, Igranic, Ferranti, Mullard, etc.).
1 2-megohm grid leak and holder (Graham Farish, or Ediswan, Ferranti, Telsen, Lissen, Dubilier, Igranic, Mullard, etc.).
1 Output choke (R.I. Hypercore, or Ferranti, Varley, Lissen, Igranic, R.I., Atlas, Wearite, Bulgin, Magnum, etc.).
1 L.F. transformer (Lewcos, or Mullard, R.I., Lotus, Varley, Ferranti, Lissen, Igranic, Telsen, etc.).
2 600-ohm Spaghetti-type resistances (Bulgin, or Ready Radio, Lewcos, Magnum, Sovereign, Keystone, etc.).
1 25,000-ohm Spaghetti-type resistance (Magnum, or see above).
1 100,000-ohm Spaghetti-type resistance (Lewcos, or see above).
1 Fuse (Belling & Lee, or Keystone, Bulgin, Magnum, Ready Radio, etc.).
10 Indicating terminals (Igranic, or Belling & Lee, Eelex, Clix, etc.).
1 Terminal strip, 21 in. × 1½ in.
Battery wander plugs (Belling & Lee, Clix, Igranic, Bulgin, Eelex, etc.).
Wire (Lacoline, Glazite, etc.).
Flex, screws, etc., etc.

The "Extenser" Four—*continued*



(A) Shows the S.G. de-coupling resistance (Spaghetti); (B) and (C) are the respective self-changer contacts of the H.F. and detector Extensers; (D) is the flex lead for the anode of the S.G. valve; (E) is the volume control, and (F) the valve holder for the S.G. valve which protrudes through the screen.

some very definite "goings on" here!

No doubt what will first strike you is the peculiar arrangement of the vertical screens, which effectively divide the set into three distinct sections. On closer investigation you will find that one section contains the H.F. stage, one the detector valve and its associated components, and the long, narrow section at the back the L.F. department.

Completely Screened

The whole of the baseboard is covered with copper foil, and thus each section is very completely screened from the others. To simplify the wiring, and also to help to keep the set looking neat, the baseboard is arranged a short distance up from the bottom of the panel.

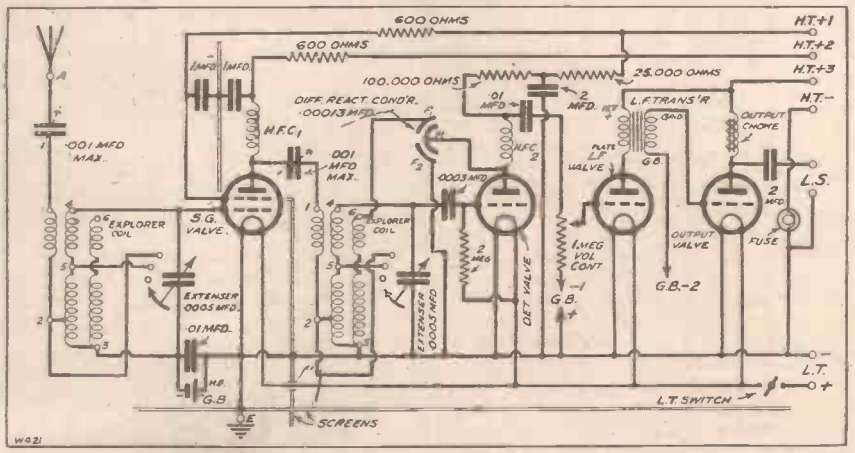
This makes it possible to run a number of the leads under the baseboard, and you will see that the L.T. switch is situate below the baseboard, although mounted on the panel in the usual way.

A special feature of the receiver layout is the novel positioning of the volume control. As just mentioned, the L.F. part is at the back, and therefore it is very desirable that the volume control should also be at the back along with the other L.F. components. To have it in this position and yet to be able to vary it from the panel, a special extension handle is utilised, and the volume control itself is mounted by means of a bracket fixed to the baseboard.

From a general point of view the construction of the "Extenser" Four is perfectly normal; you just collect together the parts given in the component list, drill the panel, mount the components and then wire up.

But there are a number of points that require amplification, and so I will confine the constructional detail's

A CIRCUIT FULL OF FINE FEATURES



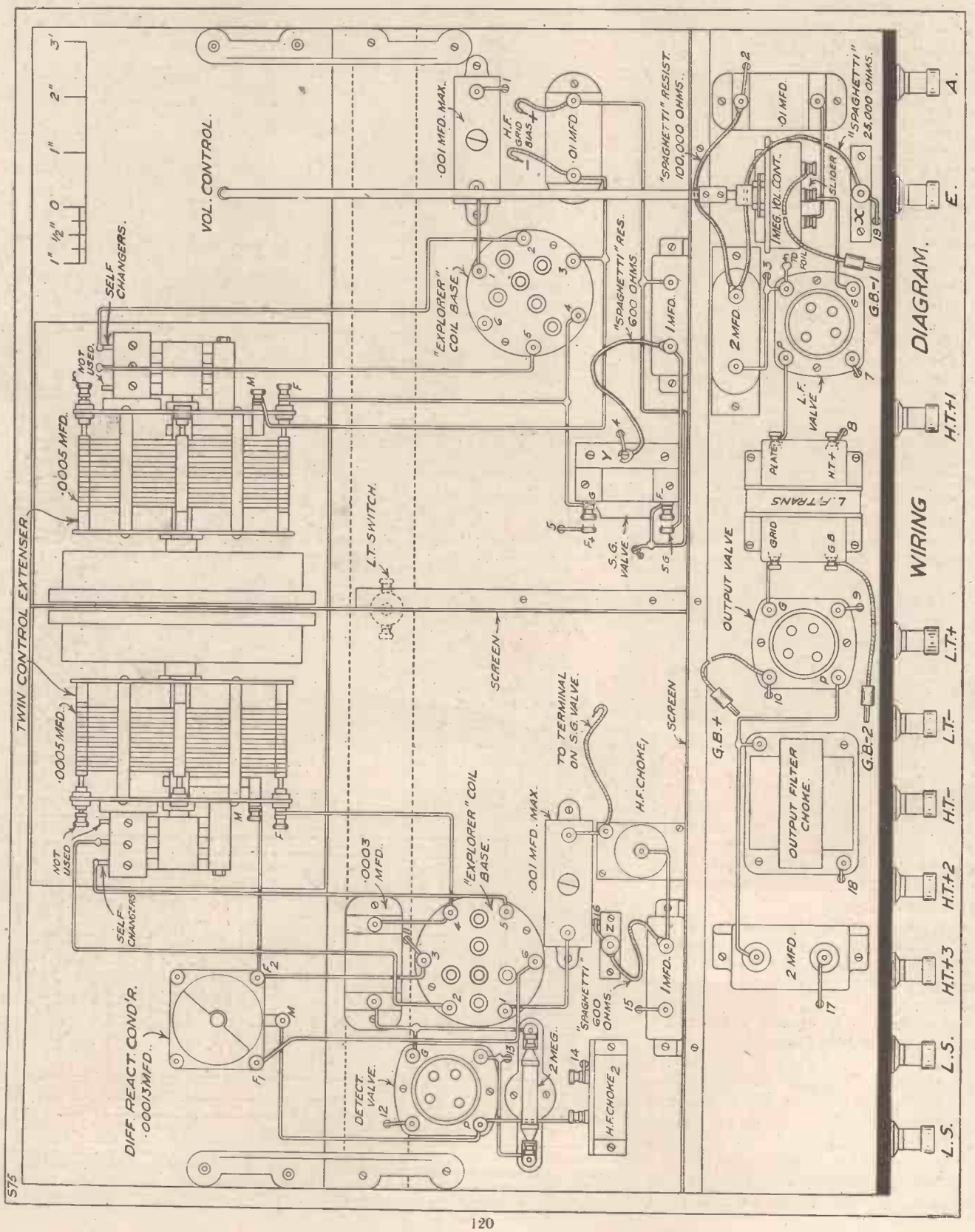
The Extenser-tuned H.F. circuits lead up to a "differentialled" detector, followed by R.C. and transformer L.F. stages. It will be seen that there is adequate de-coupling, but for the sake of simplicity some of the screening has been omitted from this diagram.

THE "EXTENSER" FOUR—*continued*

to dealing with these in the order in which you are most likely to come up against them.

The terminal strip runs the whole length of the baseboard and is 1½ in. wide. Instead of being fitted in the usual way it is arranged so that its top edge is flush with the top edge of the baseboard.

In view of this, remember that the screw holes for fitting the panel to the baseboard must not be right at the bottom of the panel. The top front edge of the baseboard should be 1½ in. from the lower edge of the panel, the screws coming 1 5/16 in. up from the bottom.



The "Extenser" Four—*continued*

THE "WIRELESS CONSTRUCTOR" "EXTENSER" FOUR

Circuit:—S.G., H.F. stage. Det. and two L.F. stages, one R.C. and one Trans.

VALVES.

1st: S.G. type.
2nd (by itself in screened section): Special detector or H.F. type.
3rd (nearer det.): L.F. type.
4th: Power or super-power.
Valves may be rated at 2, 4, or 6 volts.

BATTERIES.

L.T.: 2,- 4-, or 6-volt accumulator according to valve rating.
H.T.: 120 to 150 volts (or mains unit if preferred). Max. voltage on H.T. + 3, about 120 on H.T. +2, and between 60 and 80 on H.T. + 1.
G.B.: 9- or 18-volt according to whether power or super-power valve is used.
H.F., G.B.: 1½-volt cell.

CONTROLS.

Double-drum Extenser tunes set to all wavelengths in both medium and long wave-bands. (Change-over automatic.)
Pull knob at bottom centre of panel to turn on set, push to switch off.
Left-hand knob controls volume.
Right-hand knob controls reaction (turn to right to increase).

ADJUSTMENTS.

Set both compression-type condensers on baseboard to maximum. If selectivity is not then great enough, try reducing capacity of first one a little and then the other.

COILS.

Two standard "Explorer" units.

For this reason it is also as well to screw the panel to the baseboard before marking on the former the positions for the holes for the panel brackets. Incidentally, it is not advisable to attempt to do without these brackets, because of the weight of the dual Extenser assembly on the panel.

Fixing the Foil

The copper foil over the baseboard can be fixed in place with a few brass brads around the edges of it. The two vertical screens may be bought ready cut to size from Messrs. Paroussi, or other dealer, or you can cut them yourself.

The larger one is 21 in. by 5½ in., plus an extra strip at the bottom bent at right angles for fixing purposes. The other screen is also 5½ in. high and is 6½ in. long, and a hole has to be cut in it for the S.G. valve.

The position of the centre of this hole is 1½ in. up and 1⅛ in. from the edge next to the other screen, and its diameter is 1¾ in. You will find two little slots in the front plate of the Extenser assembly for the screen to fit into. By the way, make sure that this front plate earths properly on to the other screens; if you have any doubts about this, earth it with a piece of wire to be on the safe side.

Volume Control Mounting

To raise the valve holder of the S.G. valve to a suitable height for the hole in the screen it should be mounted on a small piece of wood. The actual thickness of this wood will depend upon the particular holder in use, but ⅜ in. or so will be about right.

A metal bracket is supplied for mounting the volume control, and it must be remembered that this will therefore be in contact with the earthed foil over the baseboard. For this reason an insulating bush must be used to isolate the volume control spindle from the bracket. A suitable bush is supplied by the makers of the volume control.

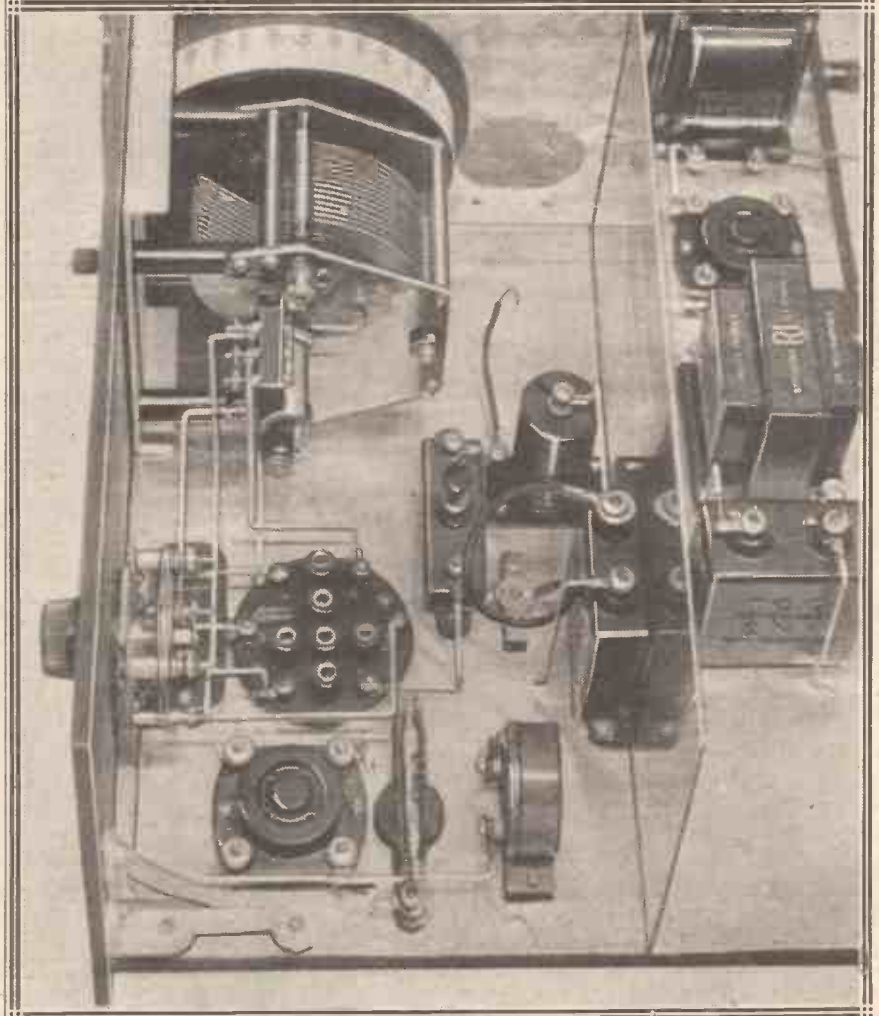
A "Spaghetti" Tip

Where the extension handle passes through the vertical screen drill a fairly large hole so that there is no possibility of the rod shorting on to the screen. One more point in regard to the component fixing.

There are two little blocks of wood screwed to the baseboard and marked "X" and "Z." To these the ends of Spaghetti resistances are screwed to enable convenient contact to be made.

A Spaghetti resistance is also anchored in a similar way to the wooden block on which the first valve holder

THE DETECTOR STAGE



In the foreground is the valve holder for the detector, and above it the differential reaction condenser which helps the set to haul in the more remote foreigners.

THE "EXTENSER" FOUR—*continued*

is mounted. It is vitally necessary that the screws holding the Spaghettis to these pieces of wood shall not pass right through the wood, otherwise they will come into contact with the copper coil and so cause shorts.

And now for a few points about the wiring. First of all you should wire up those components in front of the long, vertical screen, and while doing this the screen should be removed from the set to provide easy access to the components.

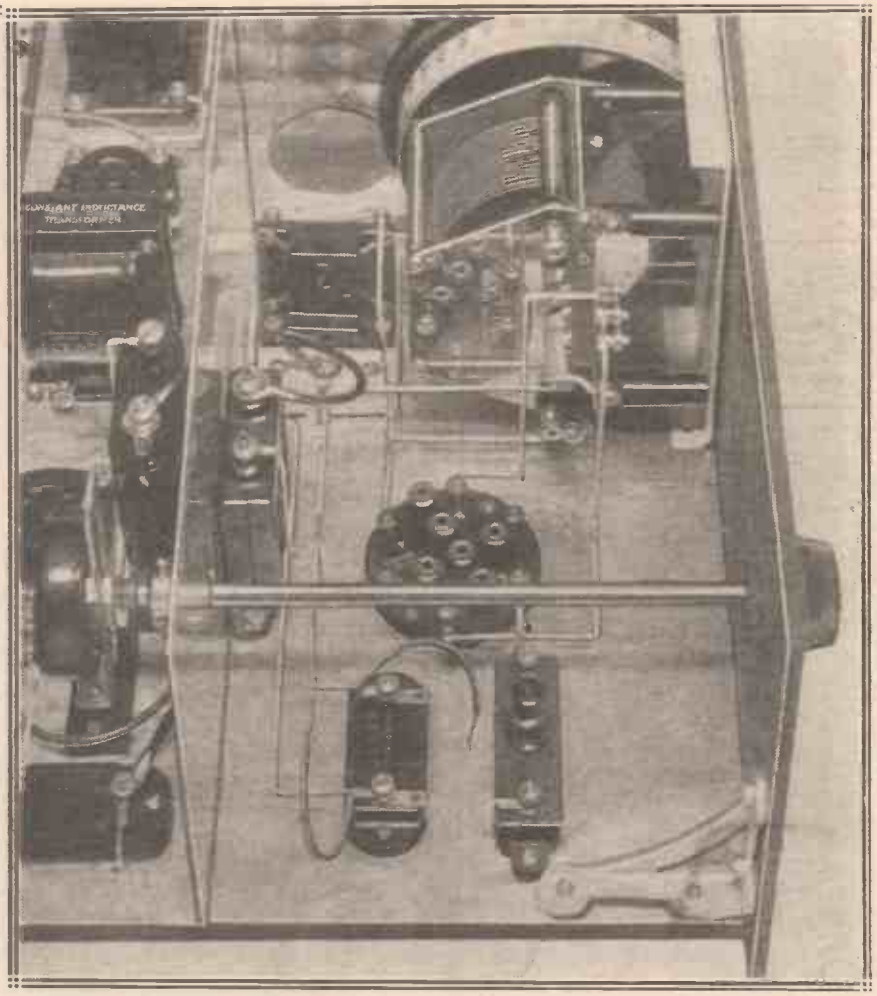
Holes Through the Baseboard

Before you actually connect up any of the leads, the holes in the baseboard through which wires are to pass should be drilled. These holes are all numbered so that you can easily follow them up in their run under the baseboard by referring to the diagram of the underneath.

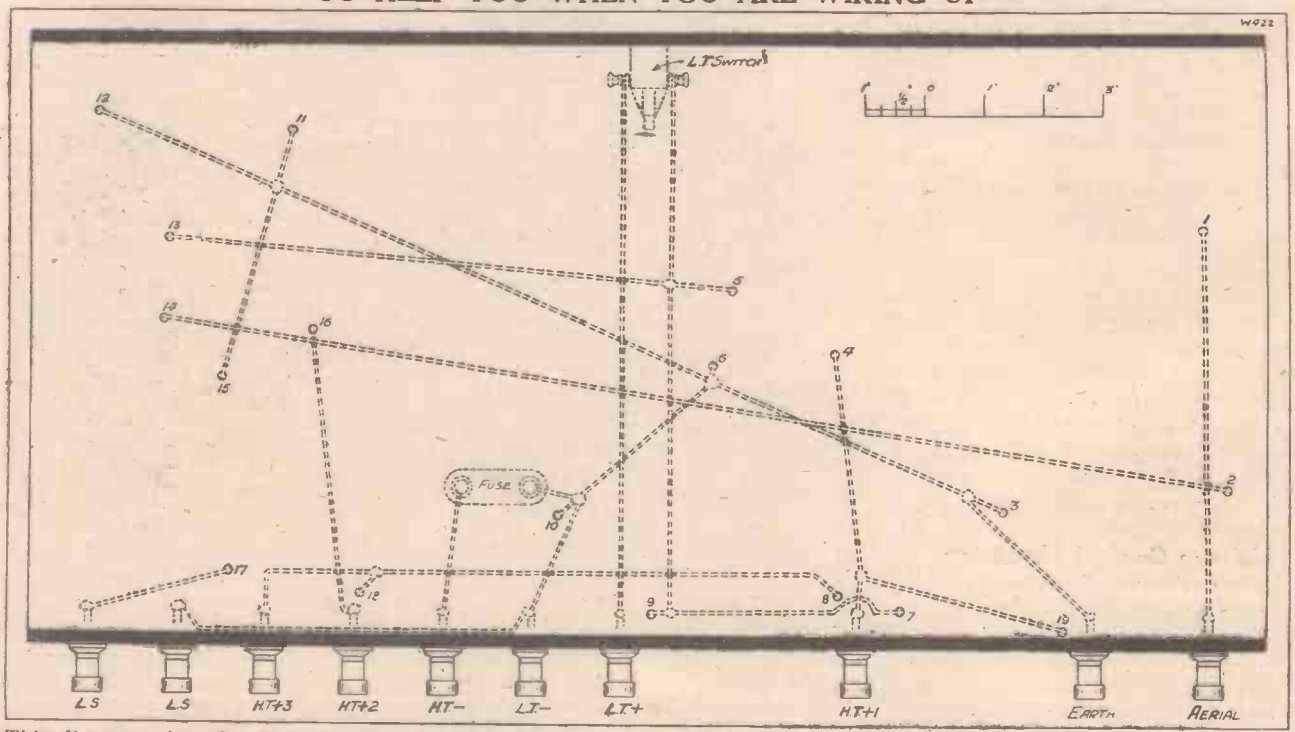
This diagram is shown as though the baseboard were transparent, so that the holes which bear the same numbers in both diagrams are simple to find. Of course, the wiring must be done with some form of well-insulated wire.

This is necessary to avoid short-circuits to the copper foil. In this

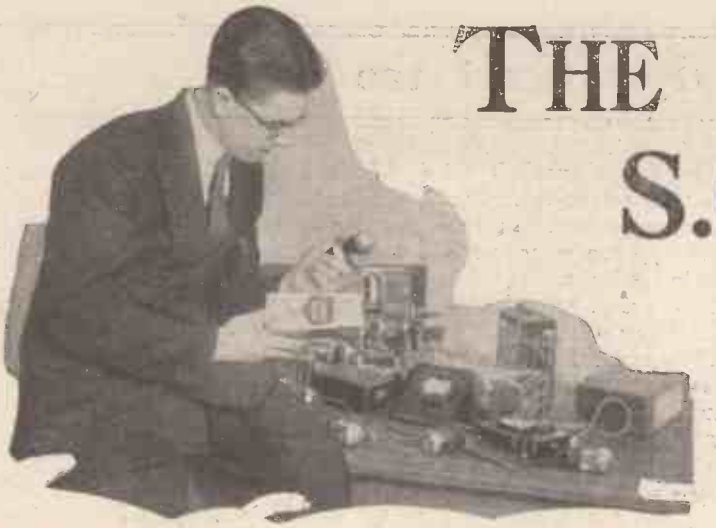
(*Continued on page* 160.)



TO HELP YOU WHEN YOU ARE WIRING UP



This diagram gives details of the under-baseboard wiring, all the numbers given corresponding with those in the larger diagram on a preceding page. So that relative positions remain the same, imagine that you are looking right through the baseboard, and can see the flex wires on its under-side. Above is a view of the H.F. input end, with the volume-control rod passing through the screen.



THE NEW S.G. VALVES

By G. W. EVANS

How the new metallised S.G. valves will affect the home constructor, and a few words concerning the results they give and how they should be used.

IN this number of the WIRELESS CONSTRUCTOR you will notice a set by Victor King in which a double-ganged drive Extenser is employed, and a single stage of H.F. followed by detector and two note-magnifiers. And you will probably wonder why such elaborate screening has been employed in the construction of an apparently simple receiver.

Efficient Screening

But if you look closely at the design you will find that the screening is not so elaborate as it at first appears, but that nevertheless it has been efficiently carried out. I want to impress upon readers who build not only perhaps this particular set, but other sets using screened-grid valves, the necessity for accurate screening. Screening is sometimes difficult, but it is unfortunately a necessity if you want to get high magnification out of the H.F. stages. It is because screening is such an important factor in the construction of H.F. amplifiers that the valve manufacturers have recently brought out metallised screened-grid valves.

A STEP FORWARD

Two of the Cossor metallised valves—the A.C. S.G. and the 2-volt S.G.

You have probably seen some of them already. They consist of an ordinary screened-grid valve with a metallised deposit on the bulb outside, and this deposit is connected by means of copper wire—in the case of one well-known make at least—to one of the filament pins.

Filament Earthing

These filament pins, of course, may come in contact with the L.T. circuit, and therefore, of course, in most designs with earth, but you must be careful when using metallised valves that the correct filament pin be earthed.

In all the WIRELESS CONSTRUCTOR sets the negative L.T. goes to earth, and therefore when using a set with a metallised valve one must be certain that the L.T. negative goes to the correct valve socket, so that when the valve is pushed in it will make contact with the metallic coating on the bulb.

The bulb has been arranged so that in the valve holder the filament socket on the right, looking at the holder from the plate end, is the one which goes to the coating of the valve, and therefore this is the one which should be made L.T.— in the design of the set.

By-passing the H.F.

Should you want to use a valve of this kind with an ordinary set which has not been wired correctly, and in which the wrong filament pin goes to earth, it is usually quite adequate to fit a 1-mfd. condenser across the filament connection of the H.F. valve. This succeeds sufficiently in by-passing the H.F. to earth should it by any chance decide to wander round the filament wiring.

When Using Pentode

In certain cases, especially where a high-magnification valve such as a pentode is employed, there is a remote possibility that some instability might be caused by this sort of thing occurring. Of course, the proper thing would be to insert a heavy-duty H.F. choke in the lead, which will completely prevent any H.F. from going down the filaments; but, as a rule, a by-pass condenser seems to have the desired effect in such cases, which, as I said before, are remote.

METAL JACKETS

Another method of screening the valves is illustrated by this photo of two Six-Sixty valve "jackets."

Metallised valves assist very greatly in obtaining very efficient screening, but care must be taken, of course, as in the case I have just mentioned, that the metal coating on the valve does not touch the screening, and this point of the screen touching the

Mind You Do Not Short the Bias

valve coating is even more important in the case of A.C. valves with automatic biasing.

A Warning!

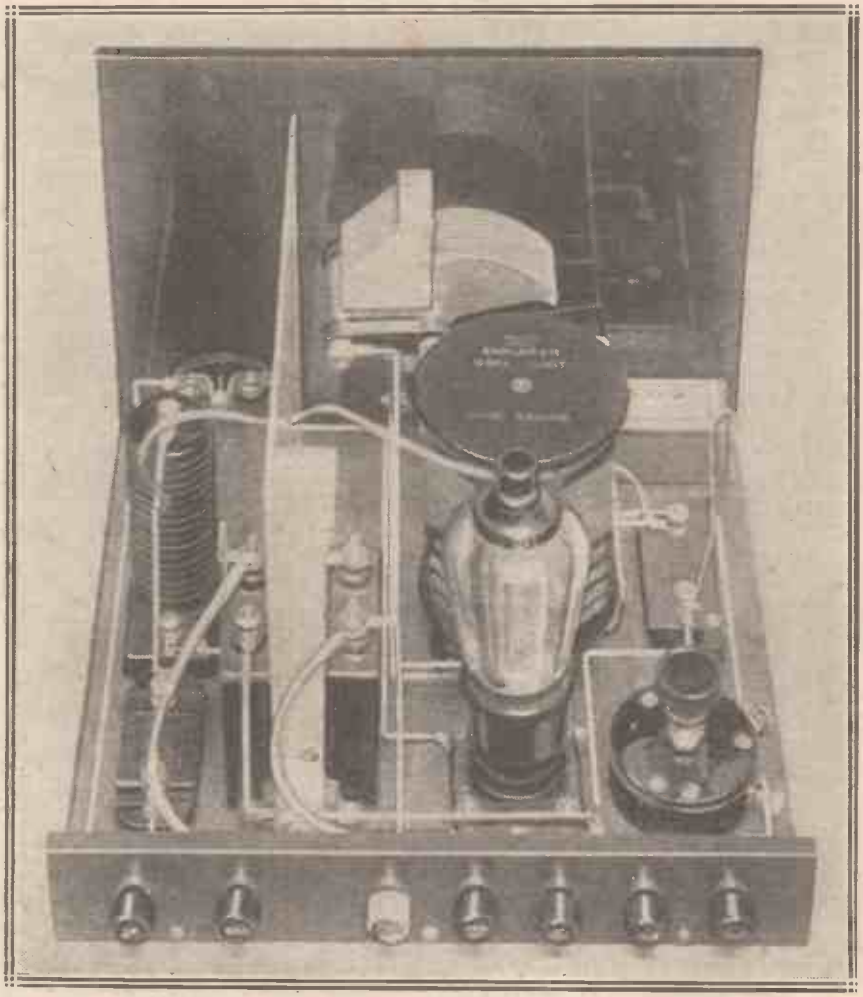
The automatic bias resistance causes a voltage difference between the cathode and earth, so that while the screens are earthed the cathode is at 1½ volts or 3 volts positive, according to the value of the bias resistance; and therefore as the metallic coating on the valve is connected internally to the cathode of the valve, one has the metallic coating at 1½ or 3 volts positive in respect to the screen. Therefore, should a valve touch a screen the grid bias is automatically shorted, and the valve gets none.

The metallic screen principle is being extended to A.C. detector valves also, so that they shall not cause hum due to interaction between their heater elements and the surrounding wiring of the components. That seems a tall order, perhaps, but it is a fact that certain valves of the A.C. type, in the detector position especially, may cause hum by induction between the valve electrode and the surrounding components, and also can pick up hum from the remaining components, however well screened may be the wiring to the valve.

Keeping Out Hum

The screened valve will eliminate such a possibility, though anyone who has much to do with A.C. sets will recognise that the probability of hum being produced by the set is always present.

A USEFUL UNIT



In small sets and S.G. units a plain screen can often be used as above, but even here the new S.G. will greatly assist the set designer to obtain maximum efficiency.

So far I have only tested thoroughly the Cossor metallised valves, but these are really excellent in their characteristics and their results; especially efficient are the A.C. detector valves, the 41 M.H. and the 41 M.H.L. These have very high magnification factors and exceedingly good mutual conductances.

NEXT MONTH

THE AUGUST "WIRELESS CONSTRUCTOR" WILL BE ON SALE JULY 15th.

ORDER YOUR COPY NOW.

The impedance of the 41 M.H. is 18,000 ohms, and it has an amplification factor of 72, giving a mutual conductance of as much as 4. This fine figure is exceeded by the 41 M.H.L., however, which has a mutual conductance of 4·5, having an amplification factor of 52, with an impedance of 11,500 ohms. These are two truly remarkable valves, and we shall no doubt hear a great deal more about Cossor valves in the near future.

There is one thing you will notice in the metallised valve, and that is they always seem to run hotter than the ordinary valve. This, I think, is probably due to the fact that the metal is a good conductor of heat, and this conducts heat from the valve more rapidly than would the ordinary glass bulb, and therefore, of course, the valve feels hotter than it really is.

An Excellent Valve

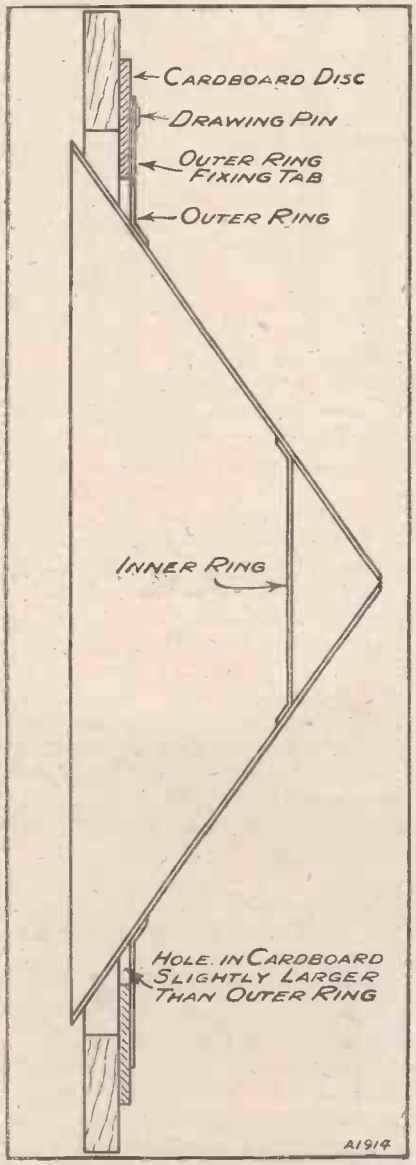
I was quite surprised when I first used the Cossor detector in an A.C. set and noticed how warm the bulb seemed to get, though a little reflection told me it was not really so warm as it felt. Actually, the radiation of heat from the valve will be more efficient with the rough metallised surface, and therefore the valve probably is actually a little cooler than it would be without the metallised covering.

But, as I said before, the rapid transfer of heat from the metal does give one the impression that the valve is running hot—much hotter, in fact, than it really is.

The "SUMMA-CONE"

Here's an idea—a home-made loud speaker forming a light table. It is just the thing for tea in the garden, and the results from it are definitely better than from most outfits costing double the money.

By G. T. KELSEY.



This is a sectional view showing how the cone is assembled and supported.

WHY not enjoy your summer radio to the fullest extent by building yourself a "Summa-Cone"?

What is there particularly "Summery" about the "Summa-Cone"?

Just this. You build a highly efficient cone loud speaker into an easily made table and stand, and when the hot days do arrive you can carry it out into the garden, without any of the usual fuss and bother of finding something on which to stand the loud speaker, and enjoy your radio out-of-doors.

A Useful Article

You can even have your tea on it, providing you are not a big eater! And when you've finished with it out-of-doors it forms quite a useful piece of furniture for indoor use, as well as a means of overcoming that old problem of where conveniently to place the loud speaker.

Moreover, the table top forms quite a useful "parking" place for the receiving outfit, if your set is not an "Elstree Six," or anything bulky like that.

But the applications of the table top and the advantages of having the loud speaker on a permanent stand do not by any means complete the story of the "Summa-Cone." Quite apart from all this the loud speaker itself is one of exceptional merit, and is capable of giving results quite on a par with, if not better than, any of the best modern cone loud speakers.

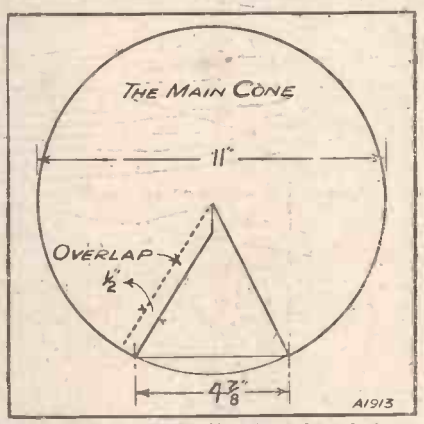
Brilliant Reproduction

And the reason for this is that the "innards" of the "Summa-Cone" are identical with that ingenious design produced by the Research Department a few months ago which was given the name of "Brytacone." From my own personal tests I'm convinced that they couldn't possibly have chosen a better title.

As they said at the time, everyone has been so concerned with obtaining low notes that they have been rather apt to overlook the fact that if the low notes are obtained only at the expense of the high ones then the resultant "boominess" cannot provide anything approaching realistic results.

And that was precisely what they set out to avoid in designing the

CUTTING THE KRAFT



This is how the section is cut out from the main cone.

WHAT YOU NEED FOR THE "SUMMA-CONE"

1 Loud-speaker unit (Blue Spot, or Brown Vee, Ormond, Bullphone, Edison Bell, G.E.C., Amplion, Lissen, Triotron, Hegra, W.B., Wates, Wufa, etc).
1 Set of legs (Peto-Scott).
Wood for sides and top (see text and diagrams for sizes).

The "Summa-Cone"—*continued*

"Brytacone." The design at which they finally arrived, after trying dozens of different cone arrangements, is about the nearest approach to realistic radio that I have ever heard from any loud speaker of the cone type.

It does not produce the slightest trace of "boominess" any more than it over-accentuates the high notes. It's a sort of happy medium between the two, with sufficient bass to be pleasing and a high-note response producing that brilliance which makes reproduction sound so natural.

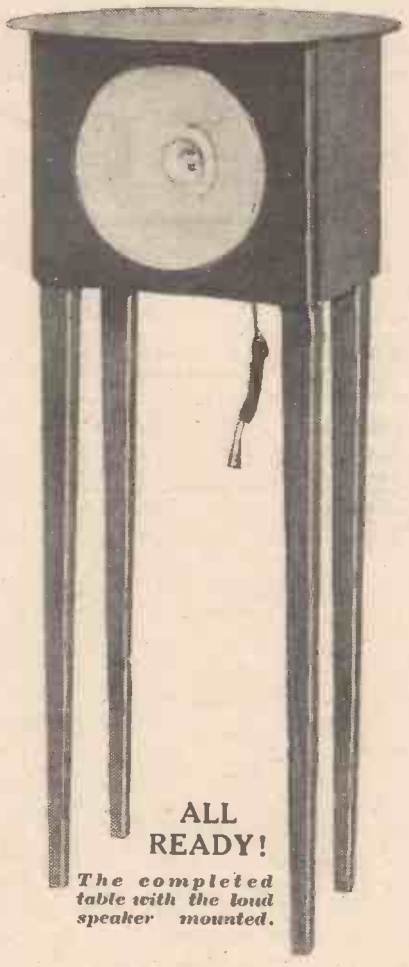
Unusual Sensitivity

There is, as a matter of fact, another advantage of this particular design, and that is to do with sensitivity. The light weight of the cone, together with the extraordinary rigidity given by the "Brytacone" scheme of assembly, result in a loud speaker that has a higher degree of sensitivity than is obtained with more conventional arrangements.

Made for 30s.

So that if you are in need of a really good loud speaker—not only for use in the open air during the summer, but for indoor use as well—you cannot do better than to build yourself a "Summa-Cone."

It is by no means an expensive outfit to build, and if you choose a fairly cheap cone unit of guaranteed make it need not cost you a penny more than thirty shillings, if as much as that. The total cost will, of course, largely depend upon the materials you choose, but we can reckon upon the unit costing a pound, the legs will cost about 7s. 6d. (they can be obtained all ready for use from Messrs. Peto-Scott), and to keep within the thirty-shilling limit that allows half a crown for the wood and the cone paper.



ALL READY!

The completed table with the loud speaker mounted.

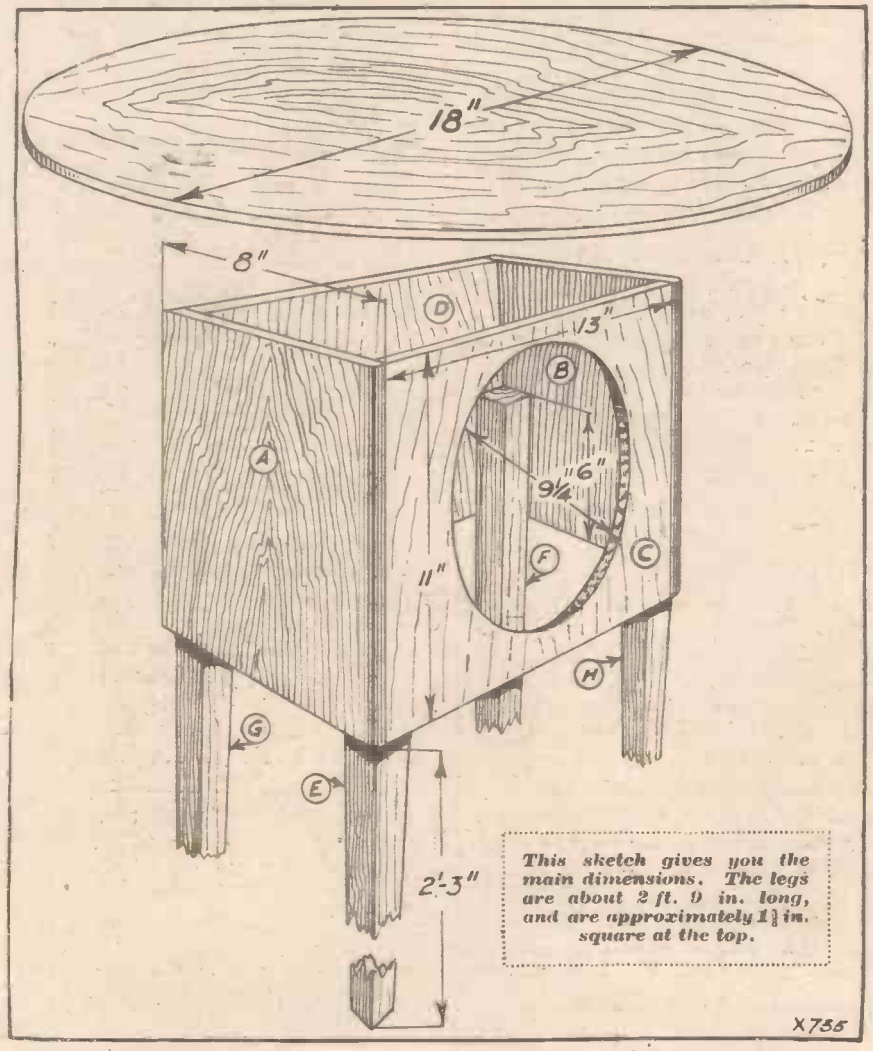
That brings us to the actual construction, and in this connection I would ask you not to be misled into thinking that the "Summa-Cone" is beyond your capabilities as a home-constructor on account of the somewhat "snappy" appearance of the cabinet or table into which it is built.

Assembling the Wood

You can get the wooden side pieces and the table top ready cut to size and shape, and there is certainly nothing difficult in the assembly. You simply screw side C to legs E and H, and do the same with side D and the other two legs, and fix the whole thing together by means of the two sides A and B.

All these letter references are on the sketch diagram of the cabinet,

WHAT THE WOODWORKER WANTS TO KNOW



This sketch gives you the main dimensions. The legs are about 2 ft. 9 in. long, and are approximately 1½ in. square at the top.

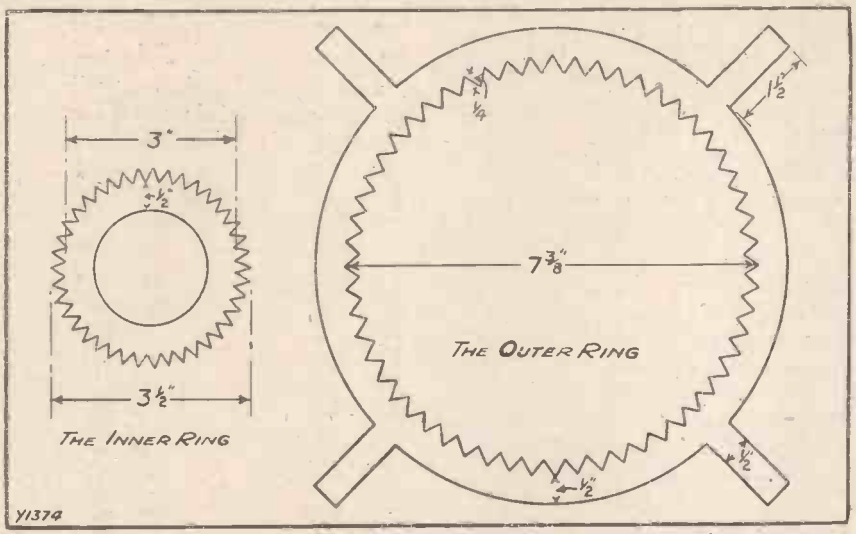
X756

The "Summa-Cone"—*continued*

and if you work from this diagram you won't be likely to go very far wrong. Side D, by the way, will have to be removed in order to fit the cone and unit in position, so it would be advisable not to make too firm a job of this particular side when assembling the woodwork.

Now with regard to the actual cone, this is made from ordinary "Kraft" paper (size 120 lb. to the ream). The diameter of the circular disc of paper from which the cone is made is 11 in., and out of this a V-shaped piece should be cut $4\frac{7}{8}$ in. across. All the necessary constructional details of this main cone and the two "teethed" rings are given in the diagrams, and all that it is necessary to mention is that the number of teeth around each of these rings is quite immaterial.

HOW TO SHAPE THE TWO RINGS



Here is the whole idea in a nutshell, and it will be seen that it really is quite straightforward.

Cutting the Teeth

You need only take a pair of compasses and draw a circle as a guide to where the teeth commence, and another to indicate where they end, and you can then sketch them in free-hand, making each "tooth" roughly about a quarter of an inch across.

In order to fix the inner and outer rings in position the "teeth" should be bent up all the way round to an angle of something rather less than 45 degrees. Fix the inner or smaller ring first, and when you secure the outer ring, place the cone flat on the table with the apex pointing upwards.

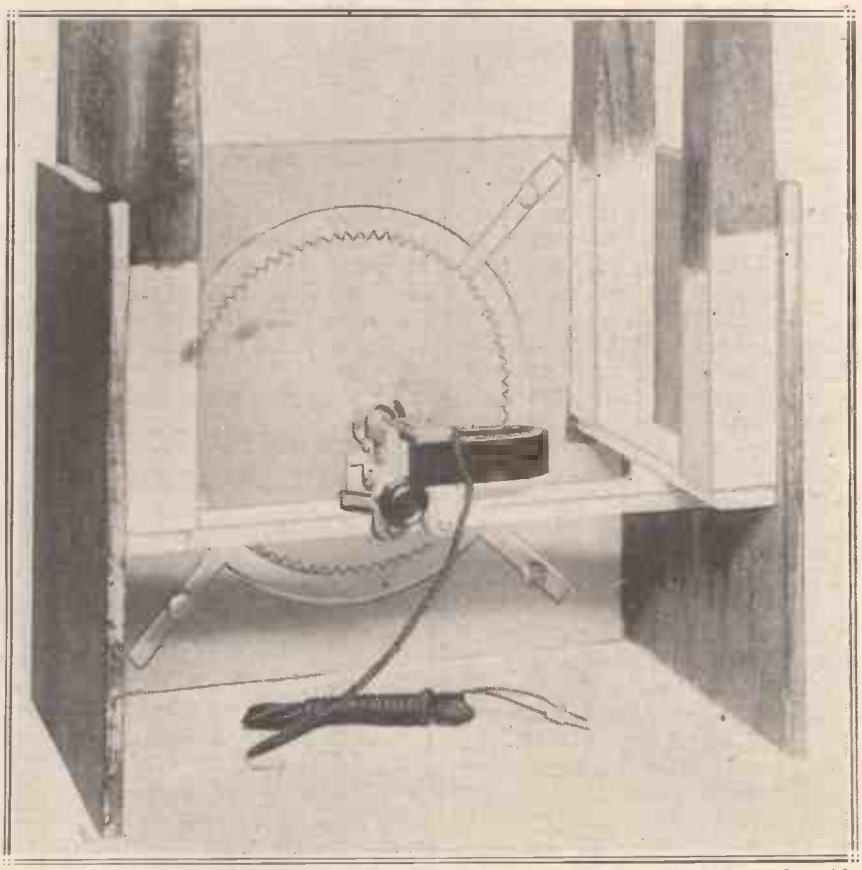
The method of fixing the cone to the front of the cabinet can easily be followed from the diagram showing the finished thing in side elevation. A piece of fairly thick cardboard with a hole in it just slightly larger than the outer ring goes between the tags on the outer ring and the wooden front, and both the cardboard and the tags of the outer ring which support the actual cone are fixed to the wooden front by means of ordinary drawing pins.

The Unit Mounting

To complete the loud speaker it simply remains to fix the actual cone unit. In this connection the dimensions of the wooden strip on which the unit is fixed have purposely been omitted, as the size of this strip will obviously depend upon the unit chosen.

All that you need to remember is that the unit must be arranged so that the reed is dead in line with the apex of the cone, and placed so that the reed protrudes through the cone for about three-quarters of an inch.

FIXING THE L.S. UNIT



To get this view of the unit in place the back was removed and the table turned upside down.

ROUND the DIALS

Practical notes on what stations to look for and how to get the foreigners that are coming over well.

ALTHOUGH the months of May, June and July used to be considered radio's off-season, the enthusiastic long-distance man has recently found plenty to interest him. And there is a good time ahead, by all accounts.

* * *

Several of the promised increases of power have now well and truly materialised. And consequently several of the foreigners are coming in with real punch, even though it is summer-time.

Lwów, the Polish programme on 381 metres, is a case in point, and other summer-defying foreigners are our old friend Langenberg, now rejuvenated, and Sottens (403 metres) and Beromunster (459 metres).

* * *

On the long waves my own star surprise has been Reykjavik, who often outshone Oslo during the past few weeks. But having incautiously boasted of that to a friend (without "touching wood") I found on the next occasion I tried for Reykjavik that it had gone almost off the earth altogether—too weak to bother about. I am hoping it decides to come back again, for there is still a touch of novelty about this Icelander on 1,200 metres.

* * *

The queerest thing of all is that occasionally those Americans are still finding their way across the herring pond on ordinary wave-lengths! A friend of mine hauled Schenectady out of a lot of crackles and X's one night, and hung on to him long enough to make sure that it really *was* Schenectady, and not a relay from the Continent.

* * *

That is extremely good going for this season of the year, but I must admit that long before May was out I gave up losing beauty sleep on America's account. (For one thing, X's have been distinctly trying, and there is nothing so conducive to the acquirement of an unduly enlarged vocabulary as trying for weak stations through X's. *Is* there?)

* * *

For programmes that *are* programmes, and not mere wraiths of sound, I would suggest, on long waves, Radio Paris and Eiffel Tower, Kalundborg, Warsaw and Huizen as offering the best chances. That is the order in which I get them best, and they are—at the time of writing—all reliable.

* * *

On medium waves Rome and Toulouse come next to Mühlacker and Heilsberg in order of merit, followed by Lwów, Brussels No. 1, Hilversum, and quite a crowd of possibles, including Frankfurt, Konigsberg, Hamburg, Katowice, and Beromunster. Not a bad selection for what they used to call the "off season" is it?

POINTS FOR PURCHASERS

Interesting details from manufacturers about recent trade activities.

FERRANTI'S hand out the good tidings that certain of their fixed condensers, including the C.1 type (2 mfd., 1,050 volts D.C. test), have been somewhat reduced in price. This particular type, the C.1, is intended to work on a D.C. pressure of up to 525 D.C. volts, or if used for A.C. work for a pressure of up to 350 volts, and even at its old price of 5s. 6d. was looked upon as good value. The new price is 4s. 9d.

In honour of their new heavy-duty flexible resistances, Lissen, Ltd., have prepared a new leaflet giving full details of the whole range. Very attractive it looks, too, ranging from a 600-ohmer at 7d. to one of 200,000 ohms resistance which comes out at half-a-crown.

This is going to be another successful Lissen line, by the look of it—only the finest chrome-nickel resistance wire being used.

Get the Real Thing

Loud-speaker purchasers will be specially interested in the following warning issued by British Blue Spot, Ltd.:

"We wish to urge the public when purchasing Blue Spot units to particularly see that the unit is contained in our proper standard carton, which is printed in yellow and two contrasting blues; further, that the carton bears the Blue Spot trade mark as shown in our advertisements from time to time. Our limited licence clause should be on the back of all such cartons, and the printed guarantee inside the lid.

"In the case of the 66R unit, the public should particularly look for these points, and also make certain that the unit is screwed on to a wooden baseboard bearing a boldly printed serial number. When lifting the unit and baseboard from out of the carton there should be proper chassis fittings on the underside of the baseboard in question.

A Special Warning

"The reason why we specially mention the 66R unit is because there appears to be a number of units on the market which cannot be offered as genuine Blue Spots. Complaints have been reaching us for some little time, and it is definitely established that the units in question have been assembled from component parts *which have been stolen from the Works.*

"The units are not, of course, supplied in boxes. In most instances they do not function at all, but invariably they are not properly adjusted, nor have they passed through the full stages of manufacture.

"Needless to say, such units cannot be recognised by us as genuine Blue Spot, and the public when buying the 66R unit should bear in mind the above remarks."

NEXT MONTH

Look out for the August "Wireless Constructor"

ON SALE JULY 15th. Price 6d.

A "Trapper" for the North

Now the North Regional is getting well into its stride many listeners are looking out for a good means of "getting rid of it." This "Trapper" is just what they need, but at the same time its usefulness is not confined to the one station; it is just as suitable for any other medium-wave transmission.

By the Research Dept.

WHAT with the recent changes in wave-lengths, and the greatly increased power of their local transmission, many listeners in the North Region are no doubt finding their sets unable to deal very efficaciously with the new conditions.

Letting in the Foreigners

So far as the wave-length change is concerned, if a set does not tune up high enough it will usually be an easy matter to use a larger coil or to add a few turns.

Things may be very nice and rosy for those who are content with just the local programmes, but to the habitual distance-listener increased power is not at all an unmixed blessing. He, no doubt, longs to be able to switch off the power supply of the new giant, so that his favourite continentals can struggle through once more.

And it is not unlikely that the "local man" will meet a spot of bother also when it comes to choosing between National and the Regional programmes. Then he, too, may begin to think in terms of "not unmixed blessings," or perhaps something stronger!

A Complete Cure

Still, in times of such stress it is well to remember the old song of which the words run something like this: "For every evil under the sun there is a remedy. Try and find it . . .," etc. But in this case you don't even have to look for it, you simply have to make up the cheap little gadget we are now going to describe to you.

No receiver alterations whatever are necessary. The new-found friend is merely connected up in series with the aerial lead to the set, and your troubles vanish.

Station tuning is not affected, and you have nothing extra to do once the "Trapper" is set except listen in peace whenever you like. The initial adjustment is simplicity itself, and, once made, so long as the unit is left in, the local will be left out.

There are only three main components. A fixed condenser, a compression-type variable condenser, and a coil. The coil can either be made at home, or you can use an ordinary plug-in of the pin and socket type.

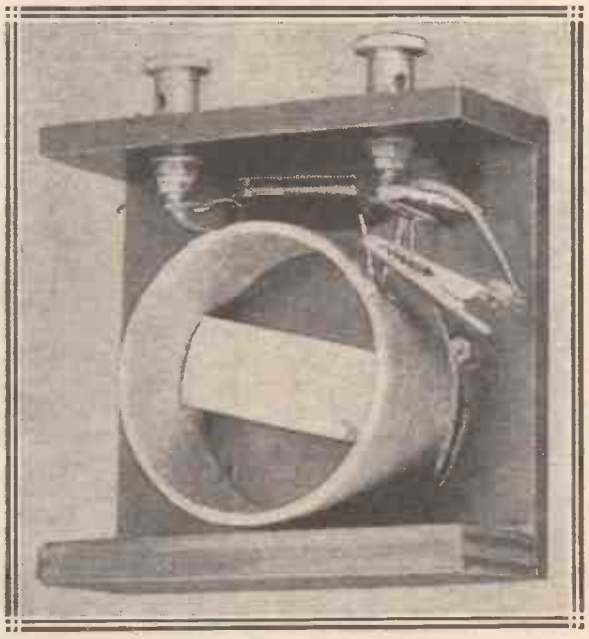
A glance at the photographs will give you an idea of the way in which the design is arranged. You will see that there is a piece of ebonite supported on two end pieces, one of which carries the two connecting terminals

Placing the Parts

On top of the ebonite is the compression-type variable condenser, the home-wound coil and the fixed condenser being underneath the small panel. That is, at least, so far as the version with the home-made coil is concerned.

If you intend to employ an ordinary plug-in coil, as has already been

BEFORE THE TRAP IS SET



This is how the "Trapper" looks when turned over. The coil taps, to one of which the spring clip is attached, are easily discernible, and the method of securing the coil with a strip of wood which has been rounded and fitted inside the former is also clear.

A "Trapper" for the North—*continued*

suggested, you will follow a somewhat different arrangement. The scheme is shown in a special diagram, from which you will gather that in this case the coil is carried on the top of the ebonite panel. (This makes it an easy matter to change the size of coil if necessary.)

Using the Taps

The range of wave-lengths that the compression-type condenser will cover is not quite so large as it would be if it were connected directly across the coil. The reason for this is naturally that the fixed condenser in series with it cuts down its effective maximum.

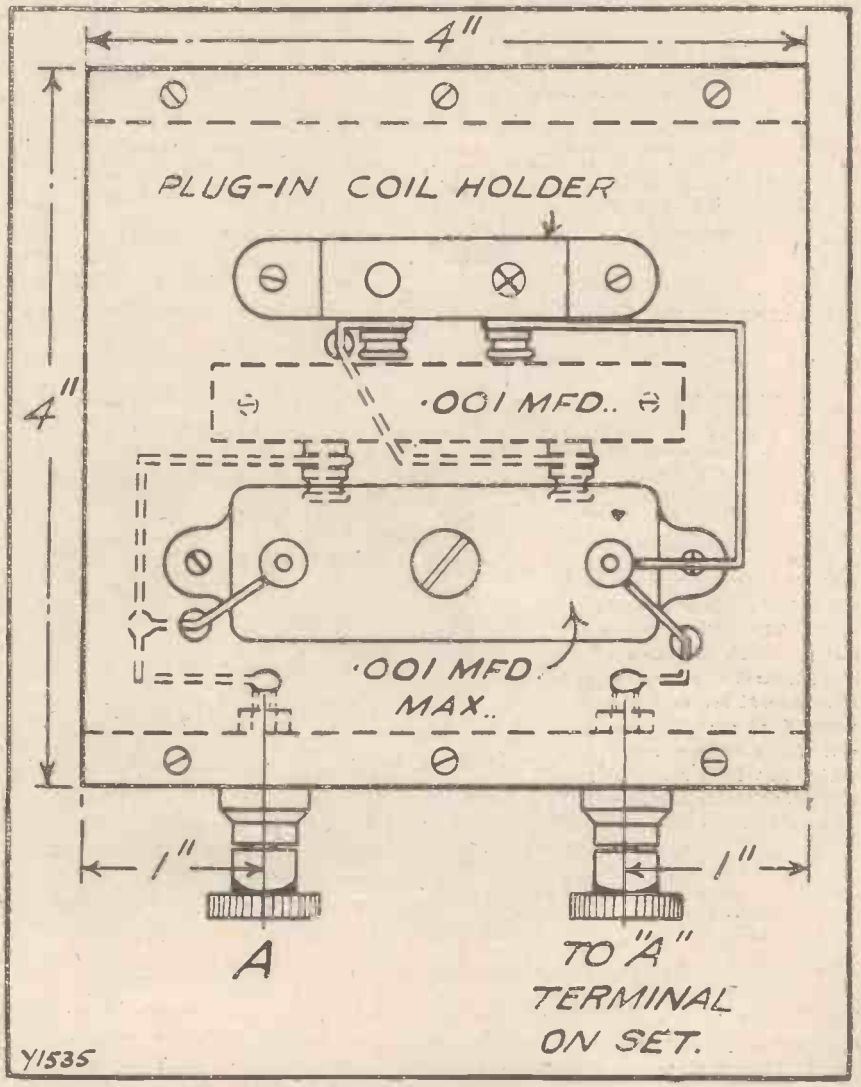
That is the reason why the coil below the ebonite panel is provided with one or two taps. If the unit does not tune satisfactorily to the station you wish to remove, you simply move the clip on to a different tapping.

Thus you alter the number of turns in the coil so far as the circuit is concerned. If you are using the second scheme that is suggested—namely, employing a plug-in coil—no tapping arrangement is necessary. In this case you simply change the coil for a different one.

Coil Construction

Now that we have told you about the working of the unit we will pass on to the practical considerations. First of all, the components.

ABOVE AND BELOW AT A GLANCE



If desired, an ordinary two-pin plug-in coil may be used in place of the home-wound solenoid. In this case the wiring will be a little different, because the spring clip is not used. The full wiring is shown in this diagram, the below-panel details being dotted.

There are, as we have already mentioned, very few of these; but all the same, for your convenience, they are set out in our usual way with makes and alternative makes. If you are going to make your own coil you will not need the single-coil holder that is specified.

What You Need to Build the "Trapper" for the North

- 1 ·001-mfd. max. compression type variable condenser (Formo, or Lewcos, R.I., Lissen, Polar, Sovereign, etc.).
- 1 ·001-mfd. fixed condenser (T.C.C., or Ready Radio, Telsen, Dubilier, Ediswan, Ferranti, Lissen, Mullard, Igranic, Watmel, Formo, Graham Farish, etc.).
- 2 Pieces of ebonite, one 4 in. × 4 in., and one 4 in. × 1¼ in.
- 2 Indicating terminals (Eelex, or Clix, Belling-Lee, Igranic, etc.).
- 1 Single-coil holder (Lotus, or Red Diamond, Wearite, Magnum, Keystone, Lissen, etc.). (See text.)
- 1 Piece of 2½ in. diameter coil-former 1½ in. long. (See text.)

Screws, spring clip, wood, 2 oz. wire (26 D.S.C.), etc.

First of all, here is how to set about the coil. Near one end of the former, about ⅛ or ¼ in. from it, make two small holes ⅜ in. apart.

Secure the beginning of the wire by threading it through these holes a couple of times, but leave 6 in. or so for connecting up purposes. Now wind on as tightly as possible 55 turns.

Looping the Loops

The turns should be kept as close together as possible, and at the 35th turn you have to twist up a little loop for a tapping. Then you carry on with the winding for 10 more turns, when another loop is made.

The addition of 10 more turns completes the coil, and you can finish off the winding by making two more small holes and twisting the wire through them. This time there is no need to have a lead for connecting up; just leave a small piece of wire to which the spring clip can conveniently be attached.

To finish off the taps: without untwisting them completely remove the insulation, and give them a final tightening twist. If you do this with pliers be careful not to break the wire or you will have the job of winding all over again.

Having completed the coil you have

A "Trapper" for the North—*continued*

very little to do. The next jobs should be to drill the panel, put on the end supports, and then fix the parts in place.

The fixed condenser goes under the panel, to which it can be attached if desired. The home-wound coil also goes under the ebonite, to which it is attached by means of a nut and bolt.

An Idea for Fixing

This nut and bolt passes through a small piece of wood that just fits inside the former, and which is held in place there by two small wood screws passing into it from outside the former. On top of the ebonite is the compression type variable condenser. (And if you are going to use a plug-in coil, the coil holder for this also.)

The wiring is perfectly straightforward and does not need any comments at all. You simply have to follow the wiring given in one of the diagrams.

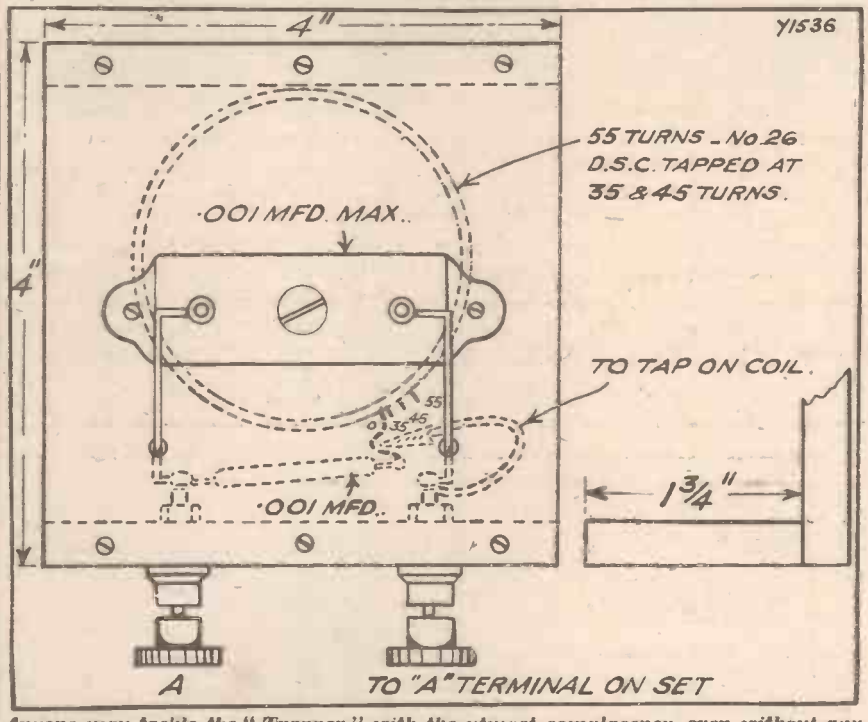
Well, now we will go ahead to the time when your "Trapper" is completed and you are ready to fix it to the set. Incidentally, you can literally fix it to the set if you like. You will find it quite a good idea to screw it to the side or back of the receiver's cabinet.

Setting the Trap

To start off with, either plug in a No. 60 coil or put the tapping clip on to the end of the coil. You then remove the aerial lead from its terminal on the set and attach it instead to one of the terminals on the unit.

Between the other terminal of the unit and the set's aerial terminal you now join another piece of wire and all is ready to start receiving. Commence by tuning in the interfering transmission with the reaction adjustment set at zero.

NO CONSTRUCTIONAL SKILL REQUIRED



Anyone may tackle the "Trapper" with the utmost complacency, even without any previous constructional experience whatever. This diagram gives the full details of the home-made coil version, and shows how it is connected up.

It is important that the transmission is really properly tuned in, on all tuning controls of the set if this has more than one. Now very slowly screw the adjusting knob of the "Trapper's" compression type condenser from its maximum position towards its minimum.

This should preferably be done with some extension instrument such as a wooden-handled screwdriver. Or a small piece of round wood cut to a wedge shape at one end to fit in the cut in the knob of the condenser is very useful for the purpose.

As you turn the knob you will find a point where the unwanted transmission either vanishes completely or comes through very weakly.

This is the setting at which to leave the unit. The setting may prove a little critical in some cases, hence the warning to adjust the condenser slowly.

When Not Wanted

That completes the details both of the construction and operation of the useful little instrument. When you wish to receive the station that is cut out, you simple short across the unit's two terminals with a piece of wire, or if you like you can short across them by means of an on/off switch connected up for the purpose.

Until you try the unit you cannot possibly realise how completely it will clear up the dials. So we must now leave it to you, with our assurance that it will do the trick better than any other type of wave-trap.

A BIG LINE IN STAY ADJUSTERS

These giant adjusters for the tension of mast stays at the high-powered Warsaw station are somewhat heavier than the simple affairs we use on our mast assemblies. Still, so are the masts!

QUEER QUERIES

Some suggestions about unusual radio faults that may help you towards better reception.

By P. R. BIRD.

"Left on All Night"

Do you ever leave your set switch switched on all night, and then console yourself with the delusion that because it was making no sound it was wasting no current?

Perhaps you will smile to see that question. Perhaps you will wonder how anyone could possibly *expect* a set to consume no current when it is "on." And yet hundreds of people make that mistake.

The truth is, of course, that a set which is controlled by a simple on-off switch uses a certain amount of current from its H.T. and L.T. supply all the time it is switched "on," and that amount varies only to a negligible degree *whether a programme is being provided or not.*

To readers with considerable experience it may seem unnecessary to emphasise such a fact, but I can assure them that it is necessary sometimes to call attention to this state of affairs. Several "mysterious" cases of run-down batteries which have proved quite puzzling would never have cropped up at all if every listener had realised it.

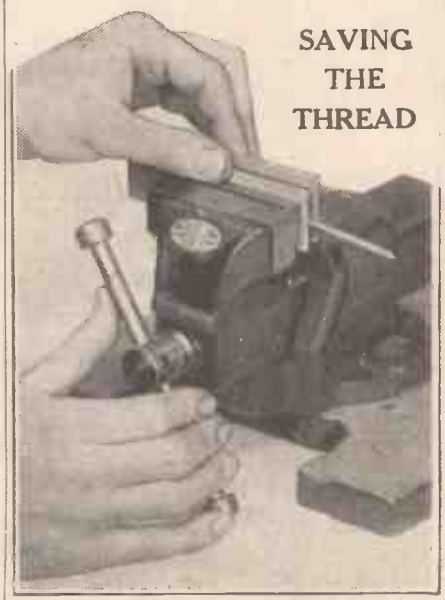
A Switch for the H.T.?

Evidently the somewhat warmer weather has been "taking it out" of our H.T. batteries just recently, if one can judge by the reappearance of queries about switching off H.T.

"Is it necessary?" some ask. Others, convinced that it is, say: "Will an ordinary on-off switch do?" And as there seems a lot of uncertainty about the whole affair, perhaps it will be as well briefly to refer to the main points.

Everyone who uses an H.T. battery wants to ensure the longest possible life for it. Will a switch help in that? It will if the set has "leaky" insulation—if there is a dud by-pass condenser, for instance, or a piece of frayed coating on what is supposed to be an insulated wire. (Even a cheap piece of what was assumed to be "ebonite" has sometimes proved to be simply a high-resistance and a current waster!)

SAVING THE THREAD



Don't grip threaded rod with the vice, but insert wooden "cheeks" which can be tightened up on it. It won't take a minute to slip them on, but it will save a lot of time and trouble being spent on damaged threads.

In nearly all such cases the use of an on-off switch in the lead to the H.T.B. negative will stop the trouble when the set is switched off. And as it is "off" most of the twenty-four hours there will be a correspondingly big save in current consumed.

Of course, there *ought* to be no need for an extra switch in the H.T. negative lead. Theoretically, the mere cutting-off of the L.T. should cut off the H.T. as well, and so the one L.T. switch should be sufficient.

It would be sufficient if all insulation were perfect. And if you can check your insulation's performance by means of a good milliammeter there is no need to use an extra switch to cut out H.T.

Nevertheless, the fact remains that plenty of people who find their H.T.B.'s running down too quickly have no means of checking insulation; but they have a spare on-off switch knocking about, which could be tried in the H.T.— lead. And if it stops the leak and makes the battery last longer—well, why not put it in?

HOW'S THE SET GOING?

If you are puzzled by a radio problem, remember that the "Wireless Constructor" Technical Queries Department is fully equipped to help you.

Full details of the service, including scale of charges, can be obtained on application to the Technical Queries Department, "Wireless Constructor," Fleetway House, Farringdon Street, London, E.C.4.

SEND A POSTCARD, on receipt of which the necessary application form will be sent by return.

LONDON READERS, PLEASE NOTE. Application should not be made by telephone, or in person at Fleetway House or Tallis House.

S.G. Voltages

The prevalence of complaints of curious distortion effects, non-selectivity, and poor H.F. amplification would seem to point to the fact that the S.G. valve is often being very unfairly treated in the matter of voltage.

Those who have regularly read the valve articles in this journal will be familiar with the fact that incautious departures from specified S.G. voltages will often have the most curious effects on the behaviour of the valves —even to the extent of apparently reversing the direction of current flow!

As a general rule it should be remembered that whilst a little latitude may be tolerated in the S.G.'s anode volts, it is more critical about its correct screen volts. And the anode and screen voltages must be kept relatively proportioned, within limits; for if one is increased and the other ignored the characteristic is pretty sure to be seriously upset, to the detriment of quality or amplification

AS WE FIND THEM

Six-Sixty Valve Screen

THE increasing efficiency of modern radio designs, together with the advent of high-magnification all-mains sets, has made it desirable in many cases to screen certain valves in the receiver. This applies in particular to the S.G. and detector valves.

Messrs. Six-Sixty Radio Co., Ltd., of 17–18, Rathbone Place, Oxford Street, London, W.1, have recently introduced an aluminium screen retailing at 1s. 3d. At one end of the screen there is a lug, which is bent over inwards at right angles. This lug has a hole drilled in it, and the valve is placed inside the screen so that the valve pin, which is connected to earth, passes through the hole, and so makes contact with the metal screen.

The Six-Sixty valve screen is attractively finished and should prove a useful aid towards ensuring stability on the H.F. side, or as a means of minimising hum in the case of a detector valve.

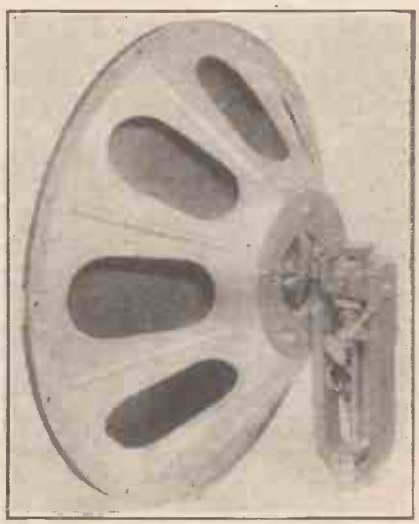
SANDBLAST FINISH

This standard type of Magnum vertical screen has a pleasing matt finish. It is made of aluminium.

Aluminium Screens

Messrs. Burne-Jones & Co., Ltd., 296, Borough High Street, London, S.E.1, have sent us one of their latest screens for use in H.F. amplifying

MATCHES THE VALVE



The Wufa cone loud-speaker assembly which is provided with means for varying its impedance.

circuits and draw our attention to the improved sandblast finish. They inform us that a special plant has been installed and that in future all "Magnum" aluminium components will have this finish.

We have examined the screen and commend Messrs. Burne-Jones on their excellent workmanship. The sandblast finish adds greatly to the appearance.

The Wufa Loud Speaker

We recently tested out one of the Wufa 60-pole speaker units, which are now being marketed by M. Lichtenberg, 4, Great Queen Street, London, W.C.2.

The unit bears the hall-mark of first-rate workmanship, and is a thoroughly soundly-constructed mechanical job. Terminals are provided to enable the windings to be matched up with the particular output valve used.

The cone is of a fairly large diameter, and on test we found the results very pleasing to the ear, while at the same time the degree of sensitivity was excellent.

This unit is sold by itself for 27s. 6d., or complete with chassis for 40s.

Polar Gang Condenser

Messrs. Wingrove and Rogers, Arundel Chambers, 188–189, Strand, W.C.2, have sent us one of their latest Polar "Tub" two-gang variable condensers.

Each section has a rated capacity of ·0005 mfd., and the matching is guaranteed to be within 1 per cent.

A DOUBLE GANG

A special aluminium case and "star-wheel" trimmers are features of the Polar condenser illustrated here.

As We Find Them—*continued*

To ensure accurate balancing each section has a trimmer controlled by a star wheel. The condenser frame is a solid aluminium casting and the assembly is solidly constructed. The sections are screened from each other and the shielding is completed by an aluminium cover enclosing the unit. There was no trace of side- or end-play in the bearings of the specimen submitted, the moving vanes rotating perfectly smoothly without "stickiness."

It is an excellent mechanical and electrical job, and the price (less drum-drive) is 21s.

A Becol Product

Messrs. The British Ebonite Co., Ltd., Nightingale Road, Hanwell, W.7, have submitted a 6-in. length of their new type 13 low-loss former for our examination. The former has six ribs and has an outside diameter (over the ribs) of 3 in. The price works out at 6d. per inch length, i.e. the 6-in. former is 3s.

The former is nicely finished and

LOW-LOSS FORMERS

These Becol formers are obtainable in varying lengths, and are 3 in. wide over their ribs.

the ebonite is up to the usual high standard of this firm's products.

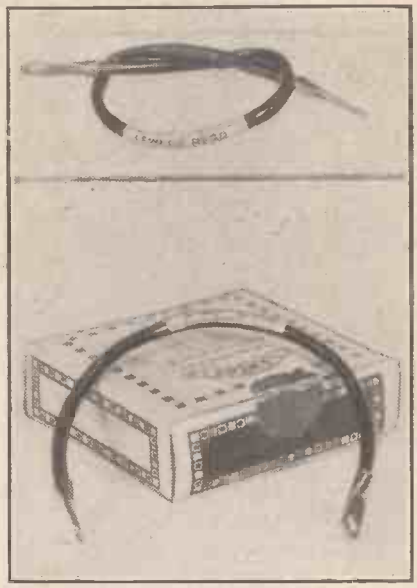
New Lewcos Component

Messrs. London Electric Wire Company & Smiths, Ltd., of Church Road, London, E.10, have now added to their already extensive range of components by placing on the market a series of Spaghetti type resistances having values ranging from 300 ohms to 100,000 ohms. The 300-ohm type is rated to carry 50 m.a., and the 100,000-ohm type 5 m.a.

These resistances are well made, the value being clearly marked on the sleeving, and the specimens we tested were found to be well within the practical limits of the rated values.

Resistances of this type are particularly handy, and have the advantage

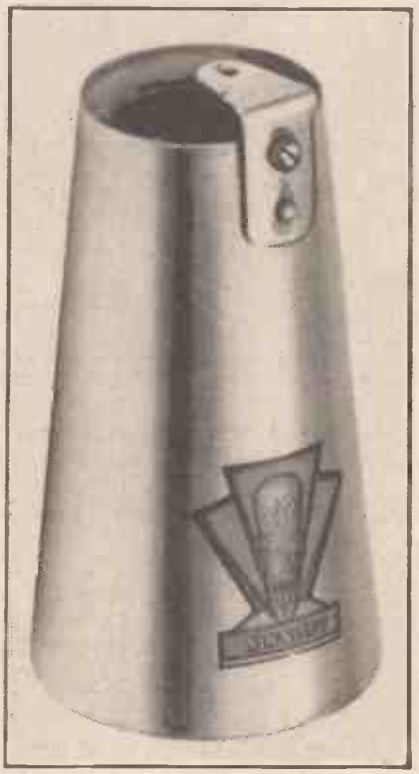
USEFUL SPAGHETTIS



This convenient form of resistance is now obtainable in the Lewcos range of components.

of taking up very little space in the receiver. They are also highly suitable for use in mains units. Amongst their many uses may be mentioned

FOR S.G. STABILITY



The neat Six-Sixty valve screen described on the preceding page. The tag fits over one of the filament pins.

de-coupling on the H.F. side, R.C.C. coupling, and in mains units for breaking down the voltages, etc.

The prices vary from 9d. for the lower values to 1s. 6d. for the 15,000- to 100,000-ohm range.

Atlas H.T. Unit

Messrs. H. Clarke & Co. (Manchester), Ltd., Atlas Works, Old Trafford, Manchester, the well-known makers of "Atlas" components, have sent us one of their A.C.244 mains units designed for supplying H.T. from A.C. mains.

The unit utilises a dry metal rectifier and comes within the 20 m.a. class. It is intended for use with sets of medium size, such as portables and circuits of the popular S.G., detector and L.F. type.

There are three H.T. positive tappings, having nominal voltage ratings of 60–80, 90–100 and 120–150. The first tapping is intended to supply the small current required for the screening grid of an S.G. valve (about ·5 m.a.), the second tapping may be

NO VALVE EMPLOYED

Made by the well-known Manchester firm, this unit employs a rectifier of the dry metal type.

used for the detector and S.G. anode voltage, whilst the 120–150-volt tapping is suitable for the output stage.

The highest voltage tapping is taken direct from the output side of the smoothing choke, the 90–100-volt tapping obtains its current by way of a series resistance, while the screening-grid voltage is taken from the junction of two resistances in series, thus giving a potentiometer effect.

From the test curve supplied it is seen that with the output valve taking 15 m.a. the 90–100-volt tapping reads 90 volts at 15 m.a., and the 60–80, 75 volts at ·5 m.a. These readings, of course, vary somewhat with the load.

This instrument retails at the very moderate figure of 59s. 6d., and is fully guaranteed for twelve months.

SAVOY HILL NEWS

Adrian Boult's Success—Lighting for Public Concerts—Edgar Wallace—Bad Operatic Beginning—Broadcasting in Russia—International Exchange of Officials—Jack Payne's Band—The Lewes Festival—Controversy.

By OUR SPECIAL COMMISSIONER.

Adrian Boult's Success

It is now just a year since Dr. Adrian Boult took over the musical administration at Savoy Hill. In that short time he has transformed conditions and achieved a brilliant personal success. Having been the first to indicate that he was a candidate for the job which Mr. Percy Pitt was resigning, and having strongly advocated his appointment, I think I am justified in a special measure of gratification.

Dr. Boult owes his success to sound ideals, clear thinking, commonsense, hard work and the absence of an "artistic temperament." His administration and conducting have produced in the short space of twelve months the finest orchestra in the world. But he is only beginning.

He himself is far from satisfied. I hear now that he is off to Moscow and Baku, where he will conduct some of the best Russian orchestras. This is a characteristic way of spending a holiday. In the autumn he will resume the baton at Portland Place for another still more brilliant season.

He will be supported by a new executive in the person of Mr. G. Mase, formally associated with Miss Ursula Greville.

Lighting for Public Concerts

The B.B.C. has wisely decided to introduce new methods of lighting for public concerts. The main auditorium is to be darkened and special local lights provided for those who desire to consult programme or scores while the concert is in progress. There is to be a spot-light on the conductor and the solo artiste. In addition, members of the orchestra are being provided with a new design of desk light. There is, however, to be no flood lighting. These innovations will be tried out at Portland Place in the autumn.

Edgar Wallace

I understand there is strong probability of Mr. Edgar Wallace accepting a contract for a new big serial thriller which he will broadcast himself in the autumn and winter. Mr. Wallace is an excellent broadcaster, both in manner and in voice, and it is much to be hoped that the present negotiations fructify.

Bad Operatic Beginning

Many listeners were surprised and all opera lovers were thunderstruck at the nature of the broadcast of the opening of the Grand Opera season on April 27th. At 7.40, when the Duke and Duchess of York arrived, the National Anthem was played in a scene of majestic enthusiasm, but there was no broadcast of this.

Indeed, the B.B.C. did not go over to Covent Garden until the middle of the overture. This was a lamentable slip-up, all the more so perhaps because such slip-ups are exceedingly rare in British broadcasting.

Broadcasting in Russia

The B.B.C. has received some very

KEEPING AN EYE ON THE PROGRAMMES

This shows the Superintendent's room in Studio No. 3 at Germany's new Broadcasting House in Berlin. The large glass window looks into the studio so that the man in charge can see what is happening.

Savoy Hill News—*continued*

interesting and authentic accounts of broadcasting conditions in Russia. Here are some of the points: The loud speaker is everywhere in evidence—in all workrooms, public squares, and thoroughfares. It is in the Green Room of the theatre and in the factory workshop.

For instance, the Moscow electricity works has its own broadcasting station and 70 loud speakers. The transmissions are almost continuous. Those who complain of the proportion of talks in the B.B.C. programmes would hardly be pleased by Russian programmes!

Moscow alone, with its six stations, puts out about thirty hours of talks, speeches, and lectures every day. There is enormous public interest, which is constantly stimulated. Masses of correspondence are received, all letters to the broadcasting administration being sent post free. Every station has a public hall in which concerts and debates are given most nights.

POWERFUL AMPLIFIERS FOR GERMAN PROGRAMMES

German broadcasting has recently moved into its new and commodious premises in Berlin, and here you see the main amplifier switchboard.

International Exchange of Officials

One result of the recent visit to Europe of Mr. Elwood, the Public Relations Director of the National Broadcasting Company of America, is the establishment of a new system of exchange of officials between the chief broadcasting organisations.

For the present the arrangement is to apply to the United States, Germany, and Great Britain. Later on other countries will be included. The idea is that representative officials should work as ordinary members of the staff of the corresponding organisation in another country, for a period of from three to six months.

There is no doubt that this will be of value if the right people are exchanged. At Savoy Hill it is planned to send either Mr. Wellington, the Programme Balance Director, or Mr. McConnell, the Dramatic Producer. Perhaps both will go—one to Germany, the other to the United States.

It will be interesting to observe whether experience abroad will be reflected in the B.B.C. programmes, as these gentlemen return to their normal functions.

Jack Payne's Band

Important changes have been made recently in the composition of the B.B.C. Dance Orchestra, which is directed by Mr. Jack Payne. Four or five of the instrumentalists have been placed to the considerable advantage of the orchestra.

It has recently come to light that Mrs. Jack Payne, who is the daughter of a distinguished Army colonel, plays an important part in the success of the orchestra. Mrs. Payne is very popular with her husband's "boys."

There have been some touching scenes, especially on the occasions when Mrs. Payne's former nurse visited the studio to meet "the boys." There is a good deal of speculation as to how much money Jack makes. Rumour has it that he is far from the poverty line. But the job is well done, and there is no envy.

The Lewes Festival

B.B.C. officials heard the final concert of the 1931 Festival at Lewes and reported favourably, especially on the choral singing. It is expected that parts of this festival will be broadcast next year.

This, of course, signifies the application of a policy very dear to the heart of Dr. Adrian Boult, namely, a more active concern with the executant in music as comprehended in the amateur movement generally.

Mr. Liveing, the North Regional Director, was telling me not long ago that there is a great wealth of untapped festival material in the North. This he will develop for his Regional service, and I hope that some of it is included on the National as well.

Controversy

Since the row in the spring about the alleged Bolshevist tendency of B.B.C. talks there has been a good deal of heart-searching and consultation at Savoy Hill. It is only now that it is possible to forecast policy and attitude with any definiteness.

The B.B.C. has wisely declined to be stampeded out of all controversy. Instead they have elected to reaffirm their traditional attitude of providing a platform or forum for the exposition of opinion as well as fact.

There may be more careful preparation, but there will be no drawing back from the review of problems such as Russia, China, India, morals, religion, and science.

Mr. H. G. Wells has given valuable counsel in the consolidation of the position, which will be developed in the autumn. It seems, therefore, that if the enemies of free broadcasting propose to continue their campaign they had better get busy at once.

The "PLUS-STAGE" de-LUXE

Designed and Described by the Research Dept.

A really wonderful receiver which now appears in its final form. It has been built up step by step, and contains many really outstanding features. It also possesses remarkable selectivity for a set of the type not employing an H.F. stage.

AT the conclusion of an article in the last issue in which we gave details for adding the third valve to our "Plus-Stage" receiver we mentioned that the series would be concluded this month with one or two useful refinements.

Before we proceed to tell you about these refinements we feel that, for the benefit of new readers, it would be desirable to make a few introductory remarks about the "Plus-Stage" de-Luxe.

Fine Three-Valver

The fact of the matter is our laboratory tests of the final version turned out to be so highly satisfactory that we feel the scope of appeal of the present article ought to be somewhat wider than just "refinement" instructions for those of you who have followed the series throughout.

We are perfectly justified in saying that, despite the stage-by-stage procedure under which the set has been designed, the "Plus-Stage" de-Luxe is comparable in every way to some of the best modern "threes" that we have tested.

It is selective to a degree that will cope with all normal regional requirements (quite a feature in itself, in these days of high-powered locals). Moreover, it is sensitive and powerful, not only on the locals—where, in most cases, the use of the volume control will be absolutely necessary—but on distant transmissions as well.

All That's Desirable

One could not possibly hope for more in a straight three than is given by the "Plus-Stage" de-Luxe. And in addition to being all that is desirable in the way of a broadcast receiver, provision is also made for the inclusion of a gramophone pick-up. (This constitutes one of the refinements for those who have built the set up stage by stage.)

We mention all this not so much for those of you who are in possession of the almost completed versions of the set (we don't doubt but that you will already be fully acquainted with its capabilities), as for those readers who may have missed the preliminary articles.

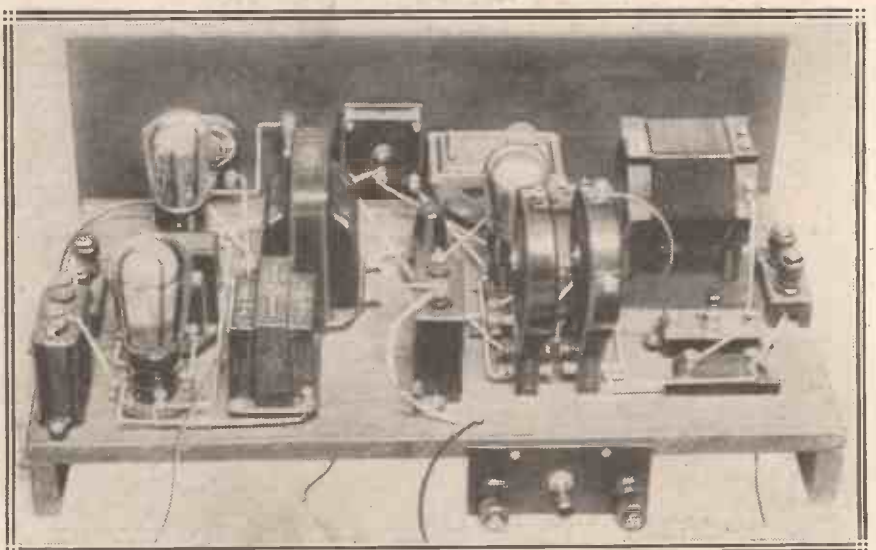
The wiring diagram accompanying this article shows the completed receiver, and with the aid of the component list, which is also given in full, you can make a start right away and build a "Plus-Stage" de-Luxe without referring to any of the past issues.

And if you do build a "Plus-Stager"—that is, if you have not built it up step by step—we are quite certain that you will have no regrets from the very first moment you put it on test. It's a jolly good set of what we in the Research Department call the "popular" type, and it is certainly not a design that is likely to go "out of fashion" for some time to come.

Simple Refinements

For those who are "Plus-Stagers" already, the refinements necessary to transform the set into the de-luxe version are quite simple, and consist

A SET TO BE PROUD OF

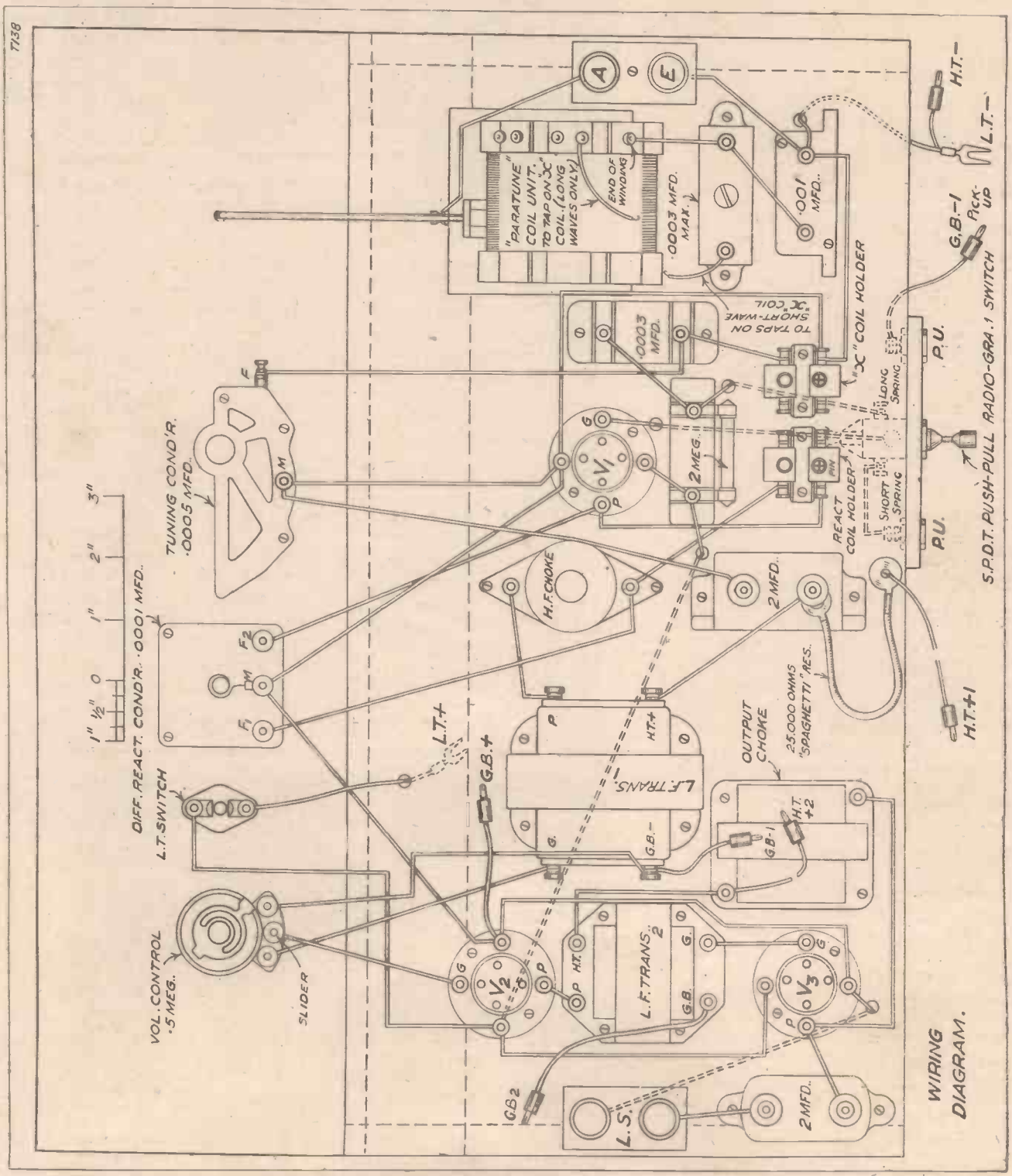


Here is the receiver, with all the little luxuries and refinements added, which we promised in our last issue.

The "Plus-Stage" de-Luxe—*continued*

of nothing more than the fitting of a panel, an output filter, and a gramophone pick-up switch.

The ebonite strip method of fixing components such as the volume control, tuning condenser, etc., was all very well—in fact, was very desirable—for the stage-by-stage procedure. But now that the set is quite complete and there are no more bits and pieces to add, it is well worth while to go to the trouble of fitting an



With the aid of this diagram you should have no difficulty in connecting up the various components. The more care you take with the wiring the better the set will look and work when it is finished.

The "Plus-Stage" de-Luxe—*continued*

ebonite panel so that the whole outfit can be housed in a cabinet.

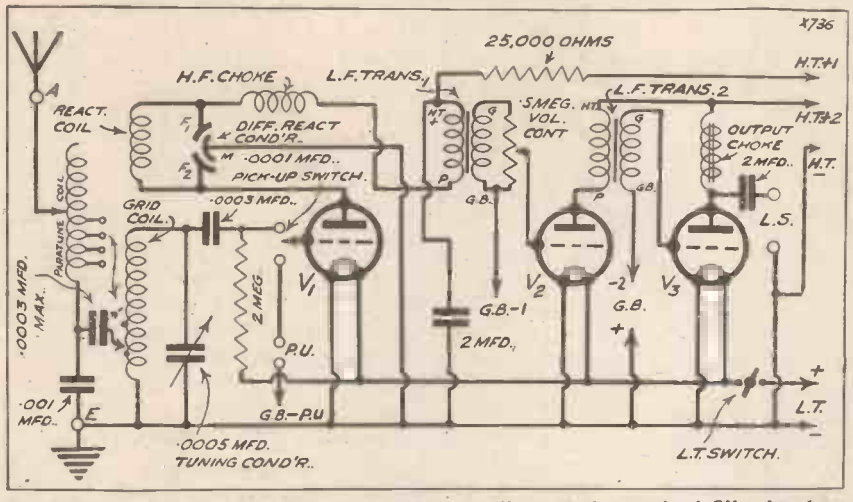
And in fitting a panel to the original receiver we have endeavoured as far as possible to keep all the panel components in exactly the same relative positions as before, so as to minimise the amount of extra wiring required.

It is true that under these conditions the panel is not quite symmetrically arranged. But if you have no objections to rewiring entirely the components on the panel, and feel that you would prefer to see a symmetrical layout, then by all means do it, for a slight re-arrangement of the panel components will not be likely to interfere with the efficiency of the finished receiver.

If you feel that you would like to have a set that you can chop and change about, then stick to the original scheme and forget altogether about the panel.

The first actual circuit refinement is to do with the output valve and consists of fitting a filter circuit. But don't expect when you have fitted the filter to find that the set gives you greater signal strength or anything like that. As a matter of fact, in so far as the ear is concerned, you may not be able to detect any difference at all! But for all that it is a well worth while modification.

THE FINAL COMPREHENSIVE CIRCUIT



This is the theoretical circuit from which you will see that an output filter has been added and also provision made for a pick-up. For medium waves the "X" coil is connected to the compression type condenser, and for long waves to one of the taps on the Paratune coil.

Protects the L.S.

Apart from lessening the tendency to L.F. instability when your H.T. batteries begin to give up the ghost, the output filter is there for the definite purpose of protecting your loud-speaker windings. With anything like a decent-sized power valve in the output position, the anode current may be as much as ten, or even more, milliamps., all of which, with the present circuit, has to pass through the windings of the loud speaker.

With an output filter circuit the anode current, whatever it may be, passes through the filter output choke, and thus the loud-speaker windings are entirely protected.

The alterations necessary to include an output filter are simple. First of all, fix the output choke and 2-mfd. fixed condenser in the positions shown in the wiring diagram. Then remove the wire at present going from the H.T. plus terminal on the second

EVERYTHING YOU NEED FOR THE "PLUS-STAGE" DE-LUXE

1 Panel, 18 in. × 7 in. (Permcol, or Parex, Becol, Peto-Scott, Goltone, Lissen, etc.).

1 Baseboard, 18 in × 9 in.

1 Cabinet for above panel and baseboard (Pickett, or Camco, Kay, Lock, Gilbert, etc.).

1 Variable condenser, ·0005-mfd. (Lotus, or Lissen, J.B., Polar, Ormond, Ready Radio, Igranic, Burton, Formo, etc.).

1 Slow-motion dial for above, unless geared type of condenser is used (Igranic, or Ready Radio, Ormond, Lissen, J.B., Formo, Lotus, Brownie, etc.).

1 ·0001-mfd., or greater, up to ·0002-mfd., differential reaction condenser (J.B., or Lotus, Ready Radio, Lissen, Ormond, Igranic, Magnum, Dubilier, Parex, Burton, etc.).

1 ·0003-mfd. compression type condenser (Formo, or Lewcos, Lissen).

1 ·001-mfd. fixed condenser (Lissen, or Telsen, Ediswan, Dubilier, T.C.C., Ready Radio, Ferranti, Mullard, Igranic, Watmel, Formo, etc.).

1 ·0003-mfd. fixed condenser (Dubilier, etc.).

1 "Paratune" coil unit (Wearite, or Ready Radio, etc.).

3 Valve holders (W.B., or Telsen, Clix, Lotus, Igranic, Benjamin, Bulgin, Junit, Wearite, Magnum, Dario, etc.).

1 2-meg. grid leak and holder (Dubilier, or Igranic, Ferranti, Lissen, Mullard, Ediswan, Telsen, etc.).

2 Single-coil holders (Magnum, or Lissen, Lotus, Bulgin, Igranic, Red Diamond, Wearite, Keystone, etc.).

1 H.F. choke (Magnum, or Ready Radio, Telsen, Lissen, Varley, Lewcos, Wearite, Lotus, R.I., Dubilier, Watmel, Igranic, Parex, Keystone).

2 Two-terminal blocks with terminals (Belling-Lee, or plain strips with any standard make of terminal, e.g. Igranic, Eelex, Clix, etc.).

2 L.F. transformers, not high ratio (Lissen Super and Lotus, or Telsen, Varley, Igranic, Ferranti, R.I., Mullard, Lewcos, etc.).

1 ·5 to 2-megohm three-terminal type volume control (Igranic, or Lissen, Gambrell, Sovereign, Varley, Centralab, etc.).

1 L.T. switch (W.B., or Ready Radio, Bulgin, Goltone, Lissen, Lotus, Igranic, Benjamin, Magnum, Keystone, Wearite, Red Diamond, Junit, Ormond, etc.).

1 25,000-ohm Spaghetti resistance (Bulgin, or Magnum, Lewcos, Ready Radio, Parex, Keystone).

2 2-mfd. fixed condensers (T.C.C. and Dubilier, or Formo, Igranic, Ferranti, Hydra, Mullard, Franklin, etc.).

1 L.F. output choke (R.I. Hypercore, or Ferranti, Varley, Lissen, Igranic, Bulgin, Atlas, Wearite, Magnum).

1 Strip of ebonite, 4 in. × 2 in.

1 S.P.D.T. push-pull switch (Red Diamond, or Bulgin, Lissen, etc.).

2 Terminals or plugs and sockets (Belling & Lee, or Eelex, Clix, Igranic, etc.).

Wood, ebonite. Screws, battery plugs (Eelex, or Belling & Lee, Clix, Igranic, etc.).

Wire (Glazite or Lacoline).

The "Plus-Stage" de-Luxe—*continued*

L.F. transformer to the L.S. plus terminal, and join the former terminal instead to one of the terminals on the output choke.

Completing Alterations

The flex lead to H.T. plus 2 should also be transferred from the L.S. plus terminal to the terminal on the output choke to which you have already connected the wire. Next remove the existing wire from the P terminal of the output valve holder to the L.S.— terminal, and join the P terminal instead to the remaining terminal on the output choke and to one side of the 2-mfd. condenser.

To complete the alterations the remaining terminal on the 2-mfd. condenser should be joined to one L.S. terminal, while the remaining L.S. terminal should be connected under the baseboard to the minus filament terminal of the output valve holder (marked V_3 in the diagram).

Record Reproduction

The last refinement is to do with the use of a pick-up in conjunction with the set, and will not therefore concern all of you. But if you are in possession of a pick-up and turntable (as well as, of course, some records !), the "Plus-Stage" de-Luxe makes an ideal gramophone amplifier, and the alterations to provide for the inclusion of a pick-up are not a bit complicated.

All that you will require is a single-pole, double-throw push-pull switch, a couple of terminals or sockets, and a piece of ebonite on which to mount them. The ebonite strip, with the terminals and switch mounted on it, should be fixed to the back edge of the baseboard in the position shown in the wiring diagram.

ACCESSORIES

Valves. 1 H.F. or special detector type, 1 L.F., and 1 power or super-power valve (Mazda, Mullard, Cossor, Osram, Eta, Marconi, Lissen, Six-Sixty, etc.).

Batteries (H.T. and G.B.). (Drydex, Lissen, Fuller, Pertrix, Ever Ready, Grosvenor, Siemens, G.E.C., National, etc.).

Accumulators. (Oldham, Fuller, Ediswan, Exide, Lissen, Pertrix, etc.).

Plug-in Coils. 1 No. 60X and 1 No 250X, of double-tapped type, 1 No. 40 and 1 No. 150 ordinary types (Lewcos, Lissen, Gambrell, Igranic, etc.).

Loud Speaker. (Celestion, Amplion, Ormond, Mullard, Undy, Blue Spot, B.T.-H., Donotone, etc.).

If you look at your set you will see that one terminal of the ·0003-mfd. grid condenser (at the side of the Paratune coil), and one terminal of the 2-meg. grid leak, are both connected to the G terminal of the first valve holder. To alter the set for gramophone pick-up work both of these wires should be removed, and instead the vacant terminal on the grid condenser should be joined to the vacant terminal on the grid-leak holder, and to one side of the radio-gram switch.

Pick-Up Grid Bias

The central or common point of the switch (in most cases the plunger) should next be joined to the G terminal on the first valve holder, while the remaining switch terminal should be connected to one of the terminals on the strip.

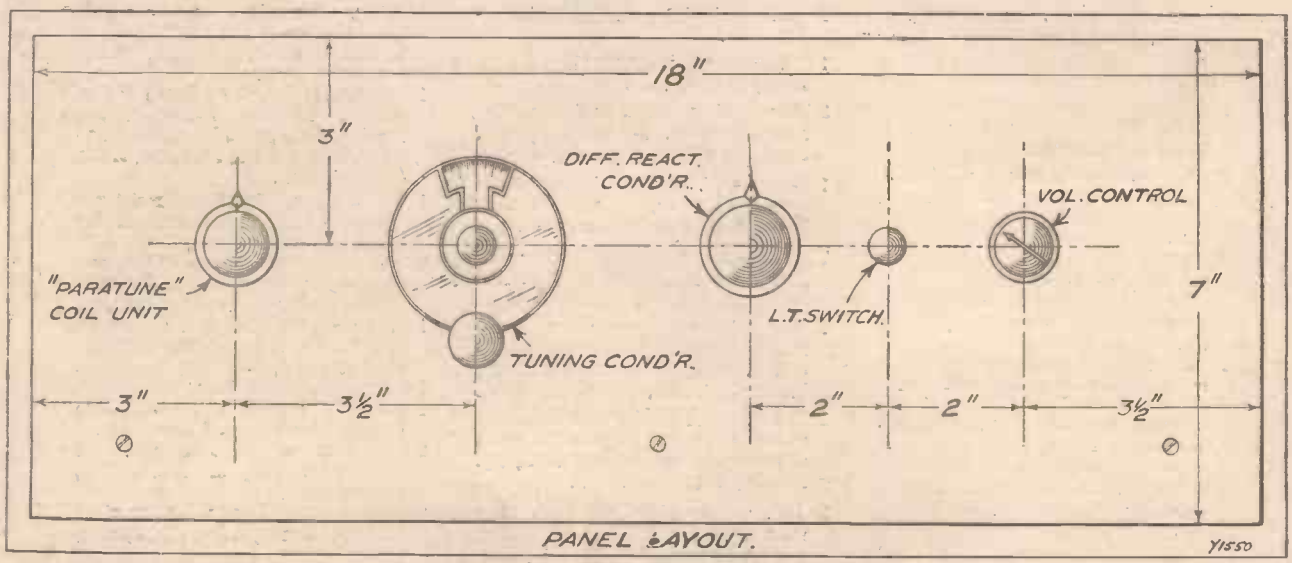
To complete the alteration you merely join a flex lead to the remaining terminal on the strip, and the remote end of the flex lead is joined to about 1½ volts negative grid bias.

When you want to use a pick-up with the set, just pull or push the switch according to the way in which you have got it connected up, and join the pick-up leads to the appropriate terminals, and there you are.

Use Maximum Voltage

Quite a simple and trouble-free change over, and the only other thing to bear in mind is that if you are out after large volume from the gramophone (the set is quite capable of giving it) it would be advisable to increase the H.T. plus 1 tap to the maximum H.T. voltage for gramophone work. But don't forget to decrease it when you go on radio.

ALL LINED UP FOR CONVENIENT CONTROL



The panel presents a very tidy appearance, and as there is only one main tuning control it is extremely easy to handle. On the left there is the "Paratune" knob, followed by the tuning and reaction condensers, "on-off" switch, and volume control.

REGULATING YOUR RADIO

BY VICTOR KING

Some outspoken comments on certain aspects of radio reception and the construction of receivers. While we may not all entirely agree with everything Mr. King says, we cannot but admit that he has a simply uncanny knack of very frequently hitting the nail on the head much harder than anybody else can.

THE reception side of radio is not totally hedged round by official restrictions. It is true that the P.M.G. makes you pay ten shillings per year for the privilege of tapping the ether, but nobody can cavil at that fee, because a large proportion of it is handed over to the B.B.C. for programme-providing purposes.

Pity the P.M.G.!

The P.M.G. will look at you nastily if he learns that you oscillate. But here, again, we have no real grouse, because re-radiating oscillations interfere with the enjoyment of our neighbours.

That you cannot erect an aerial larger than certain officially specified dimensions may seem irritatingly "red-tapish," although it so happens that no practical benefit is derived from increasing the size of an aerial above limits well within the official boundaries.

But you can instal any kind of set you like. You could use one hundred valves if you were so minded. One of these days some officious bureaucrat may come to the conclusion that it is about time he started on a new tack and turn his gimlet eyes on radio in the home (Regulation of—Form XYZ), but, in the meantime, "red-tape" hasn't cast many coils in this direction.

All Shapes and Sizes!

On the other hand, there are a few hoary old fallacies that still persist to hamper those of us who are disciples of better and cheaper wireless. And it is these that are appreciably "regulating your radio," in either a major or minor degree; it is quite definitely *major* in many instances, of that I am convinced!

I mentioned aerials just now. All over the country you see huge double-wire, triple-wire, birdcage, "sausage," and other such aerials. Their owners very obviously imagine that the greater the overall metal surfaces you project into the air the better will be the reception.

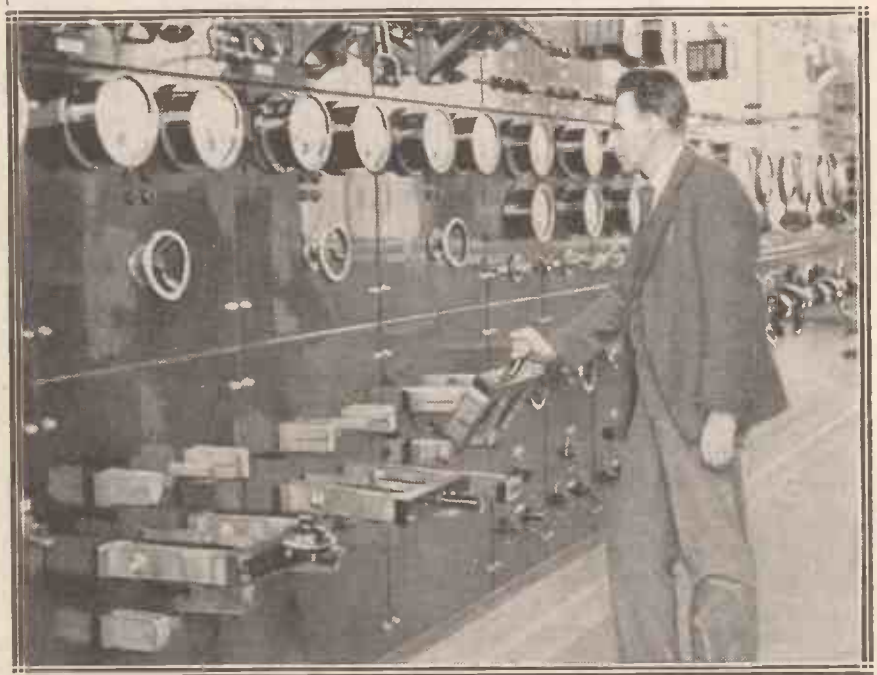
This can be absolutely wrong. Frequently one single wire forty or fifty feet long will prove far superior to a hundred-foot double-wire aerial for picking up broadcasting. Greater selectivity and less "mush," with little or no depreciation in sensitivity, quite often follow the shortening of an aerial.

Then, again, all those precautions against lightning! Metal plates buried deep in the ground, cumbersome switches you have to go out into the rain to operate, and so on. I've never worried one tiny bit about thunderstorms and haven't "earthed the aerial" at my home once in fifteen years.

A Real Comfort

Lightning will just as readily strike a box of matches in the pocket of an Iceland pilot as it will a radio aerial, or, if you prefer it this way, if a streak of lightning has the choice between an unearthed listener's aerial and a very well earthed Air Ministry wireless mast it will probably

SWITCHING ON AT MOORSIDE EDGE



An engineer closing the switch which lights the filaments of the great transmitting valves at the new North Regional station.

Regulating Your Radio—*continued*

make a kink in the latter! (This has occurred!)

An American journal with an immense circulation once offered a big reward to anyone who could point to any single instance anywhere where lightning, operating through a household wireless installation, had been the direct cause of a fatality. And this, remember, in a country that has thousands more thunderstorms than we do over here.

No one claimed this prize-money.

Almost Unknown!

I will admit that out of three-million registered radio outfits in Great Britain there have been just one or two instances where lightning has damaged a radio set. But who is there to say that if there hadn't been an aerial for the lightning to disperse through it would not have attacked the more greatly resisting roof tops and blown the lids off the houses concerned?

But there you are. Many of the insurance companies seem to think that lightning is liable to search out unearthed aerials and bring heaps of explosion and destruction to those who fail to fit "safety switches." So for the sake of your fire policies, at least, I urge you to obey the behests of this particular fallacy. Otherwise—in the middle of the night the cat sneezes and blows a cinder out of the dying fire on to that brand new carpet. A hole is burnt in this carpet. You claim. "Was your radio aerial earthed?" "N-n-no, sir." Claim disallowed.

The "Acid" Test

There is far more danger in the happy-go-lucky introduction of accumulators and H.T. batteries and mains units into the homes of the country than exists in all the lightning in the world. Though where there is just ordinary common sense such danger is reduced to absolutely negligible proportions. I won't insult readers of the WIRELESS CONSTRUCTOR by amplifying that remark!

One of the most expensive fallacies is that accumulator acid always stays inside an accumulator cell. It doesn't. It "creeps" and it vaporises and tends to collect in minute films around the terminals. If these are not completely acid-resisting they will corrode.

Makers of accumulators who fashion their terminals or parts of unprotected brass are the cause of much heart-burning among the users of their products.

But what of that prehistoric idea that a valve must be like an electric lamp because it is a direct descendant of an electric lamp? When is that naked and flimsy glass bulb going to give way to a sensibly stout metal covering? There can be glass inside like there is glass inside a vacuum flask, but I visualise a complete breakaway in construction that would cost little or no more than present constructions

Cheaper Components

And must the variable condenser always have unprotected, bendable, wire-entangling and dust-collecting vanes sweeping out?

And now I am going to venture on to really thin ice. It seems to me that many manufacturers think that the constructor always desires the efficiency of his components to be matched by fine finish, handsome appearance, and so on. Is this a fallacy, seeing that so many components are tucked away behind panels and even under baseboards, never to be seen?

I ask this question because in certain instances there is a wide gap between the prices of what are known as "set-makers'" and those of constructors' components. The first are very cheap, but they lack "finish." They are quite efficient, and are used in the construction of first-class commercial receivers. The equivalent versions as sold for constructors cost a good bit more, mainly owing to their more refined finishing.

Of course, I am taking into account that the one kind of component is sold in large quantities direct to manufacturers, and I am allowing for it.

Give Them the Choice

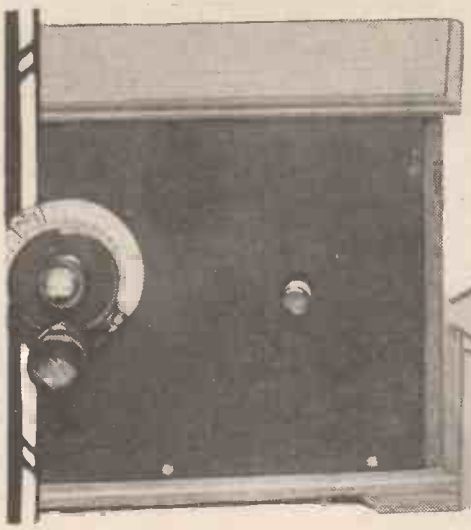
I do feel that hundreds of thousands of constructors would like to have the opportunity of choosing between the "rough" and the "finished" of two pricings of the same electrical standard of components, and I commend the idea to those concerns that make the lines that I have particularly in mind. Obviously, the scheme could not apply all round. In instances—and quite a number of instances at that—the excellent appearance and finish given add mighty little to the overall cost.

There is a widespread belief that only a few constructors are able to appreciate a technical specification.

(*Continued on page* 158.)

MAKING METERS AT MANCHESTER

A scene in the Hollinwood, Manchester, factory of Messrs. Ferranti. Meters are being made and you can clearly see one of the conveyer belts that slowly moves along carrying the instruments from worker to worker for each to add his contribution to their assembly.



THE "SUMMA-FILTER"

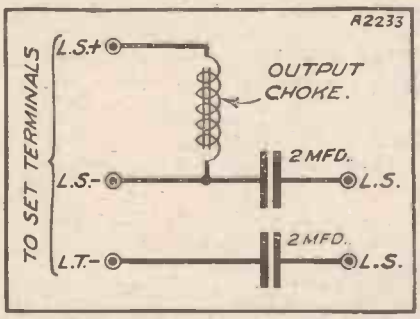
By the
"Wireless Constructor"
Research Dept.

This excellent little filter can be used to advantage with almost any type of loud speaker, and it is particularly suited to the "Summa-Cone," which is described on another page this month. In fact, it should prove an extremely useful addition to any set in which an output filter is not already incorporated.

ALMOST all the sets turned out nowadays by the WIRELESS CONSTRUCTOR Research Department which are intended for loud-speaker work are fitted with an output filter circuit. And we have adopted the filter idea as standard practice simply and solely because we regard it as a very-much-worth-while addition.

It is true that in so far as the ear is concerned the filter does not, in most cases, make the slightest difference to results; and it is also true, we fear, that because of this many people are apt to leave it out.

PRESERVE YOUR SPEAKER



Two fixed condensers are used in this circuit, thus completely isolating the loud speaker from the set as far as the direct current is concerned.

Without digressing any more than we can help—the main object of this article is to tell you all about the filter unit we have designed for use with the "Summa-Cone"—we will, in as brief a manner as possible, detail some of the advantages to be gained from the use of an L.F. choke and condenser comprising a filter output circuit.

It Saves Your Voltage

In a straightforward circuit where the plate terminal of the last or output valve is joined direct to one side of the loud speaker, and the other side of the loud speaker to the maximum H.T. plus terminal, the whole of the anode current "devoured" by the last valve has to pass through the comparatively frail windings of the loud speaker.

That, alone, is undesirable, but if the resistance of the loud speaker happens to be of the order of 2,000 ohms, with a large modern super-power valve taking something like 20 milliamperes you will be losing forty volts of H.T.

Obviates Long Leads

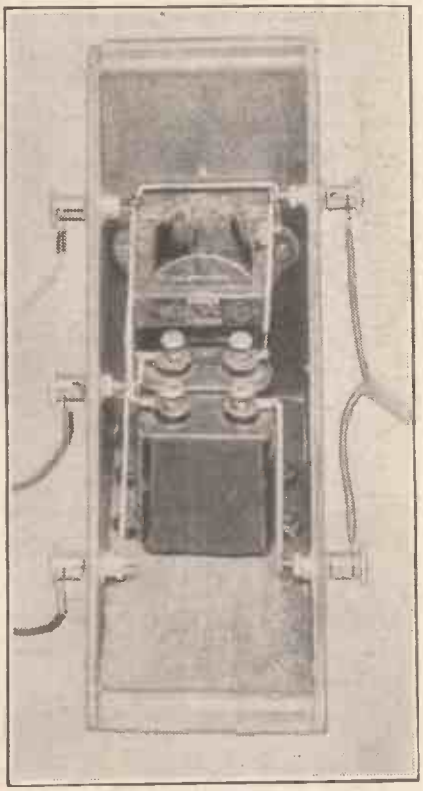
The D.C. resistance of a good filter output choke is seldom more than 500 ohms, which means to say that used with the same valve you will only be losing ten volts instead of forty. As a matter of fact, many of the filter chokes have a D.C. resistance as low as 250 ohms, so that the loss will be even less. But that is only one point.

Supposing, as in the case of the "Summa-Cone," you want to take your loud speaker out into the garden, or into another room in the house. If your set does not employ a filter circuit the H.T. current for the last valve has to "go for a walk" along one of the extension leads, round the windings of the loud speaker, and then back along the other extension lead before it actually gets to the valve!

Protects the Windings

That is where the filter comes in. Not only does the filter choke prevent the H.T. current from wandering about all over the place (which is a very dangerous practice indeed if the set is worked from the mains), but it actually *protects* the loud-speaker windings, because with a filter the H.T. current for the last valve passes

A HANDY UNIT



Among other advantages the unit enables the loud speaker to be taken into the garden, without the necessity of having long leads at high potential.

The "Summa-Filter"—*continued*

through the choke and not through the loud speaker.

Another Advantage

There is another good reason for using a filter circuit, and that has to do with L.F. instability. The choke and condenser in the plate circuit of the output valve will very often prevent motor-boating and other instability troubles, especially when the voltage of your H.T. battery begins to fall.

Thus whether you have in mind the construction of the "Summa-Cone" or not, if your set does not at present employ a filter output both your time and money would be well spent on the construction of the simple-looking unit illustrated in this article.

THESE ARE THE PARTS

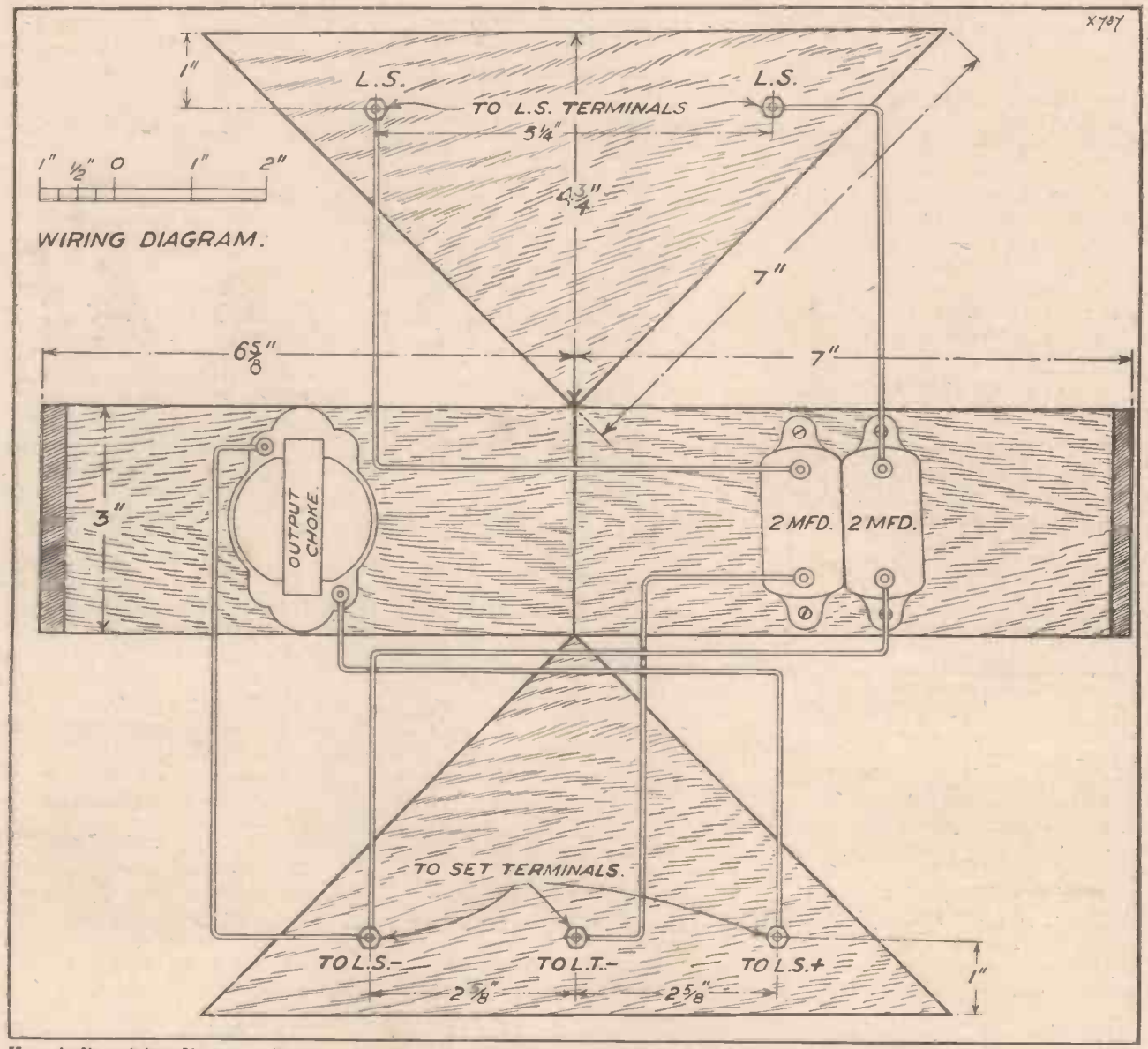
1 L.F. output choke (Igranic Midget, or Ferranti, R.I., Lissen, Varley, Bulgin, Atlas, Wearite, Magnum). (Note.—If you choose a choke larger than the one employed in the original unit, remember to increase the size of the "cabinet" accordingly.)
2 2-mfd. condensers (Dubilier, or Igranic, T.C.C., Lissen, Formo, Mullard, Ferranti, Hydra, Franklin, etc.).
Materials for cabinet (see diagram).

Safety First

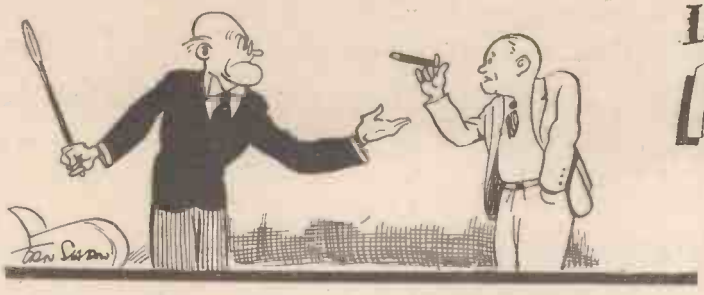
The "Summa-Cone" unit can be added to *any* valve receiver that is at present without a filter output circuit. Furthermore, it is suitable for sets of the mains-operated type, although we very much doubt whether anybody with a set of this type will find it necessary to build this unit, because a mains set without a filter is, or ought to be, an unheard-of thing!

(*Continued on page* 159.)

THE WAY TO WIRE IT UP



Here is the wiring diagram—that is, what there is of it! It should be noted that the three terminals go to the receiver, and the two terminals to the loud speaker. Also it does not matter which way the latter is connected as there is no direct current passing through the windings.



IN LIGHTER VEIN
PROBLEMS OF THE DAY
By "WIRELESS WAYFARER"

I FOUND Professor Goop in an inquisitive mood when I dropped in to see him a few nights ago. Myself, I rather wanted one of those restful evenings, when both you and your host sit in comfortable armchairs and indulge in eloquent spells of silence with closed eyes. But it was not to be.

"Let me see," said the professor. "You are using a band-pass set, are you not?"

"Rather," I replied. "It passes bands like anything. You should just hear the Wireless Military Band or the Wigan Works Brass Band."

"You don't appear to know," said the professor, "what a band-pass set is."

CLOSING DOWN!

Something to take the wobble out of soprano solos.

"Why, of course I do. One that passes bands. The trouble with mine is that it will pass organs as well and soprano singers, too. Now, if only you can invent an organ eliminator, or something to take the wobble out of soprano solos, you will be doing a real service to mankind."

An Anti-Wobble Campaign

"That's quite an idea," mused the professor. "Something I am sure could be done with an anti-wobbler. Let me see. All that you really need is a special transformer between the first and second L.F. valves, with a loose coupling between the primary and secondary. The coupling could be controlled by a small electric or clockwork motor, and in this way the output from the set could be made to wobble."

"But that's just what we don't want."

"Listen to me. My set would be so arranged that its wobble was exactly out of phase with that of the soprano, and the result would be a perfectly level output. But to return to this band-pass business. It is perfectly clear that you have not the slightest idea what it means. Let me explain."

"Well I suppose you must."

Hairy "Side-Bands"

"You are perfectly right. Do you understand the side-band theory?"

"I'm getting a little sick of these bands," I murmured. "Have you noticed, by the way, that Goshburton Crump is now wearing side-bands"?

"What on earth do you mean?"

"Haven't you seen his whiskers?" I said. "He's awfully proud of them."

"Idiot!" screamed the professor, picking up the poker and giving it a menacing twirl. "Sit up straight, open your eyes, stop twiddling your thumbs and pay attention. Have you ever heard of Dr. Robinson?"

"Why, of course," I replied. "You mean the fellow who lived on a desert island and discovered Man Friday?"

"No, no, you ass—that was Robinson Crusoe!"

"Why did he do it?" I inquired.

"Do what?"

"Why, crew so?"

Here the professor became so threatening with the poker that I shut up.

"Robinson," he continued, "has driven a coach and horses through the side-band theory.

"Is that why he crew so?"

A NEW "DIAL" SETTING

Goshbuton Crump is now wearing side-bands.

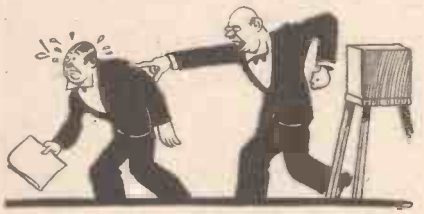
I am sorry to say that at this point it became necessary for me to apply physical force in order to restrain the professor. When he leaped at me with the poker I adroitly butted him in the tum-tum, disarmed him, flung the poker through the window (it was unfortunate that it happened to be closed at the time), jumped on his chest half a dozen times, and then restored him to consciousness by threatening him with a drink of water.

"We will now," said the professor, when he had recovered, "discuss fully the side-band theory. What is the frequency of the London Regional station?"

"Three times a day on weekdays," I replied. "With usually an easy on Sundays, when he takes the National programme."

"You blithering ——. I beg your pardon, my dear fellow. I mean, what is its carrier frequency in kilocycles?

A RARE EVENT



Somebody probably gets the sack.

Obviously, you don't know. Let me tell you. It is 842. This means that the carrier-wave rises and falls 842,000 times in every single second."

"Have you counted?"

"No," said the professor, "I have not; but you can take it that the facts are as stated. Now what happens if a single note with a frequency of 1,000 is produced in the studio?"

Telling the World

"Somebody probably gets the sack," I suggested.

The professor, who obviously intended to reply to all his questions himself, ignored my answer and went straight on.

"The carrier-wave," he said, "is now modulated and the result is that we have a composite band of waves, one with a frequency of 843,000, another with a frequency of 842,000, and a third with a frequency of 841,000."

"Sez you," I commented.

"We thus have the carrier-wave with its two side-bands."

In Lighter Vein—*continued*

"In other words," I said brightly, "the Wireless Military Band and the Wigan Works Brass Band. Now tell me——"

The professor held up his hand.

"It has been considered necessary," he said, "for the wireless receiving set to be able to respond almost equally to a band of nine kilocycles in width."

"Well, I have seen some funny bands, but I have never seen one like that. Teddy Brown must be a good deal wider than that, anyhow."

Improving the Quality

"Do shut up," cried the professor, "and try to improve your mind by listening to me! Under the present Prague plan, what is the frequency separation between European broadcasting stations?"

"Oh, well, I can answer that question," I said, "for I have just been looking at the latest report of the Brussels laboratory. As few stations are ever on their proper frequency, the separation is anything you like; and if two do work on their correct frequencies a station in France, or somewhere, generally butts in between them."

"That's unfortunately too true," sighed the professor. "But in theory each channel on the medium band in Europe is separated by nine kilocycles from neighbouring channels above and below."

"Do you think Mercedes will do it this time?" I asked.

"Do what?"

"Why, swim the Channel. Weren't you talking about that?"

"No, I wasn't!" snapped the professor. "I was talking about kilocycle channels."

Passing the Bands

"Oh, you mean the fellow who tried to pedal a thing over last year! No, I am not backing him."

The professor heaved a sigh, but went on relentlessly.

"If," he said, "we agree that the receiving set must pass a band of frequencies nine kilocycles in width in order to receive, say, Mühlacker, it is quite clear that what we require is a cascade of high-frequency circuits each arranged to pass a nine-kilocycle band, and to cut off sharply four and a half kilocycles on either side of the point of resonance."

"Why four and a half?" I inquired. "I thought you said nine just now."

"But, my good man, twice four and a half makes nine. If, then, your set is so arranged it will pass Mühlacker's side-bands, but not those of the London Regional."

A Little Mixed!

"So I should hear Stuttgart's band, and not the Wireless Military Band from London?"

"Oh, do try to forget about your beastly brass bands," said the professor, "and remember that I am talking about frequency bands."

"But I thought you were talking about side-bands."

"Well, so I am!" bellowed the professor.

"Look here," I said, "this is all getting rather complicated. First you say that you are talking about one thing, and then when I ask you a plain question you say that you are talking about another. Can't you be a little plainer?"

A BIG "SPREAD OVER"

"Teddy Brown must be a good deal wider"

The professor groaned.

"Well," he said, "side-bands are frequency bands."

"Then why can't you say so? You seem to me to be wandering all over the place. First of all you talk about Robinson Crusoe, then about Channel swimming, and then you have the effrontery to tell me that you are explaining the principles of wireless reception."

"I never said a word about Robinson Crusoe or about Channel swimming. I do wish to goodness you would attend. Anyhow, it all comes to this—that one of the best ways of obtaining first-rate selectivity with fine quality is to have a set arranged on the band-pass filter system. You know what a filter is?"

"Why, of course! You fill it with water, and when you turn on the tap nothing comes out. Then you send for the fellow who sold it to you, and he tells you that the candles want cleaning. And you tell him that yours is an up-to-date house, and that you haven't got any candles; and, anyhow, you don't see why they should need cleaning. And then he tears his hair and waves his arms about, and upsets the filter and makes a beastly mess. But what on earth have filters got to do with wireless reception?"

"I am talking about wave filters, and not water filters."

Some Filter!

"Then why on earth didn't you say so? But if you want to filter the waves of the Channel, won't it be a bit of a job?"

"The band-pass filter," said the professor, "has a flat-topped response curve extending four and a half kilocycles on either side of the resonance point——"

"You said all that before."

". . . and the result is that you obtain perfect reception from any station, and the highest degree of selectivity. Now, have you really understood what I have been telling you?"

"It has been a little difficult," I replied, "but I think that I have grasped pretty completely the gist of your lucid explanation."

"Very well, just run over the explanation in your own words."

"It's the simplest thing in the world," I said. "You provide Robinson Crusoe with a pair of whiskers each four and a half kilocycles in width, and he then swims the Channel, holding a candle.

Switching Off

This gives a flat-topped response curve, and the result is that you have either the Wireless Military Band or the Wigan Works Brass Band, whichever happens to be playing."

"Look here——" yelled the professor.

"Professor Goop is now closing down," I remarked, seizing him by the scruff of the neck and shaking him gently. "Good-night, everybody. *Good*-night."

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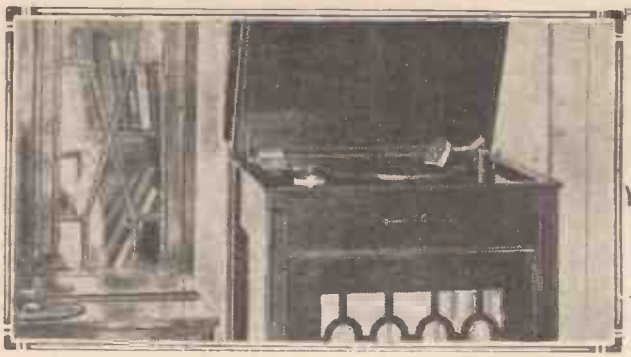


WITH PICK-UP AND SPEAKER

Pick-up versus Gramophone—A Good Test—Controlling Volume—Adding a Pick-up—A Well-made Instrument.

Conducted by A. JOHNSON-RANDALL.

I AM often asked in what way the electrical method of gramophone reproduction scores over the mechanical method.

Many listeners are frankly sceptical, although they agree that broadcasting is a great improvement upon the ordinary gramophone, they doubt whether the results obtainable from a pick-up are worth the outlay.

No Comparison!

These listeners, of course, are already in possession of a gramophone. Well, I can only think that such sceptics can never have heard a good pick-up used in conjunction with a decent amplifier and speaker.

Play a record on an ordinary mechanical reproducer, and then listen to the same record after it has been put through an amplifier and cone or moving-coil speaker. There is no comparison, the electrical reproduction being far more faithful.

Apart from the question of realistic reproduction, it is always so difficult to control volume to a nicety with the mechanical gramophone. It is true that you can employ different types of needles, and adjust the shutters on the front of the "sound chamber," but these methods do not give the fine control which is so readily obtainable with electrical reproduction.

Quite recently a friend who was listening in to one of the B.B.C. gramophone transmissions turned to me and said: "Isn't it wonderful. Why, it sounds just like the normal broadcast programme, and not a bit like a gramophone."

A Quick Conversion

I think that is a splendid testimonial for the pick-up, and there is no reason why your results should not be "just like the broadcast programmes."

I have already said that the only alterations needed to turn the average wireless set into a radio-gram are a couple of terminals and a single-pole change-over switch. The question is, what sort of circuit is suitable for gramophone reproduction.

Suitable Sets

Generally speaking, any set with one or two stages of L.F. amplification—even a detector and one L.F. can be employed—provided the pick-up chosen is of a sensitive type. In this case the pick-up would be inserted into the detector circuit, as has been previously described in these columns.

There is only one snag in inserting the pick-up into the detector circuit of a 2 L.F. receiver, and that is that sometimes there is a slight tendency towards instability. This, however, usually occurs only when the pick-up leads are unduly long, or are allowed to trail about the set and produce unwanted coupling effects.

I have recently had an opportunity of trying one of the new Celestion W.5 pick-ups. This pick-up is an exceptionally well-made job. The tone-arm is approximately ten inches in length, and has a beautifully free ball-bearing movement. There is a counter-balancing spring, which can be adjusted by means of a milled-head screw to give the minimum pressure on the record surface.

Needles can be quickly removed and replaced by simply pressing a button on the pick-up.

No Trouble Fixing

The pick-up is supplied complete with a length of flexible, comprising three leads, two of which go to the amplifier input, or to a 250,000-ohm potentiometer volume control.

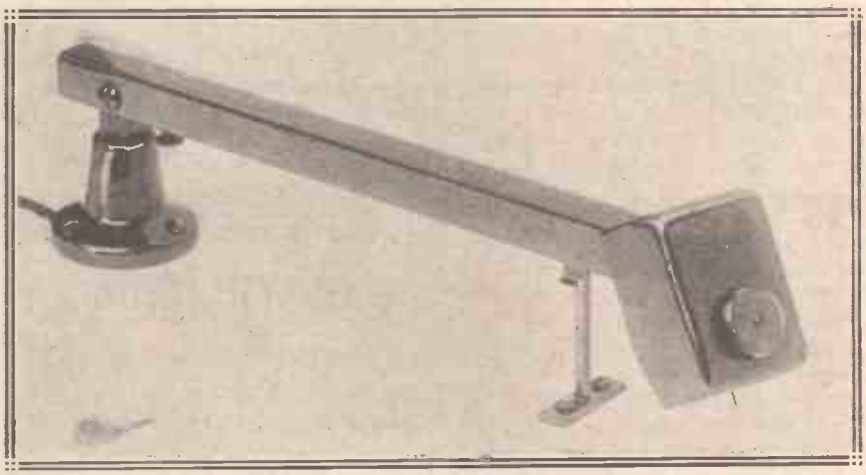
The other is joined to earth, thus earthing the metal work of the tone-arm and pick-up.

The makers supply a very neat card template for mounting purposes, and the necessary instructions for use are all given on the back of this card.

Splendid Results

This pick-up gives very fine results, and should be used in conjunction with the ordinary type of steel needle, such as the "loud" or "extra loud" tone variety. It is sensitive, and therefore requires a volume control, as recommended by the makers, in order to prevent the first valve from becoming overloaded.

A NEW GRIP FOR GRAMOPHONE NEEDLES



The new Celestion W.5 pick-up and tone-arm. This instrument, which gives very fine results, has a "press-button" method for fixing needles in place, instead of the usual screw-up adjustment.

THE MONTH ON SHORT-WAVES

I SPENT an evening recently in the "Op" room of G 6 H P, and I was surprised to hear, among many other interesting things, how well the Japanese amateurs were coming over just at present.

You can find them almost any evening between about 17.00 and 19.30 G.M.T. on the 20-metre band, and if you can read Morse you should not have any difficulty in adding "J's" to your log. They mostly send very slowly and are easily readable.

DX Telephony!

Incidentally, while on the subject of amateur transmissions, for the benefit of those of you who cannot read Morse there's a fair amount doing on the 20-metre band in the way of DX telephony.

During the last month I have heard W 2 S F, W 2 A F Q, and W 2 A O E at quite decent strength on my short-wave super-het, although, as a matter of fact, I found they could be heard at quite intelligible 'phone strength on an ordinary two-valve hook-up.

I haven't yet managed to log any of the eighth and ninth district Yanks working 'phone, and I should be interested to hear from any reader who has, because I'm told that one or two of them come over very well.

Plenty of Continentals

Have you noticed, by the way, the number of really excellent Continental stations that can be heard on almost any Sunday on the amateur bands? P A O 1 M (Holland), to mention just one of them, is a real short-wave Brookmans Park, and, like most of the others, turns out remarkably good quality.

One of them, on a recent Sunday evening, was doing, among other things, gramophone records of Gracie Fields.

I didn't hang on sufficiently long to hear the call-sign, but I did hear an imitation of a dog barking in between the items, together with an announcement that it was an H.M.V. programme. Did any of you get the call-sign?

Once or twice recently I have stayed up really late on Saturday nights to see what was happening on the other side of the "'Lantic Ocean." Before I tell you anything of what happened, I think I ought to warn you that if you try this staying-up stunt you will probably find it so intriguing that you will finally land up in bed in time for breakfast next morning!

Apart from the real "punch-merchants" (W 2 X A D, W 2 X A F & Co.), there are quite a number of real DX stations to be logged. One of my pet transmissions is H R B, Tegucigalpa, Honduras, and although it is a tidy distance to be covered with only 2½ kilowatts of power, the station comes over well after about 1.30 a.m.

Have You Heard Him?

The announcements are made in what I take to be Mexican (whatever it is, it's a foreign language to me), but occasionally announcements are made in English (or American, as the case may be!). But apart from announcements, the station is easily recognisable by an interval signal of three "cuckoos" in rapid succession.

G. T. K.

"ON THE GRID"

WHAT do you generally do if your loud speaker rattles? When I say rattle I mean the real thing—the noise of two pieces of metal knocking together, not that demonstration of Mount Everest type peaks in the upper frequencies.

"A simple question," I guess you will say. "Just adjust the speaker knob and remove the offending armature a little farther from the poles." But suppose the set is a portable and such adjustings do not have the desired effect until volume is reduced beyond toleration.

A Useful Tip

Well, I'll tell you what I'm driving at. In many portables the speaker has a cone of stiff paper, or, rather, thin cardboard. It is self-supporting, and is only attached at its apex to the unit, with the result that loud passages may easily cause it to rattle against surrounding wood or against a wire.

This trouble cut across my path the other day, and I was put to no little bother to lay it by the heels. So there's the tip for what it's worth, for I nearly sent the *unit* back to the makers.

* * *

The other month I mentioned an idea for a sort of super-frame, covering the side of a room; but being a very honest person, admitted it was untried so far as I was concerned. Since then a reader has sent in an interesting article, which should be published in due course, dealing with the use of a large single-turn loop aerial for crystal set working.

He explains that remarkably good results are obtainable, which are decidedly more beefy than those given by an ordinary indoor aerial of similar dimensions. Which is just the confirmation I had been wanting AND expecting.

Do you know, I have been dreaming (day dreaming) of what receiving sets will be like in 10 or 20 years time. That is as regards their physical shapes and general design rather than the circuits used.

I see two types of sets only, and all receivers fall definitely into the one or the other of them. Gone are the outside aerials, the earths, the indoor aerials; and gone are separate loud speakers, batteries and mains units.

Sets of the Future

First we have the transportables and radio-grams, the latter real articles of furniture, and the former disguised in a hundred and one ways as fancy caskets and so forth. They are all-mains sets with one control, a station selector which turns the set off when put at zero.

The second is an attaché case battery portable set, but only a small attaché case. It is light, and the quality is not far short of the bigger sets.

A. S. C.

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1 ReadiRad L.T. switch			10
2 ReadiRad copper screens and sheet of foil to specification		10	0
1 Pr. ReadiRad panel brackets			10
2 Lewcos 6-pin coil bases		4	0
2 ReadiRad "Explorer" dual-range coils	1	1	0
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1 Junit vertical type valve holders		1	9
3 Telsen 4-pin valve holders		1	6
1 Telsen H.F. choke		2	0
1 ReadiRad "Hilo" H.F. choke		4	6
2 T.C.C. 1-mfd. fixed condensers		5	8
2 T.C.C. 2-mfd. fixed condensers		7	8
2 T.C.C. ·01-mfd. fixed condensers		5	0
1 ReadiRad ·0003-mfd. fixed condenser			10
1 ReadiRad 2-megohm grid leak and holder		1	4
1 Bulgin L.F. output choke, 20-henry		12	6
1 Telsen "Radiogrand" L.F. transformer		8	6
2 Link 600-ohm resistances		1	6
1 ReadiRad 25,000-ohm link resistances		1	6
1 Lewcos 100,000-ohm link resistances		1	6
1 ReadiRad fuse and holder		1	3
10 Belling Lee "R" type terminals		2	6
1 Pkt. ReadiRad "Jiffilinx" for wiring		2	6
1 Ebonite terminal strip, 21 in. × 1½ in. × 3/16 in., drilled to specification		1	8
4 Valves to specification, S.G., Det., L.F., and P.	2	7	6
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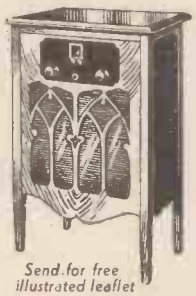

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A PRACTICAL MAN'S CORNER

This is a special section for the set-builder in which he will find many valuable hints.

By R. W. HALLOWS, M.A.

I REFERRED not long ago to the space-saving qualities of Spaghetti resistances, and I want now to deal with one or two other components which can be valuable savers not only of space, but of expense.

Just as the Spaghetti resistance can be used to make the actual connection between two points, so there are condensers and grid leaks available which can be employed for similar purposes. The Igranic Pacent pattern of fixed condenser is one of them, and there are, I believe, other makes of compact little condensers provided with holes or tags through which terminal shanks can be inserted.

Neat R.C. Coupling

In Fig. 1 you will see an extraordinarily neat and inexpensive way of fitting up a resistance-capacity coupling between two valves. The holders are placed so that a fixed condenser can be connected direct between the plate terminal of the first and the grid terminal of the second. It remains suspended between them, and requires no other mounting.

The anode resistance is provided by a "Spaghetti" which runs straight from the plate terminal of the first valve to the high-tension positive terminal on the strip at the back of the baseboard. The grid leak is one of those fitted with a wire soldered to the metal contact at either end.

With round-nosed pliers loops are formed in these wires. One is attached to the grid terminal of the second valve. To the second loop, by means of a B.A. screw and nut, or by soldering, is fixed a piece of flex provided with a wander-plug for connection to the grid battery.

This scheme has everything to recommend it, not the least of its advantages being that all connections in the grid and plate circuits of the valves are kept as short as possible.

SPACE SAVING

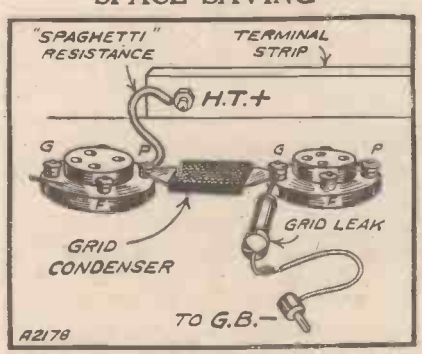


Fig. 1. Considerable space and a certain amount of wiring can often be saved by careful spacing of the components, as shown in the above diagram.

NO HOLDER NEEDED

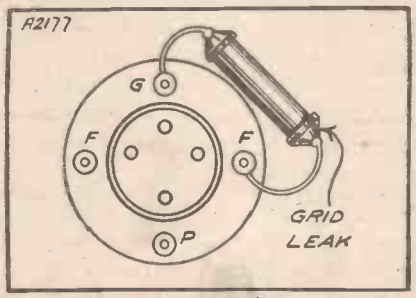


Fig. 2. These excellent little grid leaks with pigtails attached to their ends are real money-savers, as they do away with the necessity for a holder.

Grid Leaks

Fig. 2 shows the way in which grid leaks of this pattern can be mounted between the grid and filament positive terminals of the detector valve of the receiving set. Again, there is no need for any sort of holder for the leak, and wiring is kept at minimum length. The fact that holders can be eliminated means, of course, that costs are reduced, and that no space is taken up on the baseboard.

A grid-leak detector can often be connected to its coil simply by way of the condenser on the lines of the method illustrated in Fig. 1. An example of the boon provided by components of the kind mentioned occurred to me the other day.

I had to deal with a set whose baseboard was already pretty closely packed, and tests showed that it was necessary to "de-couple" the first of the two low-frequency valves. This was a resistance-coupled circuit, and a glance showed that with the existing barrel-type wire-wound anode resistance in position there was room for absolutely nothing else.

Convenient De-Coupling

If, though, this resistance and its holder were removed, there would just, and only just, be room for a 1-microfarad condenser. Fig. 3 shows diagrammatically how the difficulty was solved with the aid of Spaghettis.

The 1-microfarad condenser was installed, and a 50,000-ohm Spaghetti resistance was used as the connection between one terminal of this and the

AN INTERESTING CASE

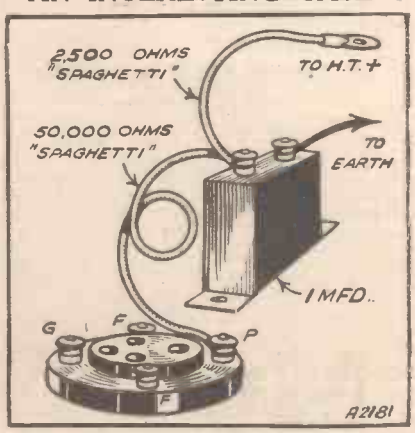


Fig. 3. Adding a de-coupling resistance and condenser is often a difficult job on a crowded baseboard, but in this case the anode resistance and holder was replaced by a Spaghetti, thus making room for a 1-mfd. condenser.

A Practical Man's Corner—*continued*

plate of the valve. The same terminal was connected to H.T. + by means of a 2,500-ohm Spaghetti, whilst the second terminal of the condenser was connected to earth.

The de-coupling problem was satisfactorily solved, since the extra components required no more space than the original anode resistance.

No Leads Needed

Similar methods of making components form their own connections can be applied to resistances and condensers of the tubular clip-in type. Fig. 4 shows how a condenser of this sort may be used as the actual connection between valve holder and valve holder, or between coil holder and valve holder.

One of the clips is mounted upon each holder, and the two are so spaced that the distance between them is such as will allow the condenser to fit nicely into the clips.

Easily Constructed

You cannot, of course, always use clip-in components in the way suggested, and there are times when you require holders for them—in fact, one is always wanting holders for grid leaks, anode resistances, tubular fixed condensers, and so on. Fig. 5 shows an easy and most inexpensive way of making these.

HOLDERS FOR "CLIP-INS"

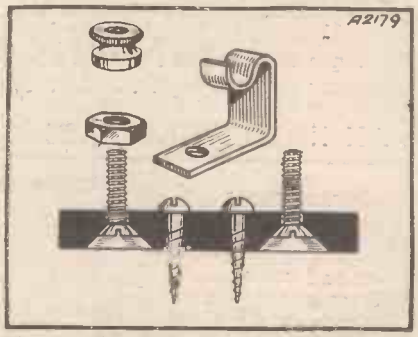


Fig. 5. When a holder is required it can easily be made from a small piece of ebonite and a few odds and ends, as shown above.

One requires a piece of ¼-in. ebonite, from ½ in. to ¾ in. in width, and about ½ in. longer than the component to be mounted. In addition, two 6 B.A. hexagon nuts, two 6 B.A. terminal nuts, two 6 B.A. countersunk screws, and a pair of clips are needed.

The clips can be bought ready-made or they can be made at home, as we shall see in a moment. Discover the proper distance between the clips first of all. You can do this by slipping a pair on to the component—one at each end, of course—and then putting a ruler across them.

In your ebonite mark out the two centres the same distance apart, and drill 6 B.A. clearance holes (No. 34 Morse drill). Countersink these holes very deeply. Between them drill a couple of holes for wood screws.

Now put a clip over each 6 B.A. screw and clamp it up with a hexagon nut. The terminal nut serves to enable you to make your connections to the holder.

Regarding Metal Panels

Clips are easily made from thin, springy sheet metal about ¼ in. to ⅜ in. in width. Make right-angled bends with the help of flat-nosed pliers, and shape the curved portions into which the components fit with round-nosed pliers.

One still comes across quite a number of components whose makers do not appear to realise that thin metal panels are largely used nowadays. The kind of things I have in mind are one-hole fixing variable condensers, volume controls, rheostats, and so on, as well as switches and the escutcheon plates for drum-type variable condensers.

Two problems arise. One is that the spindles of these components may be "live." Now a panel is, or should be, earthed, and it may happen that you don't want the spindle to be at earth potential. What is to be done?

The best solution is to cut a hole about ½ in. in diameter in the panel to allow ample clearance for the spindle. Mount the component not directly upon the panel, but on a small piece of ¼-in. ebonite. Fix this to the panel by means of bolts.

A Good Solution

The second problem concerns those components whose makers have not taken the threads of the fixings far enough down to enable nuts to bind them tightly to the panel. Here washers provide the solution. Keep in hand a small supply of ⅜-in. and ½-in. washers, and if you encounter a component of the kind mentioned slip one of them (sometimes two are needed) over the bush before putting the latter through the panel.

Screens and Shorts

Lately I have come across quite a large number of cases where trouble has arisen in sets in which screening is used. The home constructor—and sometimes the professional, too, for that matter—does not always realise that the insulated covering of a wire is continually under wear if it is passed straight through a hole in the metal screen without any additional protection.

A USEFUL TIP

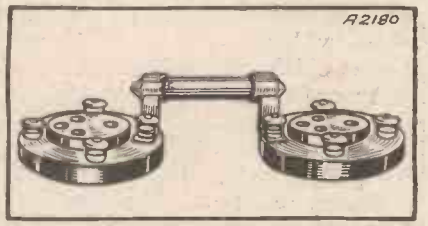


Fig. 4. This shows a good method of mounting a tubular resistance or condenser of the clip-in type between two valve holders.

The average set sustains a good deal of vibration from traffic, from the shaking of the room as people walk about, or from the sound waves set up by its loud speaker. Wires, and particularly long ones, are constantly in slight movement, and this causes chafing to occur at such points.

Again, when you are changing a valve or making adjustments inside the set you are very apt to move some of the leads as you do so.

Suitable Protection

There are two good ways of protecting leads at the points at which they pass through screens.

The first is to purchase a length of ebonite tubing whose inside diameter is such that the wire you use will pass through it comfortably. Ascertain what size of drill will make a hole into which this tubing is a push fit.

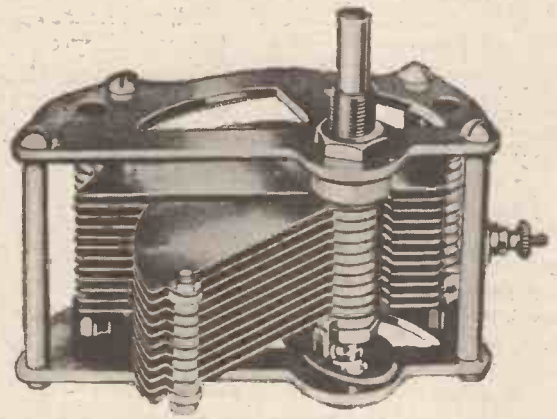
Use this drill for holes in your screens through which leads are to pass, and in each of them insert a piece of the tubing about ¾ in. in length.

The other method is to purchase a supply of Systoflex, which can be passed comfortably over the wire. Drill holes in your screens large enough to take the Systoflex and slip a short piece over each lead that must pass through them. It is quite easy to work the Systoflex down the lead and into the hole.

SPECIFIED

for the "PLUS-STAGE" de-Luxe, the "EXTENSER" Four, and every efficient modern receiver

BECAUSE



VARIABLE CONDENSERS.
Brass Vanes and end plates, ball-bearings. ·0005, 5/9; ·00035, 5/7; ·0003, 5/6; ·00025, 5/3; ·00015, 5/-.

DIFFERENTIAL CONDENSERS.
All brass, bakelite insulation between vanes.
·00007, 5/3; ·00013, 5/6; ·0002, 5/9; ·00027, 5/9; ·00034, 6/-.
Also the new miniature pattern ·0001 and ·0003, 3/- each.

L.F. TRANSFORMER.
Ratios 3-1 and 5-1. The special method of winding ensures remarkable reproduction of all frequencies. 12/6 each.

experience has proved they never fail the constructor

Every radio constructor knows the exasperation of tracing troubles to some faulty or unsuitable component. Far too many sets are working inefficiently through the substitution of other makes of components for those specified by the designer. He knows from actual experience that LOTUS Components are reliable and will give the results he has achieved. That is why every modern receiver incorporates LOTUS Components. Be sure to ask for LOTUS and ensure success.

The LOTUS range comprises Condensers, Transformers, Valve Holders, Dials, Coils, Jacks, Plugs, Switches, Remote Controls, etc. If your dealer cannot show you the components you require, write for an illustrated list to:

LOTUS RADIO LTD.,
MILL LANE, LIVERPOOL.

YOU CAN ALWAYS RELY ON

LOTUS

COMPONENTS

Our News Bulletin

The Race for Power

By the time this issue of the WIRELESS CONSTRUCTOR is on sale it is likely there will be more complaints of interference and swamping, which will far exceed those made when Mühlacker came on to the air for the first time. The reason is that Konigswusterhausen will be testing on 75 kilowatts, and Langenberg on the same power.

Forthcoming Changes

A new German station is also being built at Breslau for working on 325 metres, while the new Leipzig transmitter will take Frankfurt's wavelength of 389·6 metres and the new Frankfurt station will use Leipzig's wave-length. It may be some months before these changes come into force.

Hours of the Vatican

Unless things have been altered by the time you read these notes, the following should hold good for the Vatican radio station. At 11 a.m. B.S.T., every morning, the Vatican station calls on 19·84 metres. There is a transmission on 50·20 metres at 8 p.m. B.S.T., while on Sunday there is a transmission at 11 a.m. B.S.T., on 50·20 metres. A talk in English is usually given at 11 a.m. every Tuesday.

Nightingales a Nuisance!

There was a note in the press the other day of a village where the nightingales sang so persistently that some of the residents threatened to shoot them. Considering the difficulty the B.B.C. has had in past years in making certain of a good nightingale broadcast we think this ought to be looked into. The village in question is Merrow, in Surrey.

Perils of Television

News comes from America to the effect that one of the Federal Radio Commissioners insists that rigid censorship of television is essential before seeing by radio becomes commercialised. The Commissioner is looking rather far into the future, we think, but it appears he foresees abuses unless television is very carefully controlled.

Too much advertising by television seems to be one of the bugbears in the Commissioner's mind, and he also makes reference to the possibility of immodest broadcasts.

Not Hatched Yet

The Commissioner said, in an interview recently: "I believe that television is destined to become the greatest force in the world. I think it will have more influence over the lives of individuals than any other force."

Quite so, but we think the Federal Commissioner is counting his bad chickens before they are hatched!

(*Continued on page* 156.)

Technical Talks

Half-Wave and Full-Wave Rectification.

For the operation of a radio set from an A.C. electricity supply, either "half-wave" or "full-wave" rectification may be employed. The first method consists of the use of apparatus which will act as an electrical "sluice gate," allowing the current to flow in one direction only, and stopping its flow when it attempts to reverse. Full-wave rectification is obtained by connecting up a number of these "sluice gate" units to make use of both directions of flow, and converting both alternations into a flow in one direction only.

Generally, full-wave rectification is the better method to use.

Half-wave rectification is used for some of the smallest H.T. rectifiers, and for grid-bias rectifiers. In these cases, where the current to be dealt with is small, half-wave rectification has the advantage of simplicity and cheapness.

Further technical information will be found in "The All-Metal Way," a copy of which will be sent on request.

WESTINGHOUSE METAL RECTIFIERS

THE WESTINGHOUSE BRAKE & SAXBY SIGNAL CO., LTD.,
YORK RD., KING'S CROSS, LONDON, N.1. Telephone: North 2415.

COMPONENTS WITH A REPUTATION

MAGNUM PANEL BRACKETS

As specified for "Extenser" Four

2½ in. × 2½ in. 1/6 per pair.

The "Extenser" Four, "Plus-Stage" de-Luxe, and all sets described in "Wireless Constructor," can be supplied as constructional kits, ready wired and tested, or any parts separately as required.
Lists including particulars of Magnum components and Mains- or Battery-operated Sets, including a list of leading short-wave stations—Free on request.

MAGNUM VOLUME CONTROL

Complete with extension handle. As specified for the "Extenser" Four. 1 meg. 8/-

MAGNUM H.F. CHOKE

As specified for "Plus-Stage" de-Luxe 7/6

BURNE-JONES & CO. LTD.
"MAGNUM" HOUSE,
296, BOROUGH HIGH STREET, LONDON, S.E.1.
Telephone: Hop 6257 and 6258.
Scottish Agent: Mr. Ross Wallace, 54, Gordon Street, Glasgow, C.1

Recommended by

Varley

for use with their

CONSTANT SQUARE PEAK COIL

DUBILIER

·04-mfd. NON-INDUCTIVE
(Inductance free)

CONDENSER

Only with the Dubilier ·04-mfd. Non-Inductive (Inductance free) Condenser will you get the best from your Varley Constant Square Peak Coil.

Working in close co-operation with Varley, Dubilier evolved this Condenser expressly for use with the Varley Coil.

By substituting another type of condenser you will save a few coppers . . . but you will pay for it many times in terms of impaired performance and disappointing results. Be sure you get the Dubilier Condenser recommended, and make the most of the amazing new Varley Coil.

Price **2/-**

Ask your dealer . . . he has it in stock.

DUBILIER CONDENSER CO. (1925) LTD.,
Ducon Works, Victoria Road, N. Acton, London, W.3

Your enjoyment is perfect when listening to the WUFA

The "Wufa" speaker gives pure and natural reproduction of every musical note and voice variation.

PROOF FROM THE PRESS

"Popular Wireless" says:
". . . the 'WUFA' Loud Speaker undoubtedly deserves a position in the first three or four of the 'electromagnetics,' and not at the bottom of that enviable and leading class either."

"Wireless Constructor" says:
"On test we found the results very pleasing to the ear, while at the same time the degree of sensitivity was excellent."

"Wireless World" says:
". . . speech is excellent . . . music is well reproduced."

Many other Radio and Daily Papers give similar praise to the "WUFA."

ASK YOUR DEALER TO DEMONSTRATE.

WUFA
60 Pole Super-Power Unit

40/- Complete with Chassis.

27/6 Unit Only.

Beware of Imitations. Genuine "WUFA'S" have RED Magnets.

M. LICHTENBERG, 4, Gt. Queen St., Kingsway, London, W.C.2.

High-Grade
RADIO GRAMOPHONE CABINET

of exclusive modern design, hand-made and polished on Queen-Anne legs.

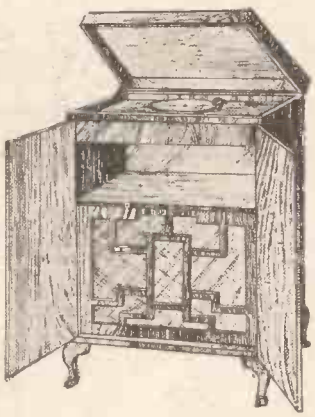
Figured Oak - - - £5 : 19 : 6
Figured Walnut or Mahogany £6 : 17 : 6
Carriage paid

THE ACME OF CRAFTSMANSHIP

Radio-Gram. Cabinets from £3 : 19 : 6 to £21
Wireless Cabinets - - - from £2

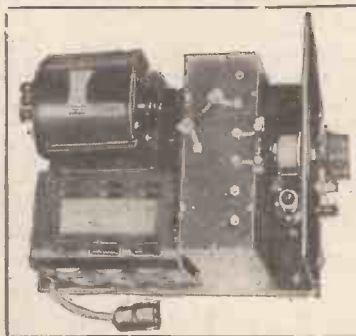
Photographs and 30-page illustrated Catalogue free.

Cabinets made to order a speciality.
Furniture at Maker's prices.



GILBERT, CABINET MAKER, SWINDON.

Estimates free. Estd. 1866



"The Only Silent Eliminator—

—and I have fixed about every sort on the market." This was the comment of a satisfied Cheshire radio man. Guaranteed for Two Years, Heayberd Mains Kits can be wired up complete in less than an hour.

MODEL C.150

150 volts @ 25 m.a. Westinghouse Rectification. Three tappings: 60/80, 120 and 150 volts. Ready assembled in Handsome Case. Requires wiring up only. Price **76/-**

Send List 947, showing how easy it is to build the Unit best suited to my particular Receiver. I enclose 3d. stamps.

M .....

Address .....

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HEAYBERD
10, Finsbury St., LONDON, E.C.2.

OHMITE

WHEN YOU SEE

OHMITE

Anode Resistances. All values, 100 ohms to 500,000 ohms.

2/3 each

MEGITE

MEGITE

Grid Leak. All values, 1 megohm to 5 megohms.

2/- each

Ohmite and Megite Resistances are constant in value of negligible self capacity and non-inductive. Dead silent and always reliable, they provide the most effective resistance on the market, giving the full range of values required. Supplied with vertical or upright holders of superior brown bakelite construction 6d. extra. *Graham Farish components carry a written guarantee of accuracy.*

Ask your dealer to obtain, or write to

GRAHAM FARISH

LIMITED .... BROMLEY, KENT

OUR NEWS BULLETIN

—continued from page 154

Critics of Moorside

As was expected, the North Regional station is coming in for a good deal of severe criticism. According to some critics on both sides of the Pennines the quality of the transmissions is pretty poor.

This didn't seem to strike a B.B.C. official as justified, for he said in an interview: "The quality is the best that can possibly be given."

It appears that scientific quality tests have been made which prove up to the hilt that the station will handle faithfully all musical notes between 30 and 10,000 cycles.

The Quality Question

If this is true, then the Moorside broadcasts should give complete realism, for 30 cycles approximates to the deepest note on a piano, while the highest note on a piano is 4,224 cycles, and therefore is much lower than the highest notes the new B.B.C. station can transmit. If the B.B.C. has really made these tests, and has proved the above statement up to the hilt, then it is a pretty good answer to those critics who are complaining about the quality of transmission.

The Warsaw Giant

It is curious that not more complaints have been made about Warsaw No. 1, the giant new station which is working on 1,411 metres. Warsaw No. 1 is easily the most powerful station on the air in Europe, or for that matter in the world. It has a power of 150 kilowatts.

Radio Paris on Test

Tests have been picked up from the new Radio Paris station, and the effect was something colossal when I listened-in the other day. When this station really gets going it won't be difficult to foresee more trouble for the Union Internationale.

The B.B.C.'s Postbag

Considering the huge audience the B.B.C. has, it is surprising that on an average they receive at Savoy Hill only about 2,000 letters a week. In past years quite a number of letters received by the B.B.C. were just abusive, but to-day most of them are very critical and of real value to the departments concerned.

It appears that of about 100,000 letters received a year at Savoy Hill, one-fifth are of an enquiring nature. Every letter—except the abusive one—is answered.

When the North Regional scheme was announced shoals of letters were received, as many as 800 a day reaching Savoy Hill.

Sir John Reith in New York

Sir John Reith has been lecturing the Americans. He has been telling them how unfortunate it is that America hasn't a monopolistic B.B.C. and a Savoy Hill of its own. Sir John has been gently maintaining—gently in order not to offend the susceptibilities of the Americans—that quality is always best when you have monopoly.

Stunting Competition

As Sir John put it, "qualitatively a service like broadcasting is bound to suffer when it has to meet modern stunting competition." There is, of course, a good deal in what Sir John says, but a writer pointed out in the "Evening Standard" that although he could not find a fault with Sir John's commonsense in this matter, the point of view nevertheless irritated him

More American Relays?

The Americans are after Sir John. They want him to increase the number of American programmes relayed to British listeners. In America to-day our programmes are being relayed to American listeners more and more frequently, so in a sense we are replying to the flood of American talkie films.

We hope Sir John won't be inveigled into arranging too many American relays. We get all we want from the films!

Treasury's Big Rake-Off

The Annual Report of the B.B.C. is rather a dismal thing to read, at least from the listener's point of view—for it becomes clear after perusing the report that out of every 10s. paid by a listener only 61·49 per cent goes to the B.B.C. The rest goes into the greedy maw of the Post Office and the Treasury.

Our Money!

Look at it in round figures. In 1930 the gross receipts from licences amounted to £1,696,000, but out of that tremendous sum the Post Office and Treasury took nearly two-thirds of a million—or, to be precise, £635,000.

(Continued on page 157.)

FORMO
ARTHUR PREEN & Co LTD.

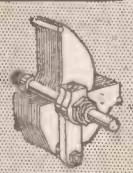
MAINS CONDENSER CAP. 2 3/3

FORMO MAINS CONDENSERS

It has been the aim of condenser engineers for years past to produce a condenser having a high test and working voltage, a high insulation value, and long life, at a low cost. The new Formo condensers have a high insulation value which makes leakage infinitesimal, and are tested by the sudden application of the test voltage, and not, as is usual, through a non-inductive series resistance.

Catalogue of the complete range of Formo components sent on request

MID LOG LINE VARIABLE CONDENSER 4/6



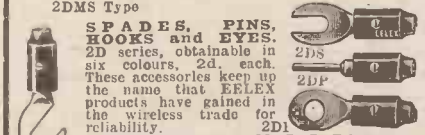
DUAL RANGE COIL 12/6

VERNIER DIAL 3/

ARTHER PREEN & Co., Ltd.,
Golden Sq., Piccadilly Circus, W.1.
Factory: Crown Works, Southampton.

EELEX

ALL MAINS PLUGS and SOCKETS.
Types 2DWS and 2DMS in six colours. Plugs 2d., Sockets 2d.
Your Dealer can supply.
2DWS Type
2DMS Type



SPADES, PINS, HOOKS and EYES. 2D series, obtainable in six colours, 2d. each. These accessories keep up the name that EELEX products have gained in the wireless trade for reliability.
Write for List No. Y 88. J. J. EASTICK & SONS, Eelex House, 118, Bunhill Row, London E.C.1. *'Phone: Metropolitan 0314/5/6.*

PLEASE be sure to mention "Wireless Constructor" when communicating with Advertisers. THANKS!

OUR NEWS BULLETIN

—continued from page 156

Taxed, on Top!

Not only does the B.B.C. get this meagre, or comparatively meagre, share of the licence money, but it is kept waiting an unconscionable time for it.

But the joke's not over yet, for when the sum is remitted to the B.B.C. it has to pay Income Tax—or, at least, is asked to pay Income Tax.

Financial Impositions

Last year the Income Tax authorities demanded £50,000 Income Tax, but so far the B.B.C. has declined to pay. Whether this will result in a court action remains to be seen, but it is nice to know that the B.B.C. doesn't knuckle down entirely under these financial impositions.

What It Comes To

For a long time we have been hammering into our readers the fact that the financial aspect of broadcastng is most unsatisfactory. It comes down to this: that everyone is compelled to pay 10s. in licence fees in order to receive B.B.C. programmes. The fact that you may want to listen only to foreign programmes has nothing to do with it. When you have paid your 10s., anticipating a return in the shape of first-class British programmes, a large portion of it is raided by the Post Office and the Treasury.

No Justification

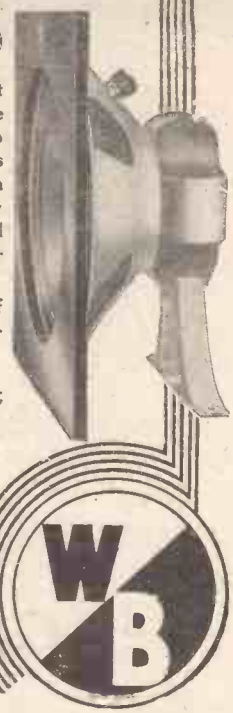
There is no legal justification for this, and the sums deducted are simply nothing more or less than unofficial taxes. How the B.B.C. ever allowed itself to be wangled into this agreement is a mystery.

Either licence fees should be considerably reduced, or the B.B.C. should receive a much greater proportion of the revenue.

Ups and Downs

Radio still continues to increase as regards numbers. For example, during 1930 there was an increase of 455,174 licences, making a grand total of 3,411,910. But there again, as the licence figures go up so the B.B.C.'s share proportionately goes down. In 1930 the B.B.C. got 61·49 per cent, as against 64·02 per cent of the licence revenue in 1929.

A NEW W.B.
PERMANENT MAGNET
MOVING-COIL
SPEAKER
for £4:10:0



So sensitive that any 2- or 3-valve set will drive it! No mains or batteries needed. Identical in design with the very successful model introduced earlier this season.

Don't be put off—insist on a demonstration.

Type PM2 chassis, assembled with 11½" × 11" baffle board, £4:10:0. If fitted with a double-ratio step-down transformer, 15/- extra

Ask your dealer for the free colour-folder, or write to us direct.

Made by the Makers of the famous W.B. Cone Speakers, Switches, and Valve Holders.

Whitley Electrical Radio Co., Ltd., Radio Works, Nottingham Road, Mansfield, Notts.
Irish Free State Distributors: Kelly & Shiel, Ltd., 47 Fleet Street, Dublin.

LET THE "CARRIER" CARRY YOUR SET

You need a light, strong cabinet for your Portable. The CAMCO "Carrier" combines lightness with strength and sturdiness, beauty and distinction.
No additional panel is required in this cabinet. The front of the case is a highly finished wood panel screwed to the inner frame and is easily removable. Inner dimensions 12¼" wide × 13¼" high × 6⅜" back to front. Cones up to 9½" in diameter can be used. Price in Oak 35/-, in Mahogany 39/-. Write for free catalogue to:—

CAMCO CABINETWORK

CARRINGTON MFG. CO., LTD.,
24, HATTON GARDEN
LONDON, E.C.1.
'Phone: Holborn 8202.
Factory: S. Croydon.

Name .....
Address .....
..... W.C.S.

as five years ago

BULGIN DIAL INDICATORS

are still unsurpassed for finish and value. Essential to accurate tuning, and easily fixed, they add distinction to any set.

No. 1	Made from the solid brass rod with points ground. Complete with nut and washer. Nickel Plated. Pair	9d.
No. 2	Projects above the panel. Most useful where dial does not fit flush with panel. For 2 in., 3 in. or 4 in. engraved dials. Nickel Plated. Each	3d.
No. 3	A neat, well-finished article at a popular price. Nickel Plated. Each	2d.
No. 4	An engraved pattern. Nickel Plated or Oxydised Silver. Each	2d.

Enclose 2d. postage for 60-pp. Illustrated Catalogue and Manual.

A. F. BULGIN & Co., Ltd.,
9/10/11, CURSITOR STREET,
CHANCERY LANE, LONDON, E.C.4.
'Phone: HOLBORN 1072 & 2072.

SALE!
Radio-Gram Cabinets De Luxe! Remarkable offers.
£12 12 0 clearing at £8 8 0
£7 7 0 clearing at £4 18 0
£3 3 0 clearing at £2 2 0
(Cash or Deferred).
GUARANTEED Perfect condition and sent ON APPROVAL free—return at OUR expense if not delighted.
Only few models available. Lists FREE!
PICKETTS Radio Furniture (C.W.), Albion Rd., Bexleyheath

PAREX
SCREENS COILS, ETC.
as specified for the
"EXTENSER" FOUR
Complete Screens, Copper, 10/6; Alum., 7/6
COPPER FOIL, 21" x 10" 3/-
DIFFERENTIAL REACTION COND. 4/6
H.F. CHOKES .. .. .. each 3/6
"EXPLORER" COILS .. „ 12/6
"PLUS-STAGE" DE-LUXE
"PARATUNE" COIL UNIT 10/6
DIFF. REACT. COND., 4/6 H.F. CHOKE, 3/6
SPAGHETTI RESISTANCES ALL SIZES
E. PAROUSSI 10, Featherstone Buildings, High Holborn, London, W.C.1
'Phone: Chancery 7010.

Make
THE DAILY SKETCH
YOUR Picture Paper.

A FRAME HINT

By R. W. H.

I SOMETIMES come across people using frame aerials for their reception who lament that though they can get Vienna the frame just will not tune up to Budapest. Often they think about adding another turn of wire, but usually they cannot get beyond thinking, since the addition of this turn is not always so easy as it seemed at first blush.

An Easy Way Out!

Actually there is no need whatever to bother about doing anything of the kind. You can make the frame tune a little—or even a good deal—higher than it ordinarily does in a very simple way. Purchase a clip-in condenser with a capacity of ·0001 mfd. and fix its clips to the terminals of your frame. Don't use the condenser in the ordinary way, but when you want to get the station that was previously just out of reach, put it into the clips. The extra capacity will enable you to cover the additional metres.

In some cases a capacity of ·0002 mfd. may be required, but usually ·0001 mfd. is quite sufficient, unless the frame is very much on the small side. Should the terminals of the frame be too far apart for the clips to be mounted directly on their shanks you can get over the difficulty by making small extension pieces from sheet brass and fixing the clips to these.

NEXT MONTH

Even if you are going on holiday don't miss the AUGUST

"WIRELESS CONSTRUCTOR"

for among the many attractions will be a

SPECIAL THREE-VALVER

with

Simplified Band-Pass Tuning

GET YOUR ORDER IN NOW

"WIRELESS CONSTRUCTOR"
6d. ON SALE JULY 15th.

REGULATING YOUR RADIO

—continued from page 142

I regard this as a fallacy that to some extent operates against the interests of home radio.

And even if there were but comparatively small numbers of potential purchasers of radio gear able to understand the implications of, say, a stated transformer inductance or a loud-speaker response curve, I think it is up to the originators of the devices concerned to educate the public. That sort of thing is being done every day in other industries.

Plenty of Data

In radio itself we have the massed exception of the valve makers, who one and all tell you in nearly every one of their advertisements all there is worth knowing about their valves. They back up their non-technical generalisations with the hard facts as revealed by the essential characteristics of their various valves.

One firm may say something like this: "You will get better results with our valves. They cannot be equalled for power, punch, and purity, etc., etc.," But then they will add: "Our so-and-so has a mutual conductance (or an inter-electrode capacity, or something else) of this-or-that." After which it is up to one of their competitors to try and produce a superior figure or claim superiority in regard to some alternative technical quality.

(*Continued on page 159.*)

THE SIMPLEST WAY TO SCREEN YOUR VALVES.
The most effective form of screen for high-efficiency Screen-Grid and Detector Valves. Simplifies and cheapens the construction of new receivers—as easy to fit as a valve! Fitted in a moment to existing receivers with marked gain in stability.
The valve lies close to the screen, and its earthed filament or heater pin passes through a lug in the screen base, earthing the screen.

SAY
SIX-SIXTY

Six-Sixty Radio Co., Ltd., Six-Sixty House, 17/18, Rathbone Place, Oxford St., W.1. Tel.: Museum 6116/7.

REGULATING YOUR RADIO

—*continued from page* 158

It does give the public something definite to hold on to. Anyone can *say* their product is the best yet, but the law can step in if actual figures are loosely juggled with.

It has been suggested that radio ought to have a kind of grading institution that would, on application, issue grade certificates for wireless goods. I am of the opinion that the industry would do itself no end of good if it formed such a thing itself. There isn't much junk about these days, but what little there is would be killed stone dead by this device.

A Reliable Guide

The public would soon learn to avoid those articles that were not stamped with a recently issued "Grade Mark." Unless you have a pretty thorough knowledge of the science you cannot possibly hope to be able to judge of the qualities of much of the stuff used in and with a radio set, whereas with most ordinary commodities it is easy for you to do so.

However, in the meantime, WIRELESS CONSTRUCTOR readers, at least, have the guidance of our "As We Find Them" pages. And if you confine your purchases to the makes of apparatus advertised in the WIRELESS CONSTRUCTOR you can't go far wrong.

THE "SUMMA-FILTER"

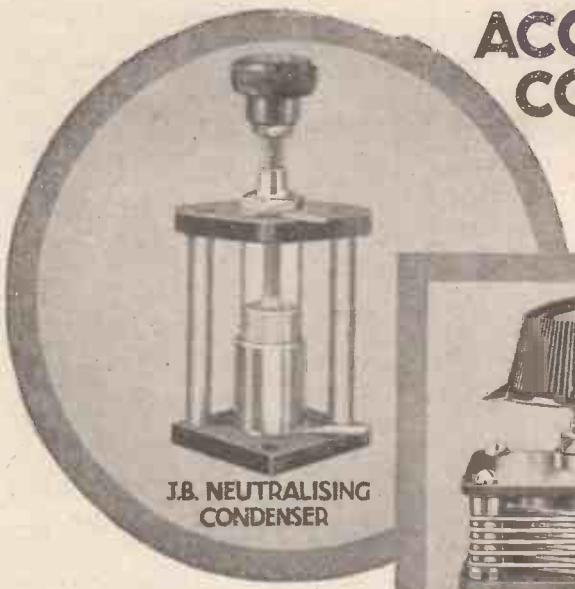
—*continued from page* 144

Now have a look at your set, and see whether the P terminal on the last valve holder goes direct to one of the loud-speaker terminals. If it does, then this unit is intended for *you*, irrespective of whether you intend to build the "Summa-Cone" or not.

Doing the Rounds!

If you *are* going to build the "Summa-Cone," then that's an even stronger reason why you should make quite certain that your set employs a filter, because if you put the speaker to the use for which it is primarily intended on a filterless set (assuming that we have a summer!) the H.T. current will have a fine time getting from the battery out into the garden to the speaker and then back again to the plate of the last valve! Ugh!

(*Continued on page* 160.)



ACCURATE CONTROL MADE EASY

J.B. NEUTRALISING CONDENSER—extremely simple design, cannot go wrong. Minute capacity changes made with ease. The slotted knob can be adjusted with a screwdriver and hand-capacity effects eliminated. Maximum capacity, 20 m.mfd. Minimum capacity, 1·5 m.mfd. Price 3/6

J.B. DIFFERENTIAL REACTION CONDENSER, for smooth reaction control. Carefully shaped vanes ensure equal capacity changes for both halves. *Insulated centre spindle.* Bakelite dielectric between vanes makes short-circuits impossible. Pigtail to rotor. ·0001, 4/-; ·00015, 4/-; ·0002, 4/3; ·00025, 4/3; ·0003, 4/6

PRECISION INSTRUMENTS

Advertisement of Jackson Bros., 72, St. Thomas' Street, London, S.E.1. *Telephone: Hop 1837.*

TENFOLD INCREASE IN SELECTIVITY . . . WITH MARKED GAIN IN QUALITY.

The new Varley Constant Square Peak Band-Pass Coil enables even the simplest set to separate every worthwhile programme. Confines local station to 3–4 degrees on *any* set. Covers *both* wavebands. Abolishes *all* interference by medium waves on long waves. Supersedes wave-traps. Easily replaces existing aerial coils. Needs no screening.

Varley

CONSTANT SQUARE PEAK COIL *Regd. Design No. 763904. Patent Pending.*

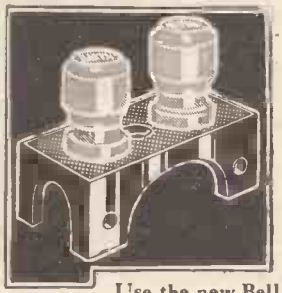
It is essential to use a non-inductive coupling condenser (·04 mfd.). THE DUBILIER CONDENSER CO. (1925), LTD., are manufacturing a special condenser, Type 9,200, for use with this coil.

Supplied complete with extension rod for switch and universal mounting bracket, 15/-

Gives a constant square-topped peak and separation of substantially 9 kilocycles on the whole of the medium- and long-wave range.

Advt. of Oliver Pell Control, Ltd., Kingsway House, 103, Kingsway, London, W.C.2. 'Phone: Holborn 5303

MOUNT YOUR TERMINALS ANYWHERE !



Belling-Lee Terminal Mount

Patent Pending

Use the new Belling-Lee Terminal Mount for your aerial lead-in, for loud-speaker extensions, for battery leads. It takes two terminals of any type and mounts them anywhere, vertically or horizontally—on your baseboard, window-ledge, wall, or skirting.

Supplied in separate cartons with Belling-Lee 12 months' guarantee of workmanship and material.

Belling-Lee Terminals
Type "B," 6d. each
Type "M," 4½d. each
Type "R," 3d. each

"Radio Connections" Handbook, 2d. post free.

BELLING-LEE
FOR EVERY RADIO CONNECTION

Advertisement of Belling & Lee, Limited, Queensway Works, Ponders End, Middlesex

THE "SUMMA-FILTER"

—continued from page 159

This simple little unit is very easy to make up, and it need not cost you much more than about fifteen shillings for the parts. You will only require three components, and a list of those used in the original unit, together with our recommended alternatives, is given elsewhere in the article.

Novel Shape

The shape of the container, by the way, has nothing to do with the function of the filter circuit. We simply built it up pyramid fashion to try and get away from the conventional panel and baseboard arrangement. After all, there is absolutely no point in using a panel in this case, because, apart from terminals, there is nothing to mount on it.

The real advantage of the pyramid scheme lies in the fact that you dispense with a cabinet, and as that means a saving of money it's worth the trouble of cutting out the four bits of wood and screwing them together.

Only Six Connections!

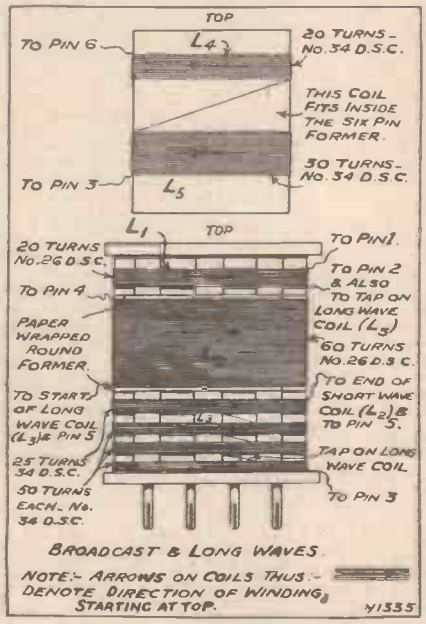
There is not much that we can tell you regarding the actual construction, because every single detail that you will be likely to require is given in the diagram. In any case, there are only six connections to be made, so you cannot go very far wrong.

When you have completed the unit, to couple it to your existing set is a job that won't take more than a couple of minutes. You simply remove the loud-speaker leads from the set terminals, and join them instead to the terminals appropriately marked on the unit. The other terminals on the unit—the three in a row—are joined to the corresponding terminals on your present set, and when you have done that the filter is fitted!

Alongside the Set

When you wish to use the loud speaker at the end of extension leads, the filter unit should, of course, be left at the set end, and the extension leads at the end remote from the loud speaker—that is, at the set end—should be joined to the unit terminals marked L.S. (not L.S. plus or minus, but just plain L.S.).

EXPLORER COIL DETAILS



With the aid of this diagram you will find the construction of these coils, which are employed in the "Extenser" Four, extremely straightforward. The larger former is a Colvern standard long-wave one with ribs, and has a diameter (to the outside of them) of 2⅜ in. The diameter of the smaller former is 1⅜ in. The medium-wave coil of 60 turns is wound in a single layer on paper wound round the larger former on top of the ribs.

THE "EXTENSER" FOUR

—continued from page 122

connection pay particular attention to the wires going to the valve holders if you solder them to the tags. The insulation of these wires has to be bared quite near to the foil, so that care must be taken to see that there is no possibility of the bare wire coming into contact with the foil.

You will note that only two of the Extenser "self-changer" contacts are used in both cases. It does not matter at all which are used, or which way round the wires go to them.

You will find the fuse mounted underneath the baseboard. One other sub-baseboard point is in connection with the reaction lead which runs right across the set from hole 14 to hole 2. It is as well to arrange this half an inch or so off the other leads, which may all lay as flat as possible on the underside of the baseboard.

A Long-Wave Tip!

That I think covers everything about the construction, except to say that the grid-bias battery should be fixed to the inside of the back of the cabinet. What little "operational" details are necessary will be found in the operating panel, where you will also find all the required information regarding types of valves, etc.

However, before closing down finally, just a little tip in case you are troubled with a medium-wave station breaking through on the long waves. A simple cure is as follows:

Connect a single-coil mount in series with the aerial lead and in it insert an ordinary No. 150 coil. When working on medum waves this coil must be shorted, and so the best thing to do is to arrange a switch across it for this purpose.

INDEX TO ADVERTISERS

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In the BLUE SPOT unit will be found the superlative effort of science to bring perfection to its triumph over the dead days of the Past. Its exquisite reproduction of the finest shades of sound has assured for it supremacy wherever experts gather to confer and compare.

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To get the best results from a BLUE SPOT Unit you must use a BLUE SPOT Chassis. Its dimensions are scientifically accurate in every detail to ensure between the chassis and the vibrations of the stylus of the unit that complete harmony without which perfect reproduction is impossible.

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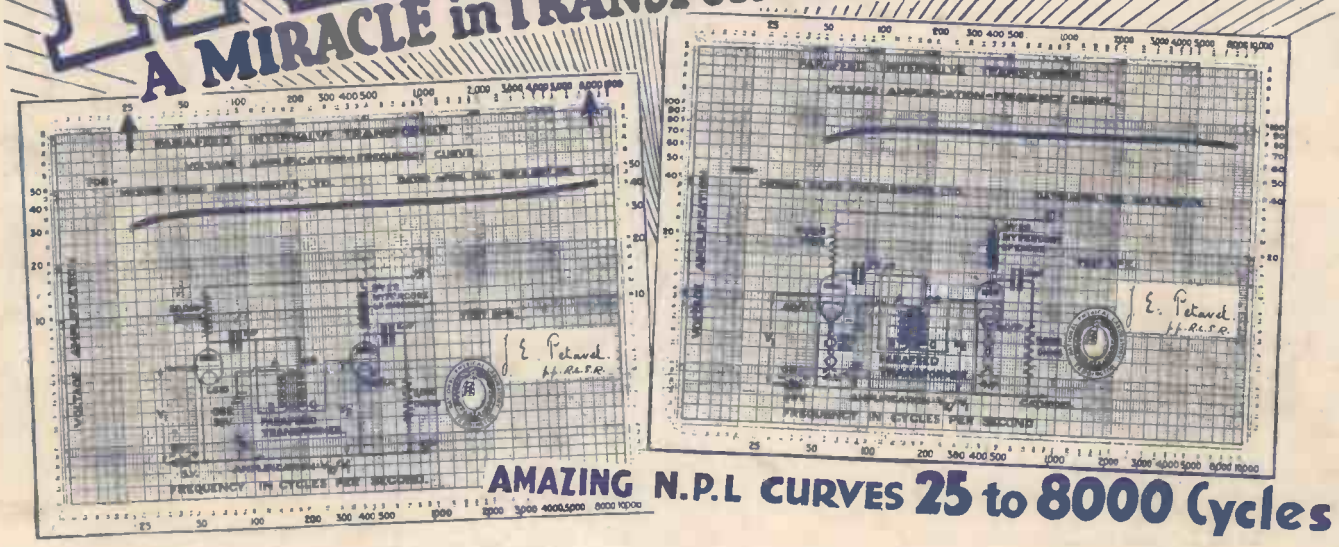
TRADE MARK

SUPER NICKEL CORE
SCREENED INTERIOR
WEIGHT 3½ OZS
Patent No-316449

8/6

PARAFEED

A MIRACLE in TRANSFORMER AMPLIFICATION



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ABSOLUTE FREEDOM FROM ELECTROLYSIS AND BREAKDOWN

BETTER L.F. STABILITY

Much lower values of speech current flowing through H.T. source render the "Parafeed" less liable to motor-boating than other transformers.

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Advertisement of R.I. Ltd., Madrigal Works, Purley Way, Croydon. 'Phone: Thornton Heath, 3211.

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