

The Wireless 6^d Constructor

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

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IN THIS ISSUE

The "VI-KING" PORTABLE

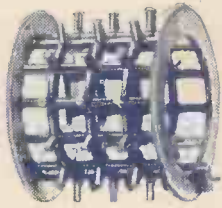
DESIGNED BY

VICTOR
KING

FIT AN
"EXTENSER"
TO YOUR SET
(See Page 87)

DID YOU HEAR NAIROBI?

Full details of this memorable
broadcast, readers' reports, etc.
(See Page 67)



One of the unique moulded skeleton coil formers



The secondary coil, shewing the air-spaced sectionalised low capacity windings



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CONTENTS

	Page		Page
The Editor's Chat	59	As We Find Them	79
A New Coil-Tapping Scheme	60	The "Explorer" H.F. Unit	81
The "Vi-King" Portable	61	Savoy Hill News	85
Queer Queries	66	Fit An "Extenser" to Your Set	87
Did You Hear Nairobi?	67	A Practical Man's Corner	91
Round the Dials	70	"On the Grid"	94
Points for Purchasers	70	The Month on Short Waves	94
The "Extenser" One	71	Are We Overdoing It?	95
Pick-Up Hints and Tips	74	The "Series-Shorter"	97
The "Plus-Stage" Three	75	Radio-Strasbourg	98
With Pick-Up and Speaker	78	Those Weather Reports	100
		Our News Bulletin	104

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.



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AMPLION

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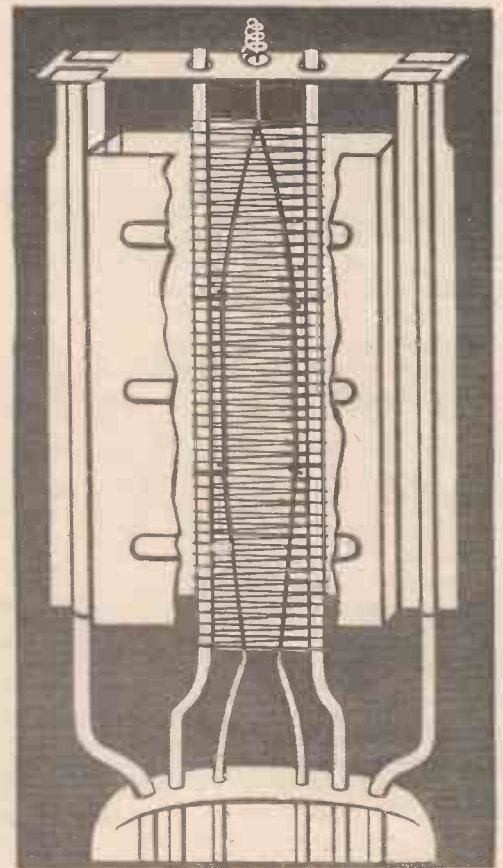
Simple facts for
Valve Users No. 2

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THE performance of a valve is largely determined by the spacing of its grid wires, the distances between the filament and the grid and between the grid and the anode. Any variation in these distances—will alter the characteristics of the valve.

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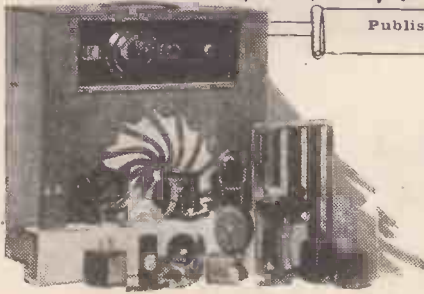
Over 50 types of Cossor Valves are available from any Wireless Shop to suit all 2, 4, and 6 volt Battery operated and A.C. Mains Receivers.



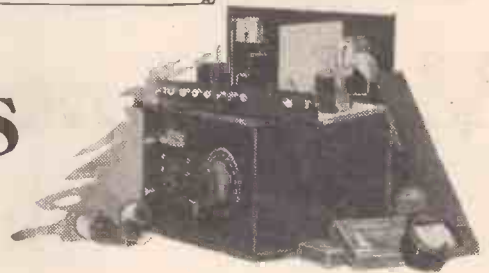
COSSOR

The WIRELESS CONSTRUCTOR

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THE EDITOR'S CHAT



Here are some details of the fine portable set described in this issue, and a note on the "Extenser's" triumphant debut into the radio world.

IF the invention and perfection of the S.G. valve has done nothing else it has made the portable set a safe, sound, practical proposition. And the man who in this year of grace 1931 turns up his nose at a really good portable is not only wasting his time but taking the risk of seriously upsetting the architectural beauties of his nasal apparatus. Seriously, if you have not kept in touch with modern portable set development you have missed something. If you can remember the early days of broadcasting, when a portable set was a weird and ultra-wonderful freak; when you wanted a suitcase the size of a small cabin trunk to hold the gear; when you used six bright-emitter valves; when the accumulator weighed a ton (about), and when the H.T. battery weighed another 10 cwt. (about), you will look at a good modern portable to-day with amazed respect.

The "Vi-King" Portable

Ten years ago a portable set was a monstrosity. I ought to know. I had one of the earliest made—six valves, frame aerial, etc. I needed a course of Sandow training before I could get very far with it. Telephones, of course; but it was a real surprise packet in those days. I often think of the amazement I caused with that old portable when I demonstrated it to Mark Hambourg, Sir Henry Wood, and other famous musicians. To-day a good portable does not arouse much wonder. Which is a pity. Because in one respect a modern portable best demonstrates the extraordinary advance which has been made in the technique of radio reception since those now far-off days of early broadcasting.

Consequently, I want especially to draw your attention to the "Vi-King" Portable, which is fully described in this issue.

Designed, built, tested and fully described by Mr. Victor King, this particular set embodies all that is best in modern portable technique. It costs more than the price of this magazine, of course—you can't

compactly housed in a good-looking case of handy size, and does, in short, represent an effort in radio design which we are proud to introduce to our readers.

A cursory examination of the set cannot but make you aware of its many advantages. And as it bears the hall-mark of Victor King, I feel you will need no further urge to build it. If you don't it will be your loss.

RADIO v. GANGSTERS



The American police car shown here has a powerful radio equipment stowed under one seat, to keep it in touch with headquarters.

expect a first-class set for less; but if you look over its "points"—if you carefully study its design—you will, I think, agree that the money you will have to spend in order to make it will not so much be well spent as well invested.

Proud of It!

The set contains its own frame aerial and loud speaker—both neatly and

The "Extenser" Extends

A word about the "Extenser." Some time this month you will be able to purchase an "Extenser" condenser—see our advertisement pages—and try it out in the "Extenser" One, which is described on another page. I have dealt with the advantages of the "Extenser" in a previous issue. You now have the opportunity of proving the truth of my contention—that it constitutes the greatest contribution to simpler radio since broadcasting began. Letters, please, when you have tried the "Extenser." Only keep them short, for I am expecting thousands!

Noises of Nairobi

Well, the Nairobi broadcast has come and gone; the lions didn't roar—but, then, we can't control East African pets.

However, other items "got over" very well. We publish a few selected letters from readers who heard 7 L O, and they clearly show what smart amateurs can do with good sets.

Incidentally, I may say that when the B.B.C. was approached with the idea of relaying 7 L O, a representative of this journal was informed that the B.B.C. engineers had never heard 7 L O! Come! Come! Savoy Hill. Look to your laurels!

A NEW COIL-TAPPING SCHEME



A method for tapping solenoid coils which is at the same time both really simple and extremely neat. No longer need coil taps produce slack turns. Just give this scheme a trial.

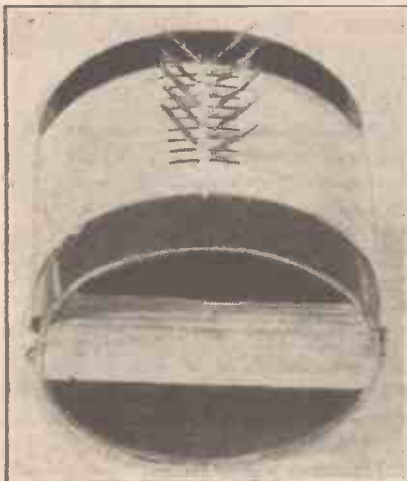
By A. S. CLARK.

MAKING neat tapping points is by no means the simplest part of coil home-construction. So next time you are making an experimental coil, or copying the published details of a coil which has several tapings of the twisted wire type, try the scheme explained in detail on this page.

Neat and Efficient

You will find that, apart from providing taps of an extremely neat and efficient character, it is about the simplest possible scheme to carry out. Most of those of us who wind our own coils take a pride in making them look really nice and professional, but too often is a coil spoiled by the ragged

NEAT APPEARANCE



By bending alternate taps in opposite directions they can be nicely spaced out, so that there is ample room to attach a spring clip without fear of it touching two of the tapings at the same time.

appearance of twisted tapings; so when you have an opportunity, just take my tip and try this new idea.

The usual scheme of making taps on a winding is this. Having arrived at the turn at which a tap is to be

made, the wire is held tight against the former with one hand, while an attempt is made with the other to twist a really tight loop in the wire.

Even if one is pretty successful in getting the wire twisted fairly tightly, there is a tendency for the loop to untwist as the wire is pulled tight to carry on with the next turn. Also, while the next tap is being made, or the winding finished, the loop manages somehow to untwist itself a little and so loosen the turn in which it is made, and possibly some of the adjacent ones as well.

How It Is Done

It is largely due to overcoming this difficulty of getting a really tight twist that the new scheme owes its success. This is what you do:

Before winding is started, three parallel slots are cut in the former at the point where the taps are desired. These slots need only be just long enough to cover the turns where you require the taps, and a fretsaw is the instrument to make them with.

The slots should be about $\frac{3}{8}$ in. apart, and in the neighbourhood of $\frac{1}{16}$ in. wide. The width depends a little on the gauge of the wire, but $\frac{1}{16}$ in. is about right for the sizes usually employed for coils.

Cutting the slots will be quite simple if you are used to fretwork. If you are not, here are two tips to note.

Drill three holes to take the fretsaw blade at the points where one end of the slots will come, and use the saw so that the blade is at an angle with the former and comes out at one end. You will then be able to get a larger backwards and forwards movement than if you keep the blade at right-angles to the former.

Winding the Coil

Start your winding by twisting the end of the wire through two of the

slots, and wind on till you reach the turn at which the first tap is to be made. Then proceed as follows:

Having reached the slots, hold the wire tight against the former and cut it about 2 in. past the slots. Thread this end through the first slot to the inside of the former, and out again through the centre slot.

Making the Taps

Next thread the other wire end, produced when you cut the wire, through the other outside slot from the outside and then out from the inside of the former via the centre slot. Now roughly twist these two ends together, and proceed with your winding, pulling the wire quite tight.

All the other taps are made in exactly the same manner, and when

COULD IT BE SIMPLER ?



The wire passes through the outer slots to the inside of the former and up through the centre slot to the outside of the former, where it is twisted into a tapping. That is all!

the winding is finished you can proceed to finish them off.

This simply consists of untwisting the wires and pulling them outwards with pliers to make sure they are really tight, removing the insulation and tightly twisting together again with pliers.

Finishing Off

You will find that the slots will hold the turns quite tightly while this is being done, so that nothing will slip.

Run a little solder over the twists, and stagger them, namely, bend each one in the opposite direction to the adjacent ones.

The photographs make the staggering quite clear. They also illustrate the other details of the scheme very well.

The "VI-KING" PORTABLE

By VICTOR KING.

Like the Vikings of old this is no stay-at-home, but a real "go-out-and-grab-at-it"! You are not tied to the "locals" with a set like this, but can choose your programmes from the Continent at any time. Compact, inexpensive, efficient—what better set could the constructor desire?

is operated without the normal aerial and earth it is inevitably a "local only" outfit. Well, it just isn't! And in designing the

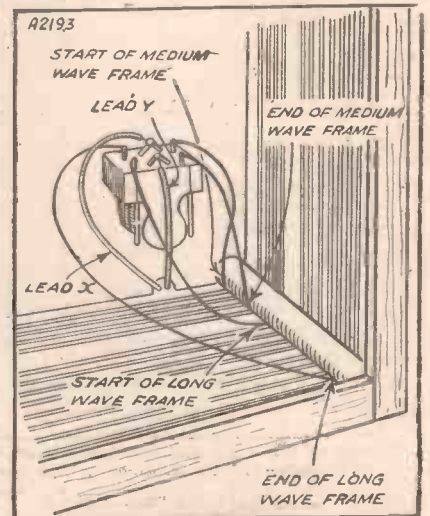
"Vi-King" Portable I set out to prove that it isn't.

Really Portable

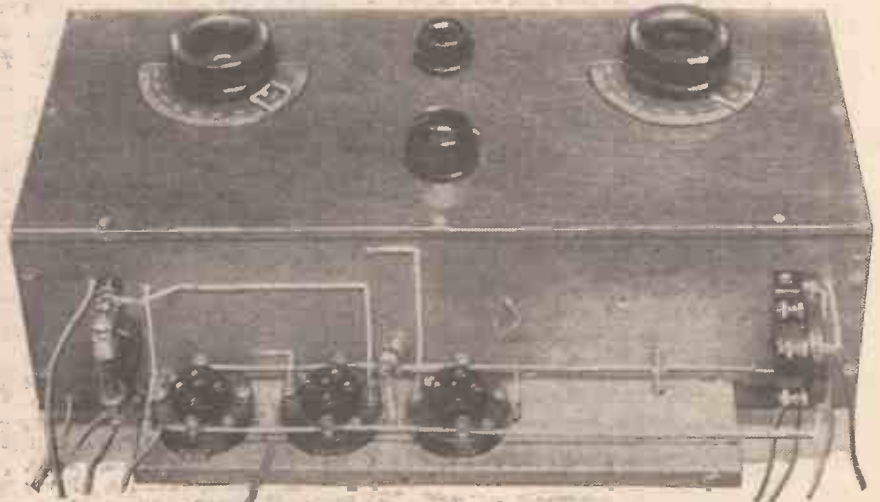
This new portable of mine (and it is a portable, because I've carted it about quite a few miles without feeling any physical effects, and I'm certainly not a "Carnera"!) will produce at will anything up to a dozen stations at satisfying loud-speaker strength under almost any normal conditions, and when it is really dark, well—just you build it, and see!

The "Vi-King" Portable is absolutely self-contained. The frame aeri-

EFFECTIVE WAVE-CHANGING



COMPLETELY CONVENIENT CONTROLS

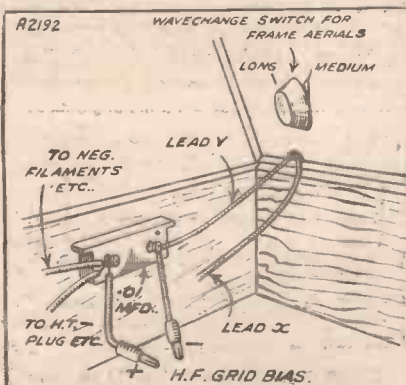


This shows the valve compartment with the S.G. holder on the extreme right. Between valves two and three there is the detector grid leak supported by its own wiring. Note the conveniently positioned controls.

I SUPPOSE everybody likes the idea of a good portable set; just a neat case, batteries and loud speaker inside, with no external aerial or earth to bother about.

Some day all sets will be like that. But until this time arrives that extra range and strength so easily

BESIDE THE BATTERIES



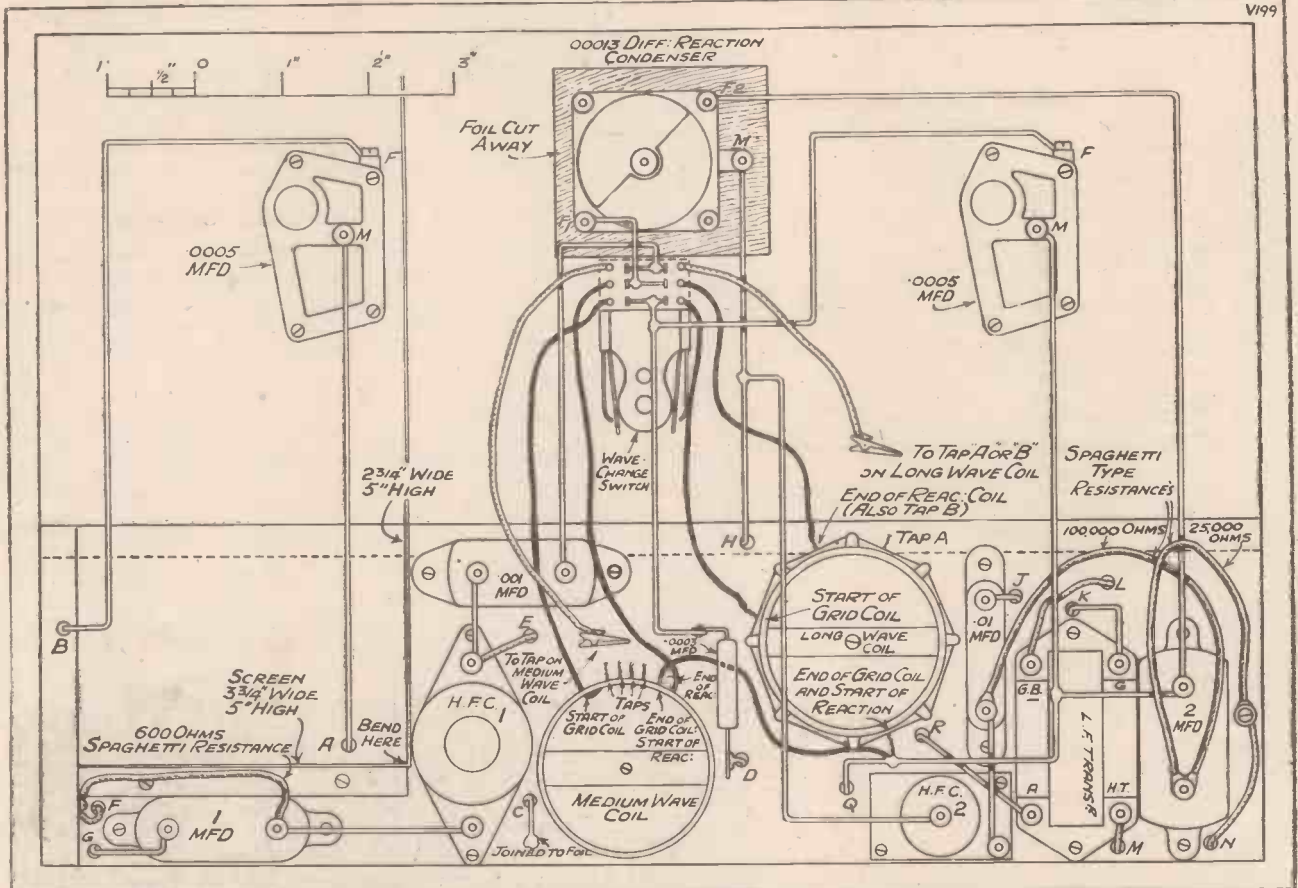
This sketch shows how to connect one frame lead to the fixed condenser which goes across the H.F. grid bias. Note how the aerial leads are marked X and Y respectively.

lost by "compressing" a set into portable form will always cause constructors to pause and weigh the "pros and cons" of portability.

It should be remembered, however, that radio design does progress. Portable sets are not now the poor distance-getters that they were a few years ago. Quite the contrary.

I know that a whole lot of people have the idea that because a set

The "Vi-King" Portable—continued



The wiring diagram of the panel and main baseboard components, a very necessary part of any constructional article. Note the "Spaghetti" resistances, which look like lengths of extra-thick wire, also the H.F. wave-change switch under the reaction condenser, it is of the three-pole double-throw type.

PARTS FOR THE "VI-KING" PORTABLE

- | | | |
|--|--|---|
| <ol style="list-style-type: none"> 1 "Riverside" Portable cabinet (Camco). 2 .0005-mfd. variable condensers (must be small type) (J.B. "Tiny," or Dubilier solid dielectric type, Ready Radio solid dielectric type, etc.). 1 .00013-mfd., or any capacity up to .0002-mfd., differential reaction condenser (Lotus, or Igranic, Ormond, Ready Radio, Polar, Dubilier, J.B., Lissen, Wearite, Magnum, Parex, Burton, Formo, Telsen, etc.). 1 Three-pole change-over switch, midjet type (Wearite, etc.). 1 Double-pole change-over switch (Wearite, or Bulgin, etc.). 2 H.F. chokes (Magnum and Ready Radio in set, or Lewcos, Keystone, Wearite, Lissen, Lotus, Dubilier, Varley, Parex, R.I., Telsen, etc.). 1 .001-mfd. fixed condenser (Ferranti, or Graham Farish, Formo, Igranic, Mullard, Lissen, T.C.C., Ediswan, Dubilier, Telsen, etc.). 2 .01-mfd. fixed condensers (T.C.C. and Lissen, or as above). 1 .0003-mfd. fixed condenser, midjet type (T.C.C., or Formo, Ormond, etc.). 1 1-megohm grid leak, with holder | <ol style="list-style-type: none"> (Graham Farish, or Dubilier, Telsen, Ediswan, Lissen, Igranic, Mullard, Ferranti, etc.). 1 2-megohm grid leak, with terminals (Lissen, or Dubilier, Graham Farish, etc.). 1 Horizontal type valve holder (W.B., or Bulgin, Junit, Parex, etc.). 3 Ordinary type valve holders (Lotus, or Magnum, Clix, Wearite, Telsen, W.B., Igranic, Bulgin, Benjamin, Junit, Formo, etc.). 1 L.F. transformer, about 3-1 ratio, must be small type (R.I. Hypermite, or Igranic Midjet, etc.). 1 2-mfd. fixed condenser (Dubilier, or Formo, Ferranti, T.C.C., Lissen, Igranic, Hydra, Mullard, etc.). 1 1-mfd. fixed condenser (Dubilier, or as above). 3 Spaghetti type resistances, one 600 ohms, one 25,000 ohms, and one 100,000 ohms (Lewcos, or Bulgin, Keystone, Magnum, Sovereign, Graham Farish, Ready Radio, etc.). 1 L.T. switch (Wearite, or Lotus, Igranic, Lissen, Goltone, Ready Radio, Magnum, Bulgin, W.B., Keystone, Benjamin, Ormond, Junit, Red Diamond, etc.). | <p>Copper screen and foil. See diagrams for sizes and shapes (Parex, or Keystone, Ready Radio, Magnum, Wearite, etc.).</p> <p>Wander plugs as marked (Clix, or Beling-Lee, Igranic, etc.).</p> <p>Quantity of wire (Glazite, or Lacoline, etc.).</p> <p>Flex, screws, etc.</p> <p>FRAME-AERIAL MATERIALS.</p> <ol style="list-style-type: none"> 1 Set of slotted frame-aerial spacers (Bulgin, etc.). 1 lb. No. 24 D.S.C. wire. 1/2 lb. No. 30 D.S.C. wire. <p>COIL MATERIALS.</p> <ol style="list-style-type: none"> 2 oz. No. 26 D.S.C. wire. No. 30 D.S.C. wire (included in frame material). 1 Former 2 in. diam. by 3 in. long (Parex, Paxolin, Pirtoid, etc.). 1 Slotted long-wave former as used in "P.W." and "M.W." dual-range coil (Peto-Scott, etc.). <p>NOTE.—This standard former has 11 slots, and as only 8 slots are required for the long-wave coil for the portable, the former can be cut down to the right size.</p> |
|--|--|---|

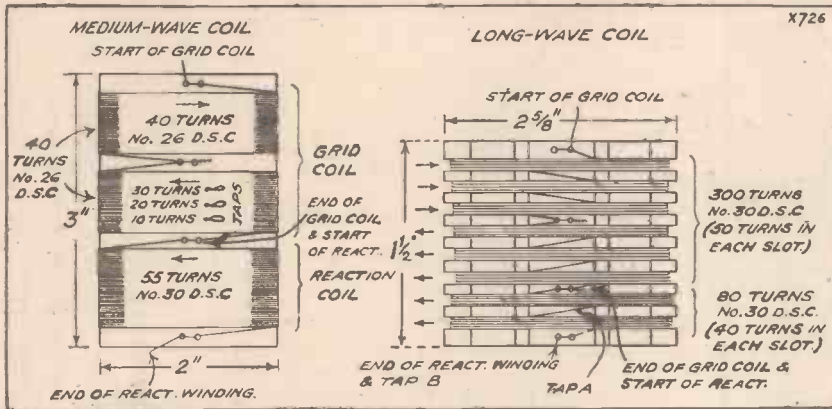
The "Vi-King" Portable—continued

(yes, it's a wave-change set!)—and the loud speaker are tucked away in the lid, and the actual "innards,"

So in the "Vi-King" Portable I have resorted to the old type of switching, which, after all, doesn't really matter

very much in a portable set. The circuit is arranged so that the change-over can be made in as simple a manner as possible, and, in point of fact, all that you have to do is to move one switch in the lid of the set, and another on the actual panel.

HOW TO MAKE THE COILS



This is a drawing which shows very clearly the construction of the coils. The long-wave coil is wound in slots on a ribbed former, the arrows at the side of the diagram showing the direction of winding.

together with the valves and all the necessary batteries, are contained in the main part of the cabinet.

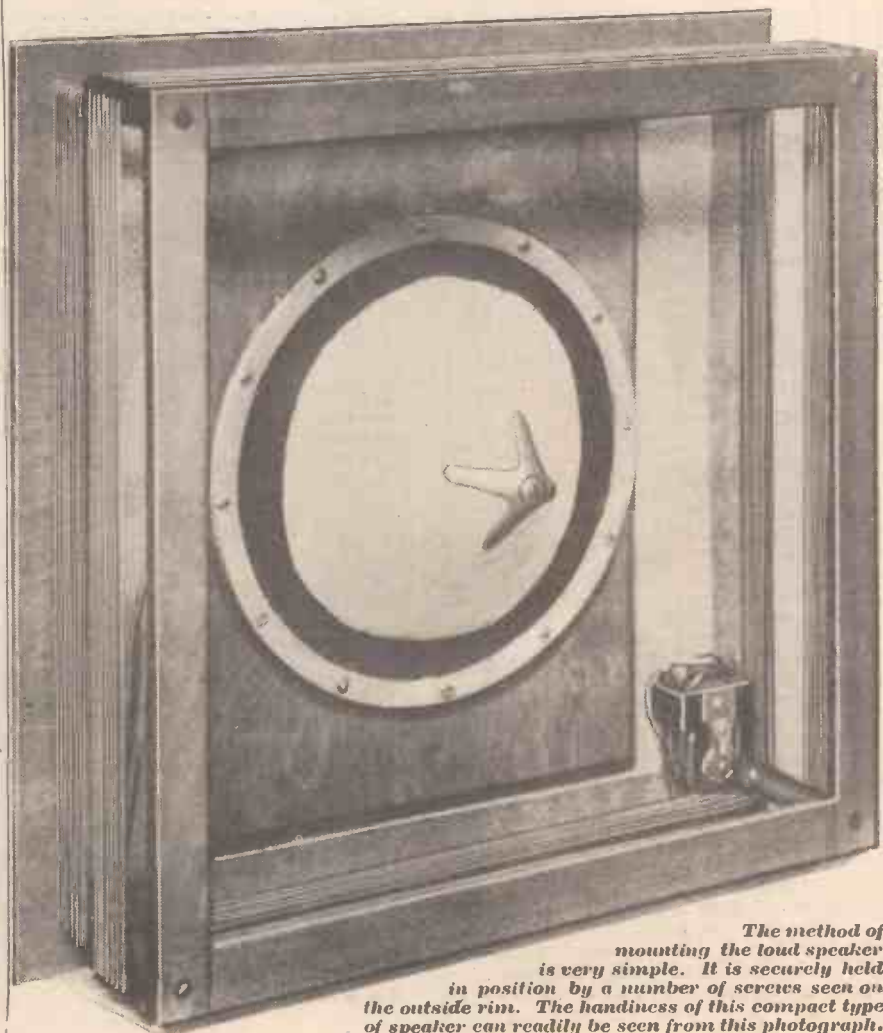
Those of you who are technically minded may be interested to learn that the circuit employed is a more or less straightforward arrangement of four valves, comprising a fully tuned S.G. H.F. stage, a detector and two note-mags., one resistance- and one transformer-coupled.

As a matter of fact, from my own experiments I am convinced that the arrangement of the S.G. H.F. stage in my portable makes it possible to obtain as much H.F. amplification with a single stage as is normally obtained with two aperiodic H.F. stages using ordinary valves, and, what is more, the scheme I have employed is a jolly sight more selective! It is not much good having a set nowadays—portable or otherwise—that gets the stations, but will not separate them.

The Wave-Changing

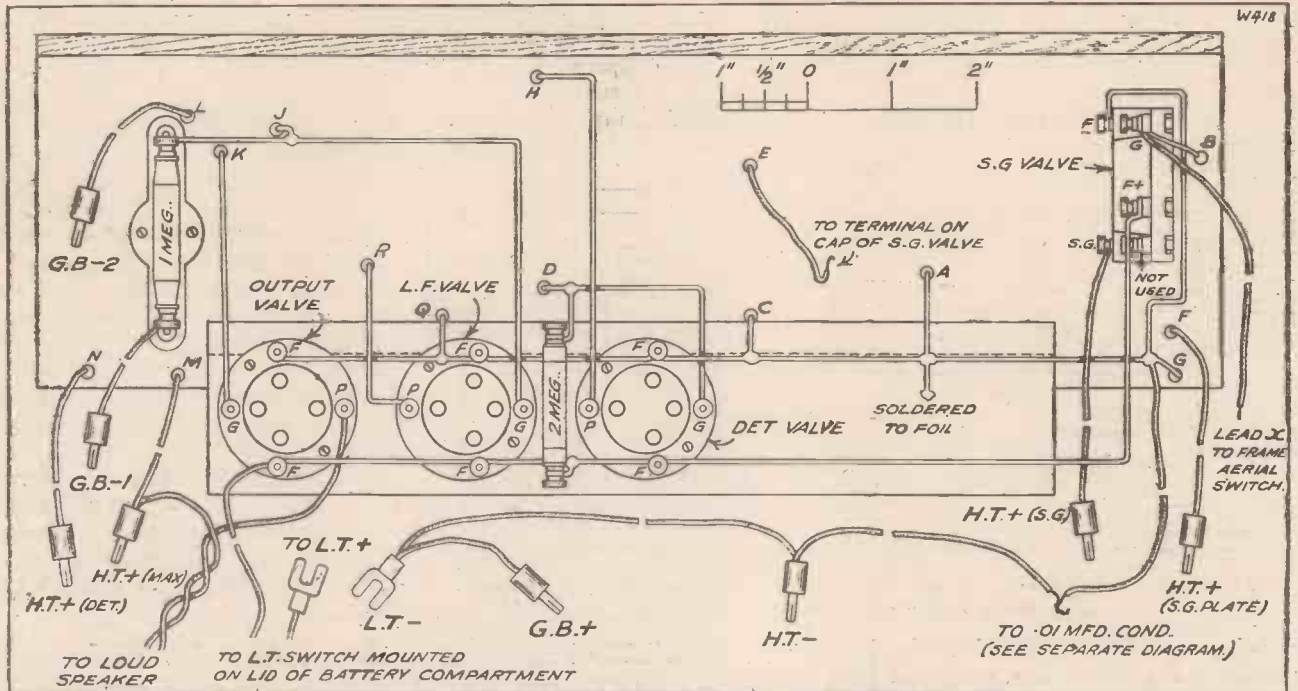
Now to turn for a moment to the question of wave-change switching. As you may well imagine, I had a regular battle with myself to decide whether or not my new design should be "Extensersised," and it was only the fact that our summer is usually of such short duration—which means to say that you cannot afford to wait for the manufacturers who have not yet had time to explore the possibilities of midget Extensers—that decided me, very reluctantly, against it.

IN THE LID—FRAMES, SPEAKER AND SWITCH



The method of mounting the loud speaker is very simple. It is securely held in position by a number of screws seen on the outside rim. The handiness of this compact type of speaker can readily be seen from this photograph.

The "Vi-King" Portable—continued



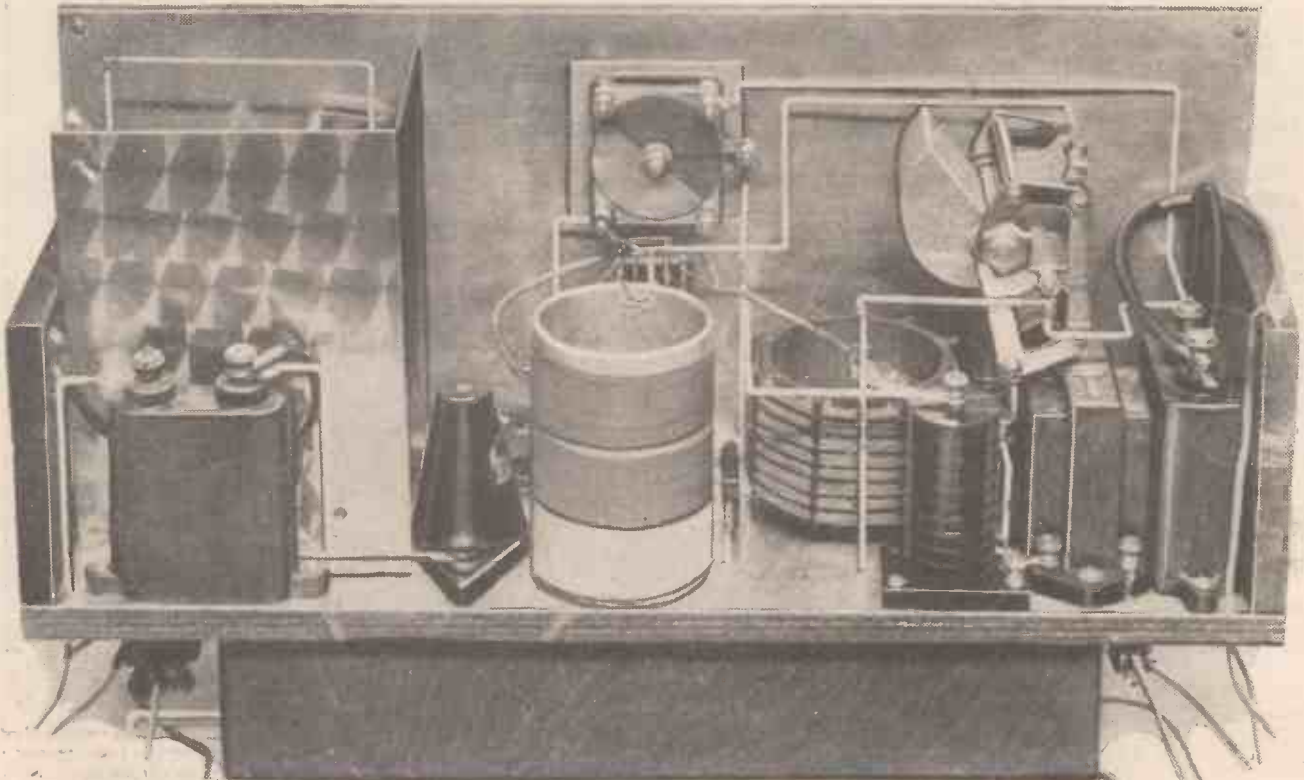
Here is the wiring diagram of the valve compartment. The different holes through which the wires pass to other parts of the set can be identified by their marking letters.

build. The coils and the frame aerials you wind yourself, and, apart from these, the rest of the components are all quite standard.

So, if you are thinking in terms of portables (and from my correspondence it is obvious that hundreds of you are!), go carefully through

the component list, choose your parts, and then "have a smack" at this one.

And now to work.



The tidy appearance of a carefully wired set well repays you for the time and trouble expended, as this photograph of the "Vi-King" Portable shows.

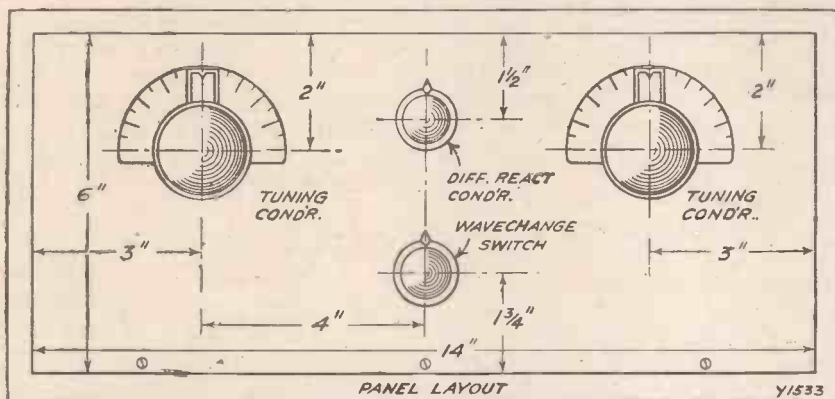
The "Vi-King" Portable—continued

You will not be able to proceed very far with the constructional work until you have made the coils, so I'm going to tell you all about these first

When these turns are completed the wire should be temporarily secured, and a further 40 turns should be wound on (with taps as shown),

but this time in a clockwise direction. The two coil ends which come together at the centre should next be joined, after which the reaction winding can be put on.

ON THE PANEL



A neat panel layout makes a wonderful difference to the appearance of any wireless set, of which fact this is a particularly fine example.

of all; at least, all that is necessary in addition to the detailed diagrams provided, from which you can obtain turn numbers and wire sizes.

IN THE CORNER



Here you see the long-wave frame above the medium-wave frame, and you will see quite clearly how the former is wound in slots on special corner-pieces.

The coils are wound in what is known as the astatic fashion. That is to say, the grid coils in each case are really two coils wound in opposing directions and joined where the two windings come together. Referring to the left-hand coil diagram (which is the medium-wave coil), you fix the wire at one end of the former and wind on 40 turns in an anti-clockwise direction (looking at the former from the top).

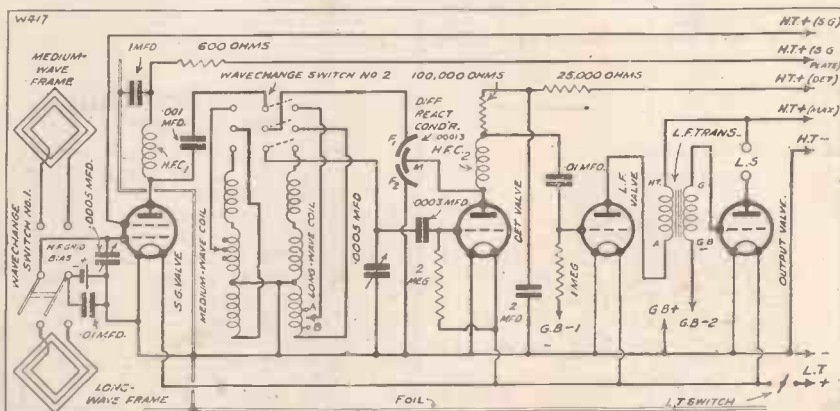
The Long-Wave Coil

With regard to the reaction coil, it is imperative that this should be wound in the same direction as the half of the grid coil against which it is placed, that is to say, in a clockwise direction.

The method of procedure when winding the long-wave coil is exactly the same as for the construction of the medium-wave coil and, since all turn numbers are given, it is hardly necessary to say anything further.

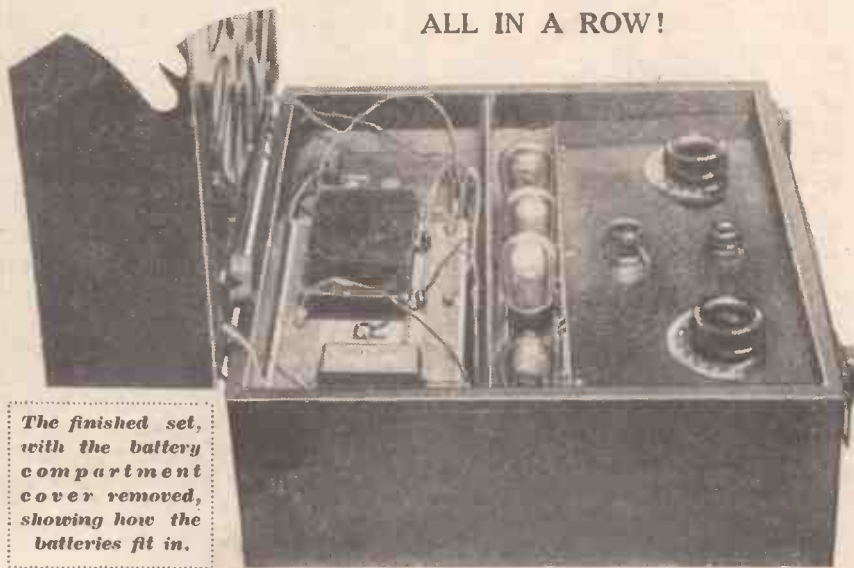
(Now turn to page 108 for full details of frame-aerial windings, and other constructional work.)

AN S.G., DET., AND TWO L.F.



The theoretical circuit, which produces an excellent combination of selectivity, range and power.

ALL IN A ROW!



The finished set, with the battery compartment cover removed, showing how the batteries fit in.

QUEER QUERIES



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

By P. R. BIRD.

ONE result of the arrival of summer weather is a renewed interest in short-wave reception; and although it has often been stated and re-stated that short waves frequently give excellent results in daylight, this fact gets re-discovered anew every year by ardent searchers after the foreigners.

Among the rather queer short-wave questions which have arisen this month are the following:

"How many turns are there in a No. 4 and in a No. 6 short-wave coil?"

"Why don't the B.B.C. use short waves?"; and

"Does the tuning condenser alter the short-wave tuning?"

The answer to the first question, as you probably know, is that there are four turns in a No. 4 and six turns in a No. 6—the coils are numbered to correspond with the turns, in fact.

B.B.C. Short-Waver

The second question has very often been asked, and the answer to it is that the B.B.C. does use short waves. They have a special S.W. station at Chelmsford, the programmes from which have been picked up all over the world. This station is not, however, intended to serve the nearby British listeners, for which purpose broadcast waves are better

"Does the tuning condenser alter the short-wave tuning?"—was evidently raised in all sincerity. And consideration showed that it was by no means an idle question (though it certainly might have been put more clearly!), for what was really meant was: "Does a set's ordinary tuning condenser affect tuning when a short-wave adaptor is being used?"

The answer to that is "No." With an adaptor of the "Kelsey" type the ordinary tuning condenser

is cut right out when the adaptor plug is in, and all short-wave tuning is done on the adaptor's own condenser.

Potentiometer Position

As recent enquiries seem to point to a good deal of uncertainty about potentiometer adjustment for smooth reaction, a few words about the correct method may be of assistance to readers in doubt on this point.

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.

Usually a short wire from the grid leak goes to the slider terminal, and other wires go from the ends of the resistance winding to the respective sides of the set's filament wiring. It is a good plan to mark these outer potentiometer terminals + and -, according to which side of the filaments they go.

It will generally be found that with the slider right round towards + the volume is good, but reaction ploppy. With the slider towards -, reaction is smooth, but volume reduced.

Evidently a compromise is needed, and the best intermediate position

should be found by trial on a weak programme. Try the H.T. + plug a little up or down from its usual setting, to find the best position for it, and, in general, try to keep the slider towards positive rather than negative.

In most cases the slider can be put about one-third or one-quarter of the way round from the positive end, and perfectly smooth reaction can be obtained. But the comparative position on different sets is a matter of small moment so long as sensitivity is really good and reaction is smooth.

It is to obtain these two that the potentiometer is used instead of a direct connection from the grid leak to filament.

"Kilotrap" Tuning

As an interesting commentary on short-wave reception, the following extract from a reader's letter may prove helpful.

"As a result of yesterday's effort, W 2 X A D came in at good 'phone strength at 5.45 p.m.—broad daylight—and at 12.30 when I tuned in W 2 X A F he filled the room at enormous L.S. volume. Experience will show whether it was a particularly good night, but my impression is that the set is good, and I contemplate no further alterations.

"As a matter of interest, I had adopted a tuning system exactly similar to that of the 'Kilotrap', after trying various methods. It is simplicity itself."

Shocks from the Speaker

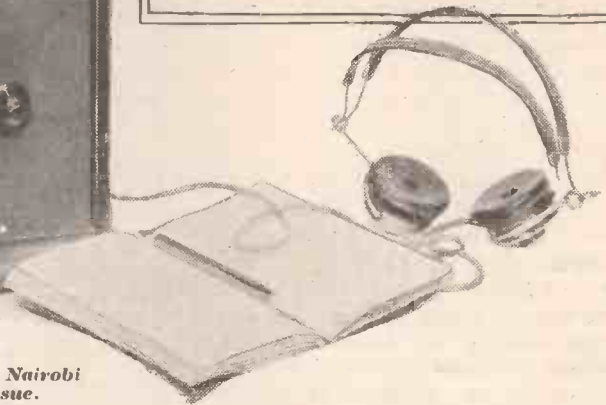
"When a fellow gets the quality and the strength and the reliability that I've got he doesn't grumble—he just basks in it," says a Goodmayes reader, in a very appreciative letter. "And yet there is one query I should like to put about the output filter," he continues, "which puzzles everybody who admires the set."

And he goes on to explain that he can get distinct shocks from his loud-speaker terminals, although it is absolutely insulated from the rest of the set by two big condensers—one connected each side of it.

To get great volume it is essential that strong signal-voltages should be developed across the output by the incoming programme, and often these output voltages are great enough to give the shocks. It will be found in such cases that detuning the set so that no programme comes through will stop the sensation of shock—a clear proof that the effect is caused by the arrival of speech or music impulses on the grid of the last valve.



**DID YOU
HEAR
NAIROBI?**



How the "Wireless Constructor" received the special Nairobi short-leave programme announced in last month's issue.

THIS is 7 L.O, Nairobi, Kenya, calling to Great Britain."

Thus commenced one of the most historically important broadcasts that has ever taken place from overseas—the first organised inter-Imperial link between Kenya and the Mother Country.

How It Began

When, a few months ago, the WIRELESS CONSTRUCTOR, in conjunction with the British East African Broadcasting Company, set out to establish a closer link between Kenya and Great Britain (we on our part organising the link at this end, and designing a special set to do the job, and 7 L O working full of enthusiasm at the other end to provide us with what turned out to be a wonderfully interesting programme) we never even dared to hope that conditions would be such as to enable almost every single word to be heard clearly and "understandably" in this country.

We were faced with the possibility of thoroughly bad conditions on the night of nights. Fading, atmospherics, interference and a host of other possible troubles *might* have marred the success of the effort; for, after all, five and a half thousand miles—overland pretty well all the way—is no mean distance to be covered with only two and a half kilowatts of power!

And yet on that memorable night of April 20th . . . !

But let us take you back to the commencement of the broadcast as it was received at the main WIRELESS CONSTRUCTOR receiving station (we had other listening posts almost all round London), where in the presence of Press and numerous other representatives the transmission was received on the loud speaker.

Almost dead on the stroke of 8 p.m.—with everyone present keyed up to a pitch of great excitement and enthusiasm (ourselves included!)—

**THE HOME OF
THE TOM-TOM**



From the heart of the East African jungle—5,500 miles away—the mournful "plonk" of native tom-toms could be heard clearly.

came the opening announcement that this was "7 L O, Nairobi, Kenya, calling to Great Britain," followed almost immediately by an appropriate inaugural address by Mr. S. J. Slingo, the manager of 7 L O.

Greetings from Kenya

"Hello, London newspaper representatives. Hello, British listeners"—every word clear, and marred only by the occasional interference of a French amateur—"I am very glad to be able to open this special broadcast for Great Britain arranged on behalf of the WIRELESS CONSTRUCTOR."

Then came the first musical item, and nothing could have been more appropriate than the tune selected, which was "Here's a Health Unto His Majesty."

It was at the end of this item and at the beginning of the greetings which followed from residents in Kenya to friends and relations in this country that we experienced the only real trouble worth mentioning. And that, once again, was the French amateur whose ears, by the time we had said what we had to say about him, were probably burned up to a frazzle!

"Joe Speaking"

Nevertheless, quite a number of the personal greetings were heard, and nothing could have been more striking than the feeling during the broadcast of these intimate messages

Did You Hear Nairobi?—continued

of the extreme value of radio as an Empire link.

There was Mr. Jenkins—"Joe speaking," as he put it—who had a birthday greeting to put over; Mr. William Chapman; Mr. Schultz (?) (we are not clear as to the spelling); who sent a message of good luck to Martin; Mr. Jones, who talked of, above all things, the weather in London, and who expressed a hope that the B.B.C. were relaying the broadcast; Mr. Higgins, and so on.

Turn of the Tom-Toms

The talk by Mr. Martin Johnson on "Gorilla Hunting," which followed shortly after the greetings, was to us city dwellers, and no doubt to all you CONSTRUCTOR readers who received it as well, a feature of real interest; but then, for that matter, the whole programme was one long hour of interest!

Next came the time for the real Nairobi natives to do their turn, and what a weird turn it was, too! A mournful, almost uncanny tom-tom dance—plo-o-onk, plonk, plonk—plo-o-onk, plonk, plonk, and super-imposed upon it towards the end (was it by way of contrast?) was a bright

TELLING THE WORLD



The impersonation of an old cockerel, which was broadcast during the Farm-Yard Noises, was one of the items received satisfactorily in every part of Britain.

and breezy record by the Band of H.M. Grenadier Guards.

By this time reception was about as good as one could possibly expect from a station such a tremendous distance away, and when it came to the studio impersonations of Nairobi

Noises (the next item)—well, suffice it just to say that we heard every one of them marvellously, as well almost as if they were coming from a station

A picturesque palm tree grove not far from the Nairobi station.



A TROPICAL SCENE

in the heart of England rather than from the heart of Eastern Africa.

There was a Jews' harp; African Rifles on the march; a jazz band performance on a banjo; Caledonian music on the bagpipes; starting up a motor-car in the pouring rain (we feel most strongly that the latter item should have been from London and not Nairobi!). Then there were the farmyard noises—ducks; pigs being carted off to the Nairobi slaughterhouse; the noise of a chicken having laid an egg, and, finally, as the announcer put it, the noise of an old cockerel not feeling too pleased about it!

The Lions' Roar

All good things, including Nairobi broadcasts, have to come to an end, but even so it was with feelings of regret that we heard the last item announced. Here, again, nothing could possibly have been more appropriate for the conclusion of an all-Empire broadcast than the tunes selected by the Nairobi people.

First came "Rule, Britannia," then the "British Grenadiers," "Here's a Health Unto His Majesty," "God Bless the Prince of Wales," and, finally, "God Save the King!"

And did the lions close the transmission with their roars? No! All the inducements imaginable, and even the honour of participating in this historical broadcast, would not provoke them to part up with a single roar!

For all that there can be no doubt that the whole programme was a very praiseworthy effort, and we feel that the British East African Broadcasting Company are to be congratulated upon the most enjoyable items pro-

vided by them. We only hope that many of you CONSTRUCTOR readers succeeded in receiving the programme satisfactorily, in which case we have

no doubts as to your opinions of the fare provided.

At the conclusion of the broadcast, the WIRELESS CONSTRUCTOR, on behalf of all its readers and all those others who constituted the chain at this end, immediately cabled a hearty reciprocation, to be read out from 7 L O, of the greetings sent by Kenya colonists.

Lisbon's Helping Hand

Let us hope that it may not be long before the British East African Broadcasting Company are able to repeat this highly interesting broadcast, and that then the lions will be more favourably disposed to give an account of themselves. Perhaps a little bit of 'cello music might do the trick!

Before concluding, we feel it only right that credit should be given to CT1AA, that enterprising amateur transmitter in Lisbon, who for the benefit of all those who did not possess sets capable of receiving the transmission direct from Nairobi picked up the programme and relayed it so that it could be heard distinctly with the simplest kind of set imaginable.

Fully half an hour before the actual broadcast commenced, CT1AA could be heard calling to England, Australia, America, Canada, etc.

"This is CT1AA testing for the WIRELESS CONSTRUCTOR, London," came over, then: "We are shortly going to relay Nairobi for the benefit of all those who cannot get it direct."

There can be little doubt that but for the enterprising efforts of CT1AA many of those people who heard the programme with simple sets entirely

Did You Hear Nairobi?—continued

satisfactorily would have been excluded altogether from participation in view of the B.B.C.'s inability to do the relay. His results, like ours, were subject inevitably to a certain amount of fading and noise, but nevertheless it was, we feel, a highly creditable effort.

HOW IT CAME OVER

Here are extracts from some of the thousands of letters from enthusiastic readers who tuned-in 7 L O on April 20th.

HE REALLY ENJOYED IT

Sir,—I listened to your Nairobi broadcast on the 20th instant and really enjoyed it. My set is the "Explorer" Three and my aerial the gas-pipes. I tuned-in with 'phones, but was so strong that I changed over to speaker. Wishing your book every success.

Yours truly,
H. HARRISON.

Luton, Beds.

RECEPTION VERY GOOD

Sir,—In the April issue of "Modern Wireless" I noticed an account was given of a special transmission from 7 L O, Nairobi, Kenya Colony, on April 20th, on 50 metres. About 8.10 p.m. I tuned in to 50 metres, and after some music it was announced: "This is 7 L O, Nairobi, Kenya Colony, in a programme for British listeners." I heard greetings to friends in England, followed by farmyard imitations.

Reception was very good, except for X's, but no fading. The set used was a straight det-pentode.

Yours truly,
WILFRID A. ATKINS.

Anfield, Liverpool.

[Ed. Note.—The reference to "Modern Wireless," our big brother, is one to the editorial article in which brief details of the WIRELESS CONSTRUCTOR Nairobi tests were announced.]

ON THE "KELSEY" ADAPTOR

Sir,—I am sending you a short report of the transmission from 7 L O which you arranged through the medium of the WIRELESS CONSTRUCTOR.

I have never heard Nairobi before, owing to the fact that this station has been on 50 m., and consequently overpowered by Moscow. A great help in finding it on the new wave-length was the call-meter described in the September number of the WIRELESS CONSTRUCTOR.

The actual transmission, though weak, came through very well. There was almost no interference other than atmospheric troubles, but this is only natural on long-distance reception. Almost every word spoken could be heard quite distinctly, and I am sure that some people must have been delighted to hear familiar voices coming to them over two continents.

J. H. HARGREAVES.

Bridlington.

DO IT AGAIN

Sir,—Just a line to thank you for your Nairobi broadcast—even if the lions didn't oblige. Seven-thirty saw me cursing because my accumulator was low, and the relief hadn't arrived, but suddenly it came, and I tuned-in on a man who gave imitations of banjos and things. I thought I must be at Saigon for a moment.

However, in spite of rather bad conditions—some static, and rather a high noise level—7 L O came in at quite nice 'phone strength on my det.-L.F. twin output set, and I hope your "Kilotraps" friends better placed as to aerial and so forth got even better results. No doubt I shall learn more about that on May 15th.

Very enterprising show, Sir. I congratulate the CONSTRUCTOR—and hope it does it again!

Yours faithfully,

Tunbridge Wells.

J. K. H.

TROUBLED BY "X's"

Sir,—I tuned-in at 6.40 p.m. and for 15 minutes I was unable to hear Nairobi through a French station and Morse; I heard a baritone singing in the distance.

7.0 Morse cleared away and light orchestra heard. (Here follows a detailed schedule of the programme.) At 8.20 I took off the 'phones, my ears refusing to stand any more.

Altogether a bad night in my district for this wave-length. The station seemed to be coming through well, but the atmospheric conditions were appalling.

The set used is based on a circuit by J. English in "Modern Wireless"—three-valve, screened-grid detector and 2 L.F.'s.

Yours truly,
R. H. CURPHEY.

Milford Haven.

A LANCASHIRE LISTENER

Sir,—I heard your special programme broadcast from Nairobi. I received 7 L O from 8.25 to 9.03 p.m. B.S.T. at about R2, or R3, and the readability was rather poor, but improved towards the end of the transmission. The modulation seemed very full, and there was some Q R N.

I am awaiting with interest details of how this transmission was received in other parts of the country.

Yours sincerely,
J. T. SHROUDER.

Maghull, Lancashire.

A "KELSEY" ADAPTOR WITH L.F.

Sir,—I tuned-in Nairobi at 7.30 p.m. on the day in question, but found the station very weak. At 8 o'clock the strength seemed to increase, and I was able to hear the announcements clearly.

The set used is a det-pentode, with indoor aerial. The circuit is the same as the "Kelsey" Adaptor, with a stage of L.F. added.

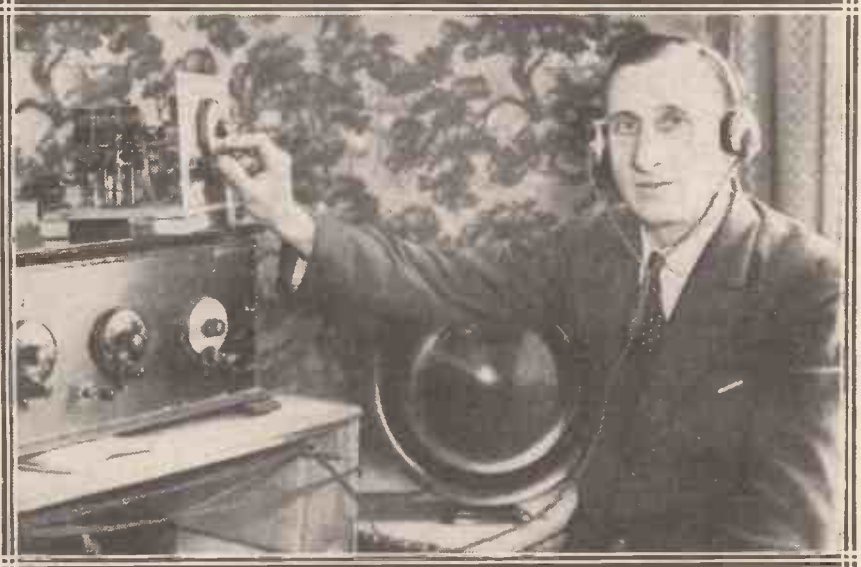
Yours truly,
C. STRIKE.

Stoke Newington.

USED AN ADAPTOR

Sir,—I used an Adaptor during this test, which I have had in commission for the past twelve months, in conjunction with an O.V.2 receiver; first L.F. switch being resistance coupled, and the second transformer coupled.

LISTENING TO THE LIONS?



A Wimbledon short-wave enthusiast who regularly uses the "Kelsey" Adaptor (described recently in this journal) for tuning-in the higher frequencies.

I used an A.C. eliminator during the tests (two sets of 'phones), with no trace of hum whatsoever.

Yours faithfully,
H. LOWETH.

London, S.W.9.

WHAT HAPPENED IN CORNWALL

Sir,—I listened-in to your broadcast from 7 L O (Nairobi) last night from 8 p.m. to 9.5 p.m. I had the whole programme, which on two valves,

det. (Reinartz) and L.F., was fair 'phone strength, but slightly indistinct. Another L.F. stage did not help much, owing to the few but loud atmospheric and the fading.

Yours faithfully,
G. H. BATEMAN.

Penzance, Cornwall.

INTERFERENCE FROM H V J.

Sir,—I have just been listening to the WIRELESS CONSTRUCTOR'S arranged broadcast from 7 L O (Nairobi). I tuned-in about 7.45 B.S.T., but could only just get him at fair 'phone strength, and H V J. on 50-26, kept butting in.

When Mr. Johnson started his talk on gorilla hunting I was able to put it on the L.S., but this did not last long, and I had to go back to the 'phones for the remainder of the broadcast.

Atmospherics were very bad at times, and with H V J spreading about two degrees, 7 L O took some holding. Things were bad when the farmyard imitator was on, and the only thing I heard clear was the cock crowing at the end. "Britannia," "God Bless the Prince of Wales," and "God Save the King," I heard quite well. I was sorry Mr. Leo did not do his stuff. I think there were too many "Kilotraps" set for him!

Yours faithfully,
G. GOODWIN.

Birkenhead, Cheshire.

"MAGIC THREE" RESULTS

Sir,—I received 7 L O (Nairobi) on the 20th. The receiver in use was the "Magic" Three.

Switching on, I picked up his transmission at 8.5 B.S.T. Volume varied from loud 'phone strength to moderate loud-speaker volume. Signals reached a maximum at 8.40 B.S.T. when native music was broadcast (tom-toms).

The static was very troublesome at times, particularly when the short greetings were given.

Yours faithfully,
G. MARTIN.

St. Pancras, N.W.1.

ONE FOR "THE LADS"

Sir,—I made up the "Kelsey" Adaptor as set out in your April issue of the WIRELESS CONSTRUCTOR, and thought I would write a few lines to say I had no trouble in getting the Nairobi broadcast on this, plugged into det. of 3-valve set—det. and 2 L.F. valves.

This Adaptor, as far as I can see, gives the "lads" quite a new sphere of operation, and anyone who takes the small trouble entailed to make this up will I am sure be delighted with the return in the entertainment provided.

Yours faithfully,

A. B. WHITEFIELD.

West Cross, Swansea.



ROUND the DIALS

Practical notes on what stations to look for and how to pull in those foreign programmes.

THE long-distance listener is one of the few people who regard Mr. Willett, of Daylight-Saving fame, with some slight asperity. That hour of extra daylight at eventide does play a certain amount of havoc with the distant stations, and alternatives are harder to find and much later in appearing.

Necessity being the mother of invention, a good many of us have therefore invented a new pastime, the idea of exploring the possibilities of foreign reception in daylight. Quite a number of captures can be had on a good set, and the superiority of long waves—which Capt. Eckersley so often insists upon—is clearly apparent under such conditions.

Daylight Programmes

Apart from the Paris stations, only Königswusterhausen and Kalundborg have been putting up strong daylight programmes, so far as my own aerial was concerned. Oslo, Warsaw, Huizen, and the other old favourites could be heard, but not really well, and Kalundborg, the Berlin long-waver, Radio Paris, and the Eiffel Tower were the ones I should recommend as chiefly worthy of attention in the London district.

After the fall of darkness Europe seems to crowd in close again, and there have been some fine programmes available. On the ordinary waves several interesting stations have rather monopolised attention, amongst them being Lwow, on 381 metres.

This transmission goes out on 21 kw., and, like the recently-installed

Warsaw station on 1,411 metres, is part of the Polish scheme for better broadcasting. Other Polish stations are under way, either with increased power or new transmitters.

Strong Swiss Stations

Beromunster, the Swiss sixty-kilowatt on 459 metres, has been very well received, though, personally, I generally find its fellow, Sottens, on 403 metres, a trifle stronger. They certainly make a fine, lusty pair of newcomers in the concert of Europe.

Apparently the Continent is very pleased with Britain, too; many listeners there having discovered a new link with this country in the North Regional transmissions. Certainly that high aerial at Moorside does seem to impart a wholesome punch to the programmes sent out from it.

POINTS FOR PURCHASERS

Interesting details from manufacturers about recent trade activities.

Prices are Down

FROM Tannoy Products recently came welcome news of price reductions which many constructors will be pleased to hear about.

The lines affected are the well-known units P.2 and C.P.2; the former, an H.T. unit for sets up to five valves, being reduced from £3 15s. Od. to £3 7s. 6d.

The C.P.2 is a combined H.T. and L.T. unit (trickle charger), employing Westinghouse metal rectification, and occupying the same space as an H.T. 108-volt battery. It is reduced from £5 10s. to £5.

Recent Publications

Copies of the latest Dubilier catalogue (No. 930S.) are now available for distribution, and will be sent post free to any reader of the WIRELESS CONSTRUCTOR upon application to the Publicity Department, Dubilier Condenser Co., Ltd., Ducon Works, Victoria Road, North Acton, London, W.3.

A new Amplion folder has been issued showing the suit-case portable receiver. It retails at 22 guineas cash, or is available on deferred terms. Of the four valves employed in this receiver, two are of the screened-grid type.

The revised price list of the Grosvenor Electric Batteries, Ltd., is now obtainable from this firm at 2-3, White Street, London, E.C.2. In addition to full details of the batteries, it gives a comprehensive list of British portables, showing necessary sizes, etc., and the Grosvenor types recommended for use with each.

Real Service

The Chloride Electrical Storage Co., Ltd., seems bristling with good ideas. Their latest is to provide their celluloid accumulators with a little transparent "pocket," in which is slipped a label plainly marked with the battery owner's name and address. The charging station cannot, then, palm you off with somebody else's accumulator, and the identification label can never be rubbed or torn off.

This is an excellent idea, and the "Exide" people are to be congratulated on this piece of real service to the customer.

Incidentally, the firm's newly-introduced "Drydex" H.T. batteries are proving extremely popular. The public apparently took the view right from the first that the largest manufacturers of accumulators in the world would not be likely to put out a new dry battery line unless it was a really good one!

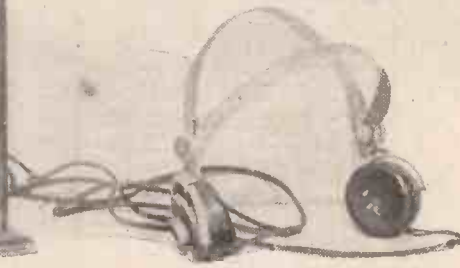
OUR JULY ISSUE

will be on sale

JUNE 15th.

ORDER YOUR COPY NOW!

The "EXTENSER" ONE



By G. T. KELSEY.

- ☐ It combines range and power with the new Extenser tuning.
- ☐ Simplifies your station-finding almost beyond belief.
- ☐ Covers both wave-bands without a wave-change switch.

A MODERN one-valver is a remarkably cheap proposition, both to build and to maintain, and, given a moderately good aerial and a fairly selective circuit arrangement, it will, in these days of high-power

But whatever may have been the popularity of single-valvers in the past, nothing, we feel, could possibly have given them a greater impetus than the advent of the Extenser.

Here we have a type of circuit which is almost essentially for the man whose enjoyment consists of roaming round the ether—a type of circuit which is constantly being changed from one wave-band to another; a type of circuit, in other words, in which the old-fashioned wave-change switch becomes a darned nuisance either from the point of view of operation or, more important still, on account of noise due to worn or ineffective contacts.

(And this is more than a mere supposition, it's a logical reasoning, because if it is only the locals that are required, it seems hardly likely that

station receivable on both the medium- and long wave-bands can be logged on a single dial without any of the inconveniences normally associated with wave-change switching?

Such is the "Extenser" One!

It's Not Expensive

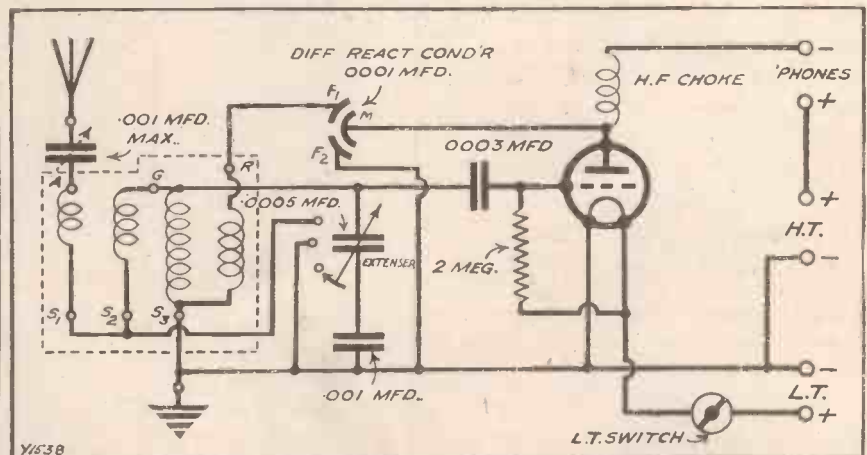
London, Stuttgart, Rome, 5 G B, Eiffel Tower, 5 X X, Radio Paris—stations on both the medium- and long-wave ranges—are all to be found on the single dial of this new single-valver. No two sets of dial readings, no wave-change switching to worry about. Just a rattling good single-valver with all the added advantages of the Extenser principle of reception. And having said that, we have said just about the last word in up-to-date set design.

And to get a set with such out-

YOUR SHOPPING LIST

- 1 Panel, 10 in. × 7 in. × $\frac{3}{8}$ or $\frac{1}{2}$ in. (Goltone, or Peto-Scott, Parex, Lissen, Permcol, etc.).
- 1 Cabinet for above, with baseboard 9 in. deep (Cameo, or Pickett, Osborn, Kay, Gilbert, Lock, etc.).
- 1 .0005-mfd. Extenser (Cyldon).
- 1 .0001-mfd. differential reaction condenser (Ready Radio, or Polar, Ormond, Igranic, Lotus, Parex, Magnum, Wearite, Lissen, Dubilier, J.B., Burton, Formo, etc.).
- 1 "P.W." and "M.W." Dual-Range Coil (Formo, or Keystone, Wearite, Ready Radio, R.I., Goltone, Parex, Magnum, Tunewell, etc.).
- 1 L.T. switch (Bulgin, or Ormond, Junit, Wearite, Magnum, Keystone, W.B., Benjamin, Lotus, Igranic, Ready Radio, Lissen, Goltone, etc.).
- 1 .001-mfd. fixed condenser (Telsen, or Ediswan, T.C.C., Ready Radio, Dubilier, Lissen, Ferranti, Mullard, Igranic, Watmel, Formo, Graham Farish, etc.).
- 1 .0003-mfd. fixed condenser (Dubilier, or see above).
- 1 Sprung-type valve holder (W.B., or Clix, Lissen, Lotus, Igranic, Telsen, Bulgin, Benjamin, Junit, Formo, Wearite, Magnum, etc.).
- 1 .001-mfd. compression type condenser (Lewcos, or Formo, R.I., Lissen, Polar, Sovereign, etc.).
- 1 H.F. choke (Wearite, or Lewcos, Keystone, Telsen, R.I., Ready Radio, Lotus, Lissen, Dubilier, Varley, Parex, Magnum, Watmel, etc.).
- 1 2-meg. grid leak and holder (Dubilier, or Lissen, Telsen, Ferranti, Ediswan, Igranic, Mullard, Graham Farish, etc.).
- Strip of ebonite for terminal strip, 10 in. × 2 in.
- 8 Engraved-type terminals (Eelex, or Belling-Lee, Igranic, Clix, etc.).
- Wire, (Glazite, or Lacoline, etc.).
- Flex, screws, etc.
- H.T. and L.T. plugs and spade terminals (Clix, or Eelex, etc.).

THEY MAKE A FINE PAIR



The "P.W." Dual Range Coil and the Extenser make a magnificent pair in any set. With them simplicity and efficiency are in perfect unison.

a single-valver will be employed where a crystal set will do the job.)

One-Dial Simplicity

What, then, could be more ideal than a set in which the wave-change switch has been done away with altogether? A set in which every

standing advantages, what is it all going to cost?

As a matter of fact, it need not cost you a penny more than a set built on the old principle! But isn't the Extenser more expensive than an ordinary variable condenser? Well, even if it is slightly more expensive there is no wave-change switch to

transmissions, receive anything up to twenty, thirty or even more stations at satisfactory 'phone strength.

The "Extenser" One—continued

buy, so that the question of additional cost doesn't really enter into it.

It all boils down to the fact that if you are looking for a really good single-valver that will enable you to enjoy the concerts of Europe with the minimum amount of trouble, then

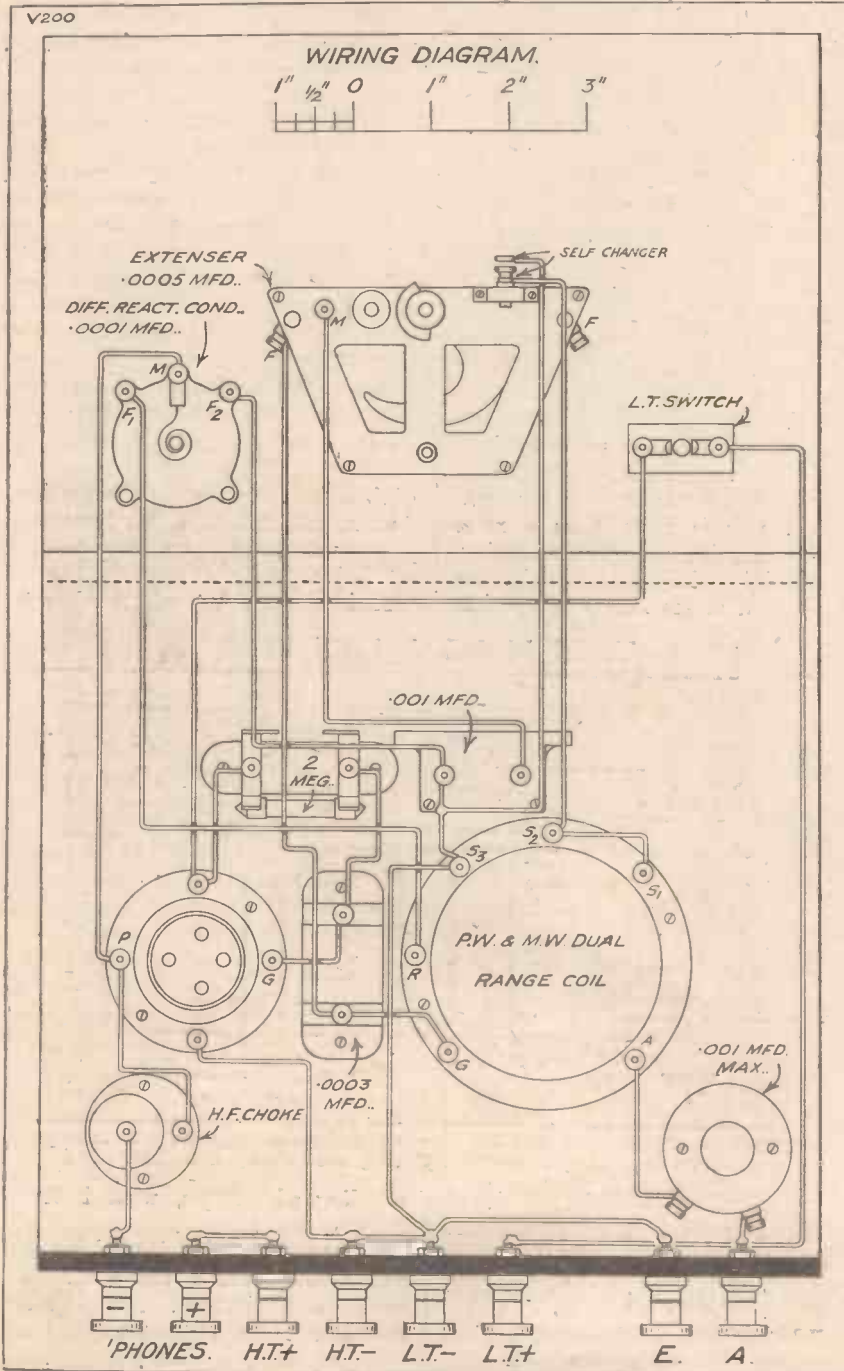
you need search no longer. The "Extenser" One will enable you to do it, and will do it in a way that will make you never want to return to the older type of circuit. Just you build it and see for yourself!

The components required for the "Extenser" One, a complete list of

which is given elsewhere in the article, are all of a standard type. The coil is one of the "P.W." and "M.W." high-efficiency dual-range type, and by the time this issue of the WIRELESS CONSTRUCTOR is published "Extensers" will be available in more than one commercial make.

Practically the whole of the condenser-making industry is taking a lively interest in the Extenser, and before very much longer they will be available quite as extensively (if not more so) as the tuning condenser of the present day.

NOTE THE SIMPLE WIRING



And simpler wiring means better results—one of the main advantages of using an Extenser instead of variable condensers and wave-change switches.

Another Advantage

The construction of the "Extenser" One is very simple indeed, and the wiring is particularly easy on account of the simplification resulting from the use of an Extenser. (Another strong point in favour of this new principle.)

Thus when you have collected the necessary components, a matter of an hour or so will see your "Extenser" One complete and ready for testing. There are only three component holes to drill in the panel, but, of course, there are also those for the screws along the bottom. And when it comes to the mounting of components and the wiring, if you follow the back-of-panel diagram you cannot go very far wrong.

What to Buy

When your set is completed you will naturally be anxious to give it a try-out, especially since it is something entirely new. So, first of all, obtain a valve—a two-, four-, or six-volter will do—of the H.F. or special detector type, and put it in the valve holder.

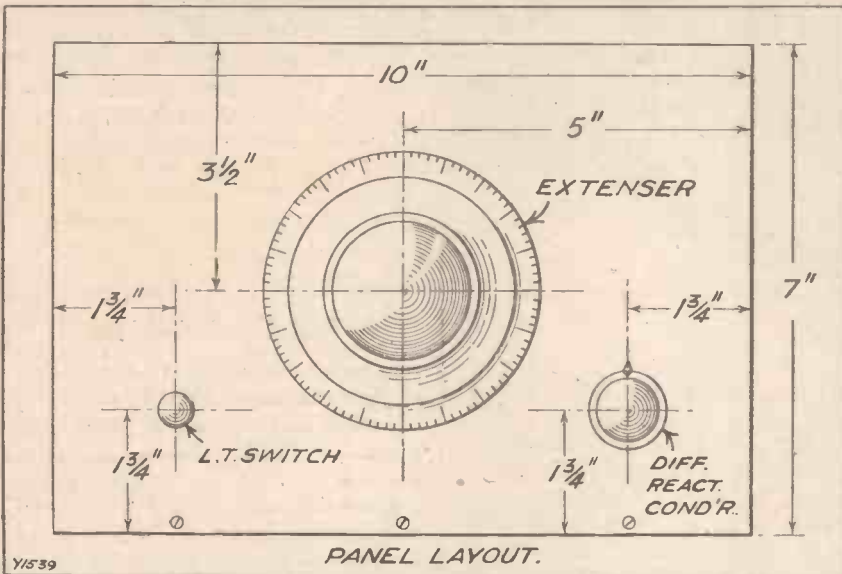
With regard to accessories, the accumulator will depend upon the voltage of the valve selected, but for H.T. you needn't buy anything larger than a 60-volt battery, because this will be quite adequate for 'phone reception, and even if you have a 100-volt battery you will probably find that you will get best reaction control with the positive wander plug at 50 or 60 volts, so there is really no point in its favour.

Simplified Searching

When all your battery, aerial and earth, and 'phone leads are connected up, everything is ready for the set to be switched on. First, then,

The "Extenser" One—continued

A DELIGHTFUL SET TO HANDLE



Until you have actually handled a set in which there is an Extenser you will be unable fully to appreciate how much easier it is to operate than a receiver having conventional controls.

find the local stations. How are you to know on which half of the condenser to look for the locals?

That is simple enough. All you have to remember is that the readings on the Extenser from 0 to 100 cover the stations between 230 and 530 metres. Over 100 are all the long-wavers. Thus you can tell instantly whether the set is working on medium or long waves.

When Using Reaction

For the local stations you will probably find it is not necessary to use reaction at all. It is only on the distant stations that the reaction control will have to be operated, and then you must be very careful not to use it in such a way as to cause interference to neighbours.

The correct way in which to use the reaction control is to keep it so that the set is always below the oscillating point. But if at first you find it difficult to log distant stations, then you will not be likely to cause interference if you search for carrier-waves, or howls, with the set slightly oscillating so long as you take great care never to go through the settings of the local stations with the set in this condition.

Control of Selectivity

The small semi-variable condenser near the aerial terminal is to enable you to adjust selectivity. For loudest

signals on distant stations it is best, if possible, to have it screwed right down, but this will only be possible in cases where the local stations do not "spread." If you are very near to the local transmitters you may even find it necessary to use a wave-trap in order completely to eliminate the local station, because, as you probably know, it is impossible with any simple one-valve circuit to get a sufficiently high degree of selectivity for conditions such as these.

A Final Tip

By the way, if you should experience any trouble with the local station breaking through on the long waves, just join a No. 100 or 150 plug-in coil directly in series with the aerial lead. You'll find that will do the trick all right. But if this coil is necessary, connect an ordinary on-off switch across it so that it can be cut out of circuit when the set is being used on the medium wave-band.

NO MORE WAVE-CHANGE TROUBLES



The Extenser built into this set is guaranteed for five years, so you'll have no more of those switch troubles that mar so many otherwise excellent wave-change sets. And all the wave-lengths are covered merely by turning the dial, readings below 100 being for medium-wavers, and above 100 for the long-wave programmes.

PICK-UP HINTS and TIPS



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

By A. BOSWELL.

LAST month I warned readers against the use of long pick-up leads. It is not so much a matter of length, as of disposition. The chief danger is that of L.F. instability.

One so frequently sees the leads to the pick-up trailing across the set, and thus completing the "chain" which produces so many of the annoying troubles which occur when the L.F. stages get "out of hand." If the leads are properly arranged and kept well away from the amplifying valves, and in particular the output to the loud speaker, the likelihood of trouble is not so great.

Screening the Motor

Electric turntable motors sometimes cause serious interference in the receiver. If you have one of these noisy motors, try placing a screen between the motor and the turntable. A piece of iron sheet will serve admirably. Also earth the motor frame. If the case is a particularly obstinate one there is only one thing to do, and that is to completely enclose the motor in a metal box.

Fortunately, special attention has been given to this problem by designers, and the latest induction types are free from this defect.

How Many Stages?

How many stages does one need to obtain adequate volume from a pick-up? I am often asked this question, and I find that it is impossible to state a definite rule.

If by "adequate volume" the querist is referring to the output necessary to give pleasant room strength, then I would suggest two stages. The modern pick-up is sensitive, and so also is the average loud speaker. I find that an L.F. type of valve, followed by a good transformer

stage, enables me to obtain plenty of volume for an ordinary room.

It is true that there are one or two pick-ups which require more amplification, but the makers usually warn purchasers of this fact in their instruction pamphlets. In any case, it is an easy enough matter to insert the pick-up in the detector circuit instead of in the first L.F. stage of the set.

TRY THESE

RECORDS WORTH HEARING

Orchestral.		
Slavonic Dances (Nos. 1 and 3)		
Royal Opera House Orchestra	-	H.M.V.
Vocal.		
Honour and Arms		
McEachern (Jetsam)		Columbia
The Little Irish Girl		
Dora Lappette and Hubert Eisdell		Columbia
{ To My First Love		
{ You Had Better Ask Me }		
Dora Lappette and Hubert Eisdell		Columbia
{ I Bring a Love Song		
{ You Will Remember Vienna }		
Layton and Johnstone	-	Columbia
Dance.		
{ Betty Co-ed		
{ Baby's Birthday Party }		
Bob Haring and his Orchestra		Brunswick
The Peanut Vendor		
Red Nichols and his Five Pennies		Brunswick
Broadway Stomp and Stomping		
Jimmy Wornell's Hot Bluebottles		Broadcast
{ Between the Devil and the Deep Blue		
{ Sea		
{ Sing Holly Go Whistle Hey, Hey! }		
Jack Payne	-	Columbia
{ When Your Hair Has Turned to Silver }		
{ You're the One I Care For }		
Jack Payne	-	Columbia
{ I'm Alone Because I Love You }		
{ Songs I Heard at Mother's Knee }		
Jack Hylton	-	H.M.V.
Piano.		
{ Whoopee		
{ Monte Carlo }		
Raie Da Costa	-	H.M.V.

The detector valve then acts as an L.F. amplifier, and provides the extra "punch" necessary.

This scheme serves equally well for all types of pick-ups, provided volume is controlled by means of a suitable

potentiometer connected across the pick-up itself; an advantage in that the volume control can then be placed in the ideal position, viz., alongside the turntable.

By the way, if your amplification is very limited, and you have trouble in obtaining sufficient volume, try inserting a spare L.F. transformer between the pick-up and the first amplifying valve. Connect the primary terminals of the transformer to the pick-up, and the secondary between the grid of the valve and grid bias negative. Sometimes this procedure tends to upset quality, but it is well worth trying.

Pick-Up Switching

When fitting a pick-up switch in a set, remember that in many cases it is advisable to arrange matters so that the filament of the preceding valve is disconnected.

Some switches have a pretty big self-capacity, and radio may continue to come through faintly as a background to the record. If you cut the preceding valve out of circuit by disconnecting the filament from the L.T. supply you will overcome this trouble. Of course, it is not always necessary, and depends solely on the type of switch you use.

Turntable Speeds

Are you in doubt as to whether your turntable is running at the correct speed? If so, it is quite easy to check it up and, if necessary, to adjust matters.

Make a chalk mark on the edge of the turntable and set the motor in operation with the pick-up in position on the record. Then with watch in hand count the number of times the chalk mark rotates, say, in twenty seconds. Multiply by three and you have the number of revolutions per minute. It is worth while doing this if you wish to get the best out of the record. I find that there is a tendency to run the average record rather too fast.

Trying Different Needles

Do you ever experiment with different needles? If so, you should do so with a certain amount of care, because you will find that the needle has a definite effect upon the reproduction.

With the average pick-up a medium-tone needle gives very satisfactory results, but if with your particular pick-up the makers recommend the use of a special needle, then you should stick to this.



This month you are told how to add yet another valve to this remarkable receiver, which is designed to be built section by section, and yet the whole time is a complete set capable of really fine results. This month's stage makes the receiver into a powerful three-valver, capable of bringing in many stations on the speaker.

Designed and Described by the Research Dept.

There are plenty of ill-informed critics who are always ready to complain that the circuit of a modern set is, apart from "unimportant minor details," the same as that of its approximate equivalent of early broadcasting days. But such grumblings are based largely on a lack of knowledge of "what is what." To start with, such critics must entirely forget what a vast effect the increase in efficiency of components can have. If we were to take one of the old sets they have in mind and rebuild it, using just the same circuit but employing modern components, it would be improved out of all recognition.

Modern Methods

If a set of old vintage were put on test side by side with a modern one of the same type, the differences in results would be staggering. There would be as many surprises going as if listeners to the original broadcasts could have been provided with receivers as we know them to-day.

True, conditions of old were much different, but that would not invalidate such a comparison as a good way of showing up the efficiency of our present-day designs. In fact, the reverse applies, for to get much better results under much worse conditions is a double triumph.

Secret of Success

Let's suppose for a minute or so that we are conducting a test of two sets, both of the det. and 2 L.F. variety, one resurrected from the past and one a recently-designed

FIVE ITEMS FOR FINE VOLUME

- 1 L.T. switch (W.B., or Ready Radio, Bulgin, etc.).
- 1 4-pin valve holder (Lotus, or Telsen, W.B., Igranic, Lissen, Clix, Bulgin, Benjamin, Junit, Formo, Wearite, Magnum, etc.).
- 1 L.F. transformer, medium or low ratio (Lotus, or Igranic, Lewcos, Varley, R.I., Ferranti, Mullard, Telsen, etc.).
- 1 25,000-ohm Spaghetti resistance (Bulgin, or Magnum, Lewcos, Ready Radio, Parex, Wearite, Keystone, etc.).
- 1 2-mfd. fixed condenser (T.C.C., or Dubilier, Formo, Igranic, Ferranti, Hydra, Mullard, etc.).

instrument. What do we find the most outstanding points of difference? Undoubtedly the thing that will strike us most will be the remarkable

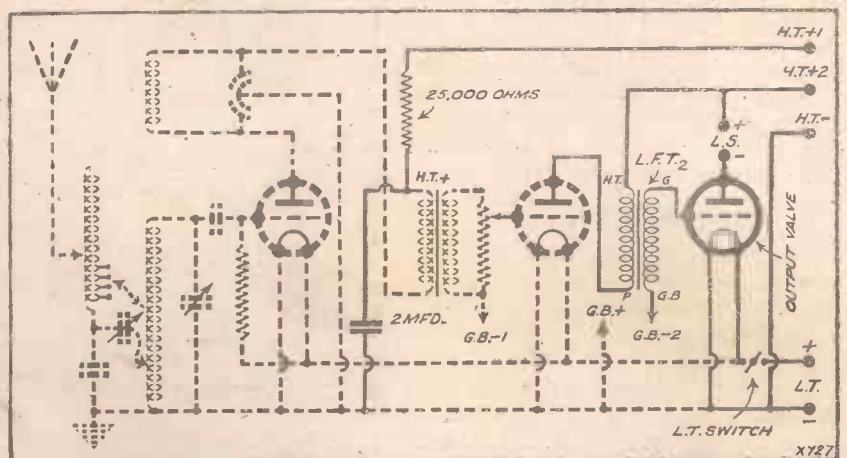
selectivity of one and the more or less complete absence of selectivity in the case of the other. The modern set will separate a powerful local station from a foreigner on a nearby wavelength quite easily, and without any loss in the volume of that station in the process.

Separating the Stations

With the old set we shall be lucky if we can separate our National programme from our Regional programme; in fact, the sooner we draw the veil over the question of selectivity, or the lack of it in relation to the old set, the better.

Another thing that we shall spot directly we switch on will be the lack of volume and the poor quality in the

EVERY VALVE EQUALLY EFFICIENT



One of the advantages of the "Plus-Stage" system is that each stage is made to work at its best before the next is added, thus ensuring the best possible overall performance. The new parts to be added this month are shown by full lines, and the other connections by dotted lines.

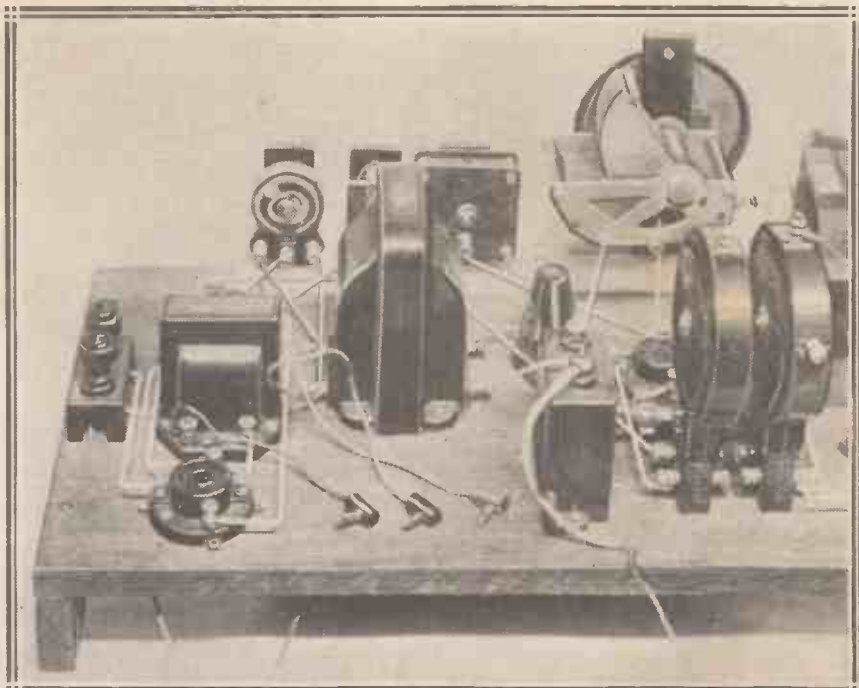
The "Plus-Stage" Three—continued

case of the old set. Why, on our modern receiver continental stations will be about as good in these respects as the local on the other instrument.

And so we could go on drawing comparisons at the expense of what is after all a pioneer that has hewn the pathway to modern design. But what we have already written is sufficient to ram home the fact that a modern three-valver is a wonderful instrument with its tremendous volume, remarkable range, high selectivity and ease of control.

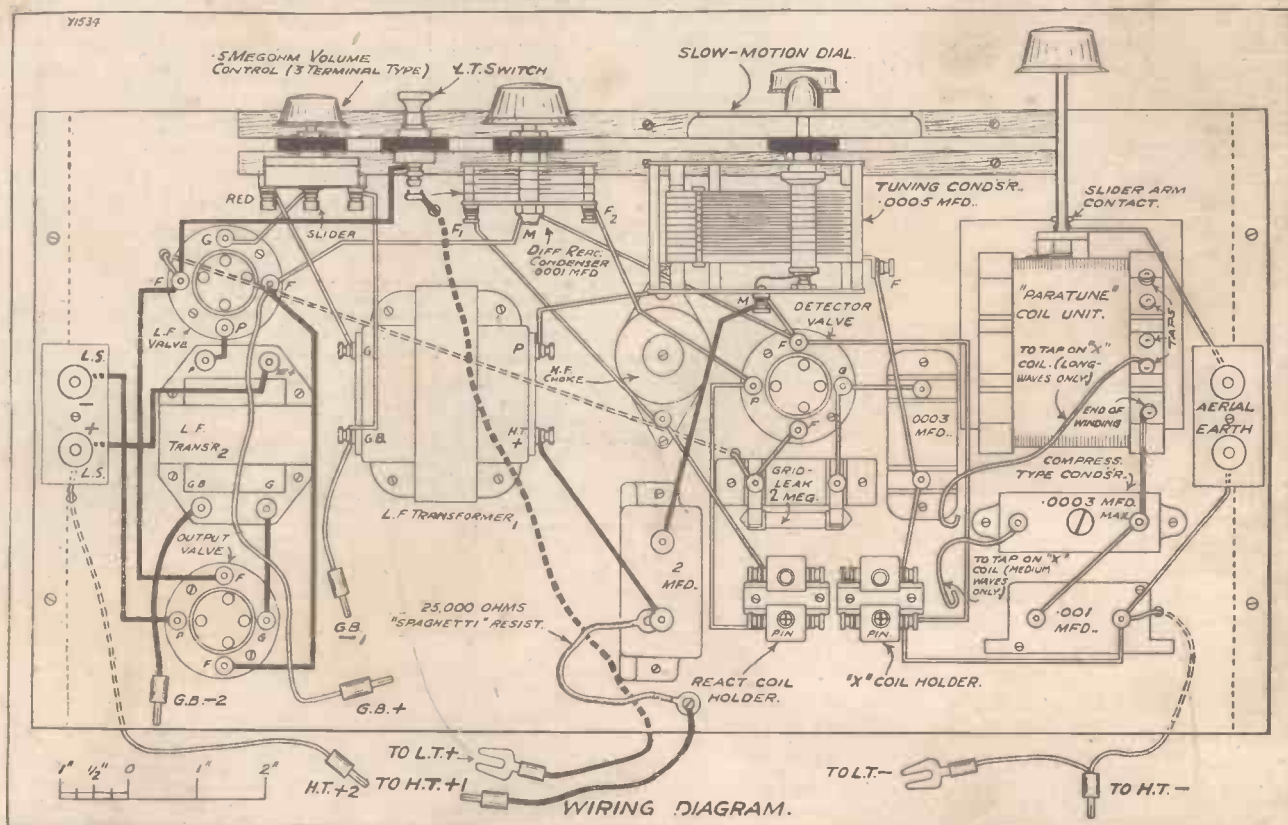
Add Another Valve

This month we are going to deal with the "Plus-Stage" Three, which in spite of its unique advantage of being built stage by stage as a complete set all the time, is well up to the highest standard set by any det. and 2 L.F. You may have been somewhat surprised by the wonderful results given on the loud speaker by your "Plus-Stage" Two, but they will be as nothing when compared with what you will get when you have added the third valve.



To the left of this illustration you can spot the new transformer and the new valve holder in front of it, and over to the right the 2-mfd. fixed condenser that is added, together with its associated Spaghetti resistance.

LITTLE ALTERATIONS BUT MUCH MORE POWER



This diagram shows the three-valver in its present complete form, but you can easily pick out the new wiring from the old. The former is shown by thick single lines, while the latter is represented by the double ones.

The "Plus-Stage" Three—continued

And now we will get down to the more practical considerations. To start with, here are a few words about the extra components to be obtained.

These are only five in number, and are detailed, together with suitable makes, in the usual form. The third stage is another transformer-coupled L.F. one, and it is from this use of two transformers that we get our tremendous volume to which reference has already been made.

Concerning the Components

Therefore, you will be quite prepared to find an L.F. transformer and a valve holder among the new parts needed. The use of the L.T. switch that is added as well this month will also be quite apparent, but the other two components, namely, the 2-mfd. fixed condenser and the 25,000-ohm resistance, may not have such obvious uses.

But they are very vital components, and are largely responsible for the very fine quality that you can get from the three valves. Together they constitute a de-coupling device that prevents any feed-back taking place between the detector valve and the following L.F. stages.

If you glance at the circuit as it now appears you will see that they are included in the plate circuit of the detector. With them in this position L.F. instability, which might evince itself only by poor quality and not necessarily by howling, is completely obviated.

To simplify matters the new connections are shown in full lines, the dotted lines representing those that are already in the set. A similar scheme has also been adopted in the case of the wiring diagram, but here the existing wiring is shown by double instead of dotted lines.

Too Easy for Words!

We don't propose to say much about the practical work, because it is so easy and the diagrams make it rather obvious.

If you remove the following leads before commencing the wiring alterations these latter will resolve themselves into a matter of simply adding the wires shown in full in the wiring diagram. Flex to L.T. positive, flex to H.T. plus one, and plate of L.F. valve to L.S. negative. Connection is made to the Spaghetti resistance at the end remote from the 2-mfd. fixed condenser by passing a screw through

the tag on the end and into the base-board, the flex lead being clamped under this tag.

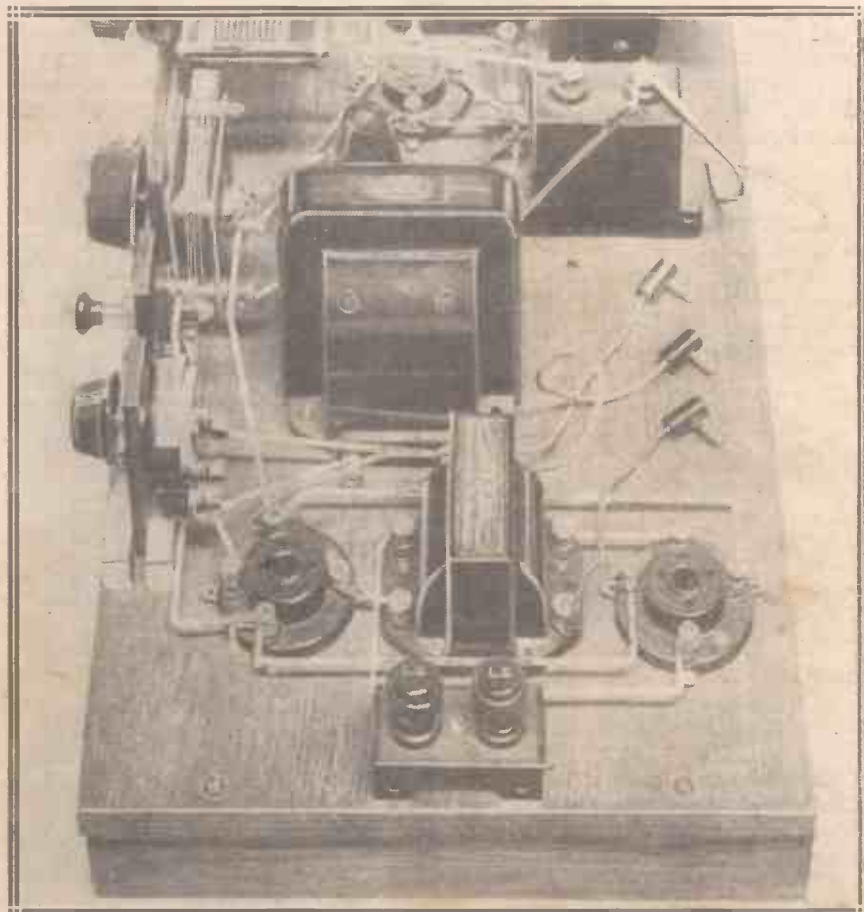
The only new accessories that you will require over those necessary to work the "Plus-Stage" Two on a loud speaker will be an ordinary L.F. type valve, of the same voltage rating as the other valves that you have been using. If you have been using the two-valve set on telephones, as last month it was suggested could be done, you will require some more accessories, but will already have the L.F. valve.

plug to deal with, and that is the one labelled "G.B.—2," which supplies the bias to the last (power) valve, and the value can be found from the maker's instruction sheet. The plug labelled on last month's diagram "G.B.—" should be considered as G.B.—1 and now applies to the L.F. valve.

More Refinements Coming

Should you have been using an L.F. valve in the second place leave G.B.—1 plugged into its old value. You will find the "Plus-Stage"

A CONTROL FOR SWITCHING ON AND OFF



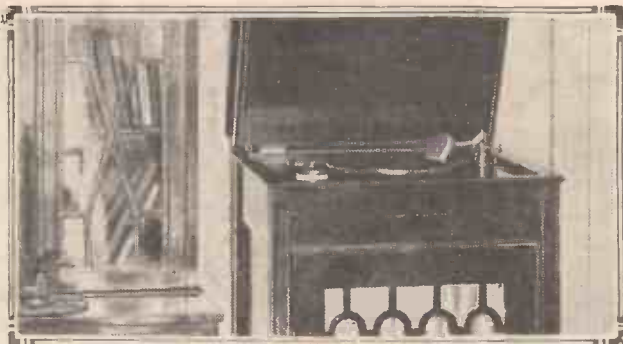
Between the volume control and differential reaction condenser you can see the switch which is added with the third stage. It is in the L.T. supply to the filament and simplifies turning the set on and off.

These other accessories were fully dealt with in our article last month, so we need not go over them again. We may as well mention though that the power valve goes in the new socket just added, and the L.F. type valve in the other holder near the L.S. terminals.

You will have only one extra battery

Three an exceedingly powerful receiver, but there are still one or two small things, partly in the way of luxuries, that can be added, such as a pick-up, ebonite panel, and cabinet. These we hope to deal with in next month's issue of the WIRELESS CONSTRUCTOR.

So good luck with your "Three."



WITH PICK-UP AND SPEAKER

Improving the bass—The importance of the high notes—Resistance-capacity coupling values.

Conducted by A. JOHNSON-RANDALL.

NOT very long ago I was having a chat with a technician who always talks sound common-sense. In the course of our conversation, which dealt mainly with L.F. amplifiers and loud speakers, we touched on the question of pick-ups.

"Why is it that some people plump for a 'straight-line' characteristic?" he said. "It is all very well to have uniform response over the whole musical scale, but is it going to give us the best reproduction so far as the records are concerned?"

Balancing Out

And there is certainly a lot in what he said. In the first place, recording has not yet reached perfection. It is getting better and better, but the average record doesn't give anything like uniform response below about 150 cycles or above 4,000 cycles.

If, then, we take a straight-line pick-up and attach it to a perfect amplifier, we get a moderate amount of bass, and a fairly good balance over the remainder of the musical scale.

But suppose instead we take a pick-up which has a definite "hump" or "lift-up" at the lower end of the scale. In this case we shall get a greater amplification of the bass to make up for the falling away on the record, and the resulting effect at the output end will be much improved balance over the musical range. There are pick-ups on the market which do this—the Burndept is one—and I must say that I like to hear the bass in its proper proportions. But I have no desire for bass at the expense of the high notes.

"Almost a Fetish"

I am afraid that in many instances bass has become almost a fetish, and the higher frequencies which make for intelligibility of speech and brilliance in music are forgotten.

No, have the bass by all means, but don't lose sight of the high notes.

The L.F. amplifier is often the cause of the trouble here. Some transformers are particularly deficient at the upper end of the scale, and resistance (capacity coupling), unless the values are carefully chosen, may give practically nothing above 2,000 cycles.

Transformers of Quality

With transformers there is only one thing to do, and that is to choose a leading make, and to pay as much as your pocket will permit. In that case you will obtain the product of a highly-trained research staff, and a good characteristic. But what about resistance coupling? Well, it is definitely not advisable to go all-out for high amplification, because that means high-value anode resist-

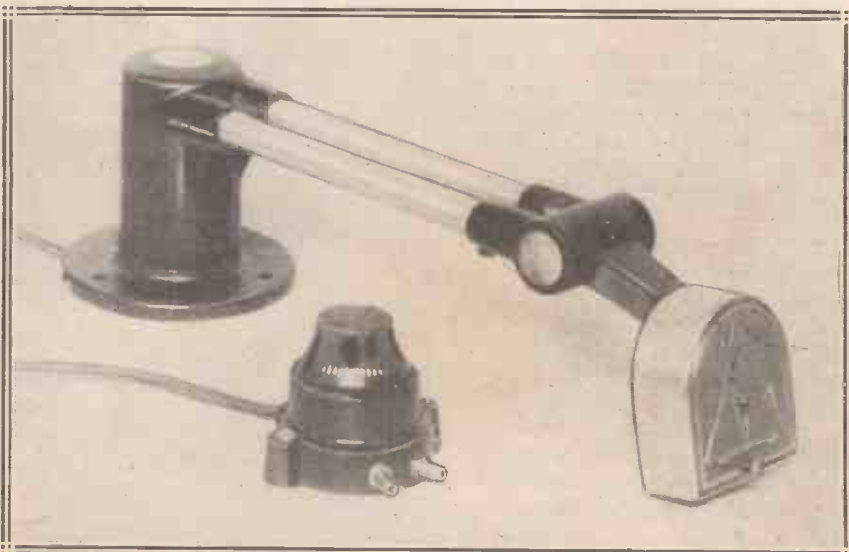
So you see, unless we are very careful we may quite easily lose a large proportion of the high notes by the time we arrive at the loud speaker. It is true that in some instances the loud speaker over-emphasises the higher frequencies, in which case a loss in the amplifier will tend to balance things out.

But, generally speaking, it is desirable to have a pick-up which gives a lift-up at the lower end of the scale, and an L.F. magnifier which provides adequate amplification at both ends of the musical range.

Tone Control

Then if your loud speaker is reasonably good you will not be able to find much wrong with the resulting reproduction. In practice

A GOOD AMERICAN PICK-UP



The "Audak" pick-up and volume control. It is of American origin and is marketed in this country by Messrs. Claude Lyons, Ltd. Although somewhat expensive, it gives most excellent reproduction and is also very sensitive.

ances. The highest value I use in any of my amplifiers is 100,000 ohms, which with a suitable valve may give me an amplification for that stage of 15. Even this value is on the high side from the point of view of quality alone.

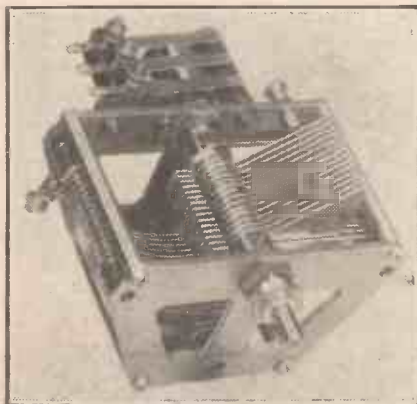
the use of a tone control between the pick-up and amplifier seems to be the most satisfactory solution, because then it is possible to correct for any deficiencies in the pick-up; amplifier, or loud speaker, and in consequence to obtain a pleasing balance.

AS WE FIND THEM



The "Cyldon" Extenser

THOSE who have read our recent Extenser articles will realise that the Extenser has certain very striking advantages, among which may be mentioned the simplification of set construction, the elimination of all wave-change switches, a general increase in the efficiency of the set produced by the easier and shorter wiring possible, and the fact that one set of dial readings covers both long and medium wave-bands.



The "Cyldon" Extenser is a real precision job, and has a beautiful velvety movement.

It will no longer be necessary when going over from medium to long waves, or vice versa, to manipulate a switch knob, and to set the condenser dial back to zero reading.

The Extenser system does away with all this, and the rotation of the dial beyond a certain point instantaneously takes you over from one wave-band to another without any of the "fiddling about" so usual with

sets of the ordinary wave-change type.

The interest which is being shown in the Extenser is remarkable, and there is no doubt that within a short space of time many thousands of readers all over the country will be using it in their receivers.

That progressive firm, Sydney S. Bird & Sons, Ltd., Sarnesfield Road, Enfield—the well-known makers of "Cyldon" condensers—have been quick to realise the possibilities of the Extenser and have already commenced production.

The model sent in for test is a first-rate engineering job, and comes fully up to the high standard set by other "Cyldon" products.

Self-Cleaning Contacts

This "Cyldon" Extenser is of the one-hole fixing type; and cone bearings are employed. There is a cam on an extension of the spindle to which the moving vanes are attached. Above this cam are three collector brushes, the ends of which bear lightly upon an ebonite support when the moving vanes are in the long-wave position.

In this position of the Extenser they do not make contact with the brass cam and are therefore insulated from each other. When the moving vanes have been rotated through an angle of 180 deg., the cam lifts the three collector contacts, thus joining them together electrically during the remaining 180 degs. rotation of the Extenser vanes.

This particular method of operating the switch has a great advantage in that the contacts are self-cleaning.

There is also a fourth brush or contact for making connection to the moving vanes. This scheme supercedes the more usual pigtail.

Mechanical Excellence

The "Cyldon" Extenser has a beautiful velvety action, so much so that it is impossible to tell from the feel when the cam is operating the switch or not. In fact, when using the Extenser in a set one completely forgets the existence of the wave-change contacts.

As for the mechanical construction of the "Cyldon" Extenser, we could detect absolutely no trace of side- or end-play in the bearings, and the vanes were most accurately spaced.

It is a first-class component, and one which we can thoroughly recommend for use in any modern set.

The price of this model Extenser is 15s. Messrs. Sydney S. Bird have also sent us a drum-control twin Extenser and screen, which we hope to deal with in the next issue.

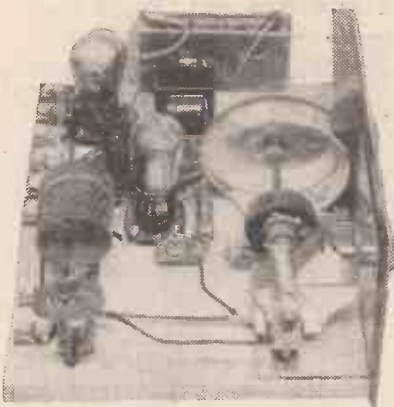


This view of the "Cyldon" Extenser shows the arrangement of the self-changer contacts. Note that the rotation of the cam renders the phosphor-bronze collector brushes self-cleaning.

As We Find Them—continued

A Good Short-Waver

Messrs. Rothermel Corporation, Ltd., 24, Maddox Street, London, W.1, recently sent us one of the Hammarlund short-wave kits they are marketing.



The Hammarlund two-valve short-waver. It is sold as a complete constructional kit and is a fascinating little set to handle.

The circuit is a conventional detector and one L.F. stage, and the kit is supplied complete and ready for assembling.

It is essentially a short-wave design and is not intended for reception on the ordinary broadcast wave-band.

Its main features are the tuning condenser and coils. These are remarkably efficient, the tuning condenser having a beautiful slow-motion device possessing freedom from "backlash," and a special capacity value for short-wave work (·000125 mfd.). There are four plug-in coils, which together cover a band of wave-lengths extending from 12·5–105 metres when used in conjunction with the condenser supplied. Three of them are wound with No. 16 gauge D.S.C. and the other with No. 18 gauge D.S.C., the winding diameter being 2 in. The aerial coil consists of six turns and the coupling is adjustable.

Easily Made and Handled

The grid condenser also is variable within certain limits, the adjustment being carried out with the aid of a screwdriver.

To obviate "threshold" reaction effects the L.F. transformer secondary is shunted by a resistance of 100,000 ohms.

The kit is a good one and, as we have already mentioned, is supplied complete.

We have two small criticisms to offer. One is that the baseboard sent with the particular kit submitted was not quite thick enough. In consequence the tuning condenser required packing up $\frac{1}{8}$ in. Secondly, the two leads from the L.T. "on-off" switch (these are already connected internally to the switch) might be longer.

These two points can very easily be remedied.

We had no difficulty in making up the set, the only implements required being a screwdriver, wire-cutting pliers, and a soldering iron. The filament resistors were omitted, since they are not necessary with British valves.

On test we found the tuning to be delightfully easy, and reaction control smoothly efficient. The receiver "slid" into oscillation without any distressing "grunts" or other undesirable effects which sometimes occur with short-wave designs.

The set was given an aerial test directly it was completed and numerous C.W. stations were brought in at good strength. A strong carrier was next picked up and this resolved



The "Drydex" dry H.T. battery is marketed by the makers of the famous "Exide" accumulator and can be obtained in types suitable for both large and small receivers.

itself into a transmission from KDKA, which came over very well indeed. WGY was also tuned in without difficulty later on in the evening.

Further tests enabled numerous other stations to be received, these including Rome, Buenos Aires, etc. Best results were obtained with a valve having an amplification factor of 20 and an A.C. resistance of 20,000 ohms in the detector valve holder. A valve having an A.C. resistance of 10,000 ohms was employed in the L.F. valve holder, and a pentode was tried and gave good results.

The receiver is a very nice little short-waver.

Drydex Batteries

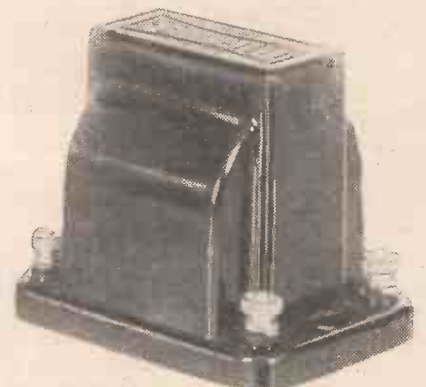
The Exide accumulator needs no introduction. It is one of the best known batteries on the market, and we ourselves can testify as to its long service and high quality. The firm are now marketing a series of dry-cell H.T. batteries which they call the "Drydex." They are supplied in four sizes, viz., the usual type designed for small receivers up to three valves, and two larger capacity types suitable for multi-valve sets and particularly those employing a power valve. There is also a type intended for use in portable receivers.

We have had a sample battery in use for some time and it has fulfilled its duties in an efficient manner. These batteries give ample evidence of being fully up to the high standard of quality set by the Exide accumulator.

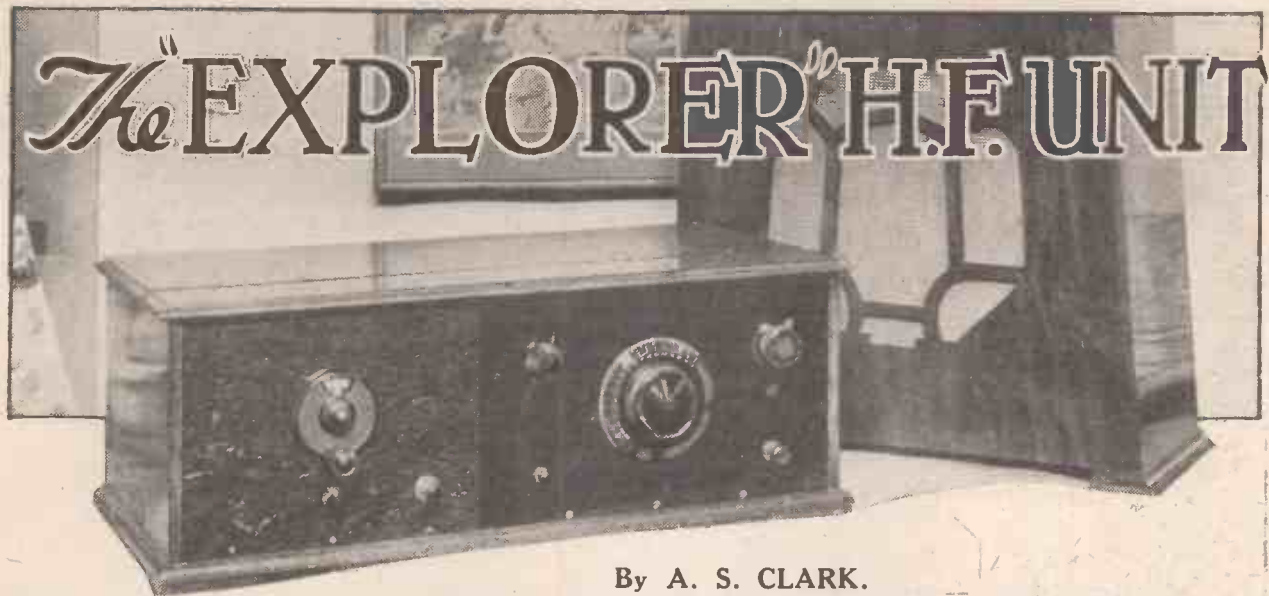
The Ferranti A.F.8

Messrs. Ferranti, of Hollinwood, Lancashire, are specialists in transformer design, and we are all familiar with the excellent characteristics of their various models. The firm's latest is the A.F.8, an instrument retailing at the extremely moderate figure of 11s. 6d. It has a turns ratio of 1-3·5, and a primary inductance in the neighbourhood of 35 henries at anode currents taken by the average detector or first L.F. valve.

Of course, its characteristics are not so good as those given by the more expensive transformers made by the same firm—one could not expect this—but at the price it is in every way an excellent little instrument. We were certainly much impressed by the specimen submitted.



The Ferranti A.F.8 L.F. transformer—a high-class instrument which retails at the extremely moderate price of 11s. 6d.



By A. S. CLARK.

Here is a really effective unit that can be quickly hooked on to practically any set in order to increase both its selectivity and station-securing power. You do not have to alter your present set in any way.

WHY does an H.F. unit have much more effect on distant stations than on the local transmissions? This question undoubtedly puzzles quite a number of constructors, so I am going to try and explain the reason quite simply, and trust that I shall succeed.

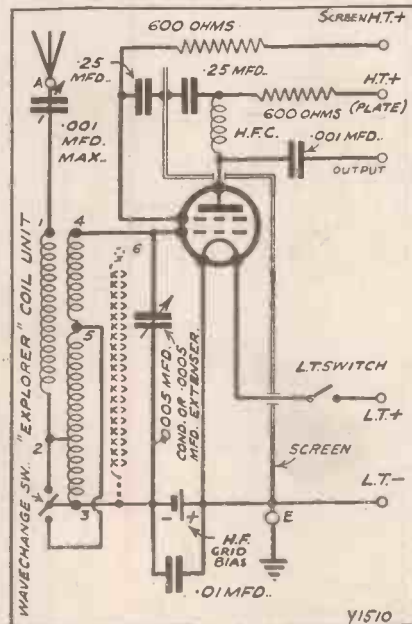
First of all let me assure you that it is not due to some mystic property which makes the H.F. valve work the harder the weaker the incoming energy. Although, in effect, this is just what seems to be happening, because H.F. amplification tends to bring the strength of all stations to the same level.

Even Amplification

Actually, providing our detector does not overload and none of the L.F. valves overload, the proportion

in which the addition of an H.F. unit increases strength will be just the same for a strong as for a weak station. And here lies the first part of the explanation, we shall notice it more on the weaker.

Here we must stop to consider a unit known as the "decibel." As **COVERS TWO "BANDS"**



The "Explorer" system for medium and long waves is used.

applied to volume it is the smallest increase, from a given strength, which the average ear is capable of detecting.

As the power increases, so the value of the decibel, in terms of power, increases. The net result is that by doubling the power representing a weak programme we may double the number of decibels, although if we double the power of a very loud station it is quite on the tables that we shall nowhere near double the number of decibels.

Fetch in the Foreigners

Apart from this tricky little point, there is the possibility of a valve overloading on local transmissions when an H.F. stage is added. And thus we shall not benefit to the full by the amplification that our extra valve is offering us.

-PARTS REQUIRED

Ediswan, Formo, Graham Farish, etc.).

- 1 .001-mfd. fixed condenser (Dubilier, or any of above makes).
- 2 .25-mfd. fixed condensers (T.C.C., or above).
- 1 Four-pin valve holder (Benjamin, or Clix, Lissen, Lotus, Igranie, W.B., Telsen, Wearite, Formo, Junit, Bulgin, Dario, Magnum, etc.).
- 1 H.F. choke (Lewcos, or Ready Radio, R.I., Telsen, Keystone, Lotus, Lissen, Dubilier, Varley, Parex, Watmel, Magnum, Wearite, etc.).
- 2 600-ohm Spaghetti type resistances (Magnum, or Lewcos, Ready Radio, Bulgin, Sovereign, Graham Farish, Keystone, etc.).
- 7 Indicating terminals (Belling-Lee cheap type, or Eelex, Igranie, Clix, etc.).
- 1 Terminal strip, 9 in. by 2 in. Wire, screws, flex, etc.

HERE ARE THE—

- 1 Ebonite panel, 9 in. by 7 in. (Goltone, or Lissen, Peto-Scott, Parex, etc.).
- 1 Cabinet for above, with baseboard 8 in. deep (Pickett, or Cameco, Osborn, Lock, Kay, Gilbert, etc.).
- 1 .0005-mfd. variable condenser (vernier type, or with slow-motion dial) (Formo, or Polar, Cyldon, J.B., Lissen, Igranie, Ready Radio, Dubilier, etc.).
- 1 Slow-motion dial for above (Igranie, or Lissen, J.B., Ready Radio, Lotus, Ormond, Brownie, Formo, etc.).
- 1 Three-contact wave-change switch (W.B., or Bulgin, Ready Radio, Keystone, Wearite, Ormond, Magnum, Red Diamond, etc.).
- 1 .0005 Extenser, with dial; can be used instead of above three components (Cyldon).
- 1 Six-pin coil base and "Explorer" dual-range coil (Wearite).

- 1 Standard screen, 6 in. by 7 in. (Magnum, or Keystone, Ready Radio, Parex, Wearite, etc.).
- 1 .001-mfd. max. compression type variable condenser (Lewcos, or Formo, R.I., Polar, Sovereign, Lissen, etc.).
- 1 .01-mfd. fixed condenser (Lissen and Dubilier, or Ready Radio, T.C.C., Telsen, Igranie, Mullard, Ferranti,

The "Explorer" H.F. Unit—continued

Another way in which an H.F. unit seems more effective on weak transmissions is that many stations previously unheard become audible.

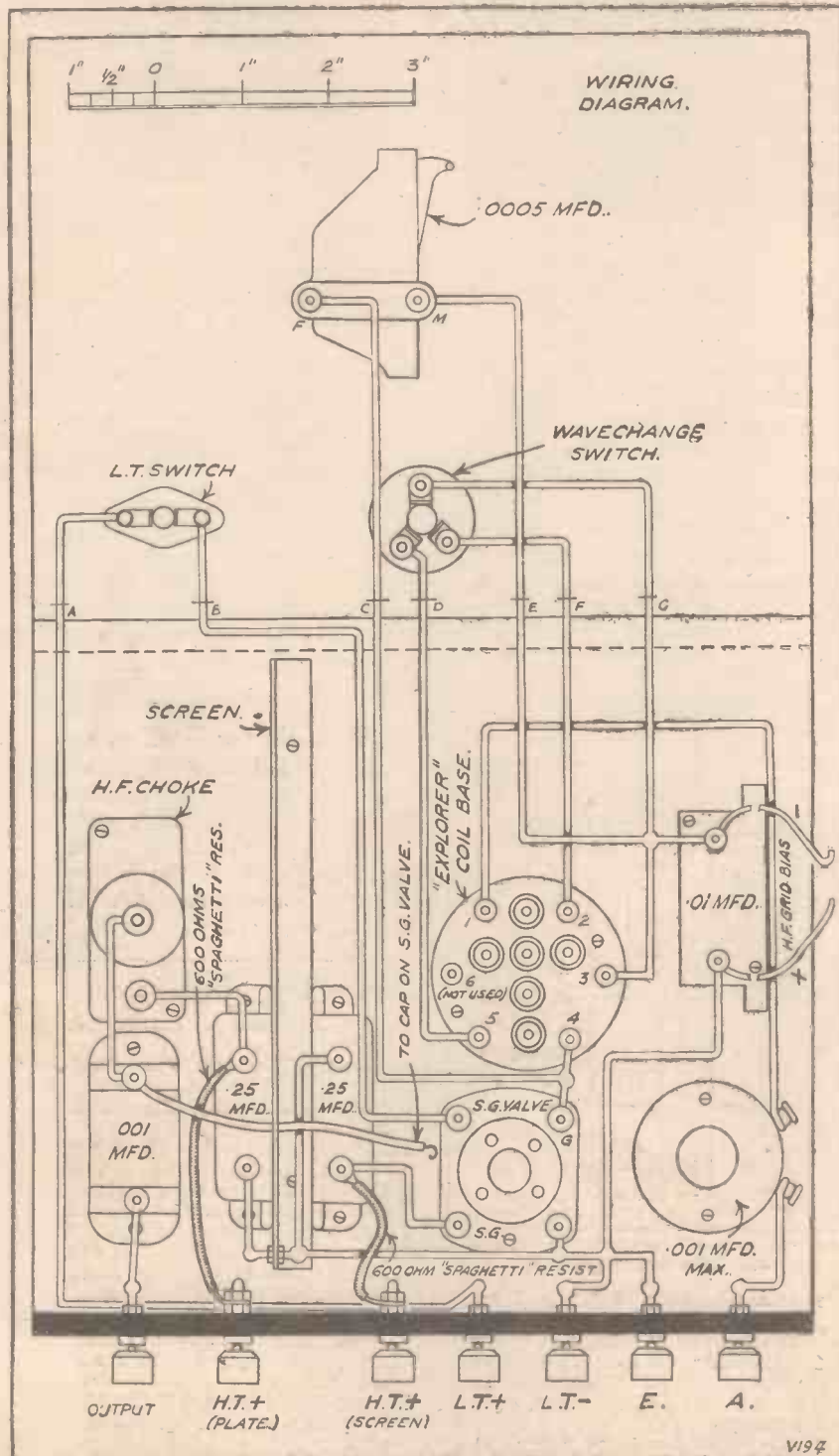
Here quite a different cause is at work.

The detector valve is a bit of an autocrat, and unless the power it is

given to detect is up to a certain standard, it simply will not look at it. In other words, a station must produce a certain minimum power in the detector's grid circuit before it can operate the valve.

So, you see, what our H.F. unit is doing is to bring the stations previously unheard up to or above this minimum. Thus we reach that "radio old" axiom: for range use H.F. amplification.

STANDARD COMPONENTS THROUGHOUT



All the parts in this virite unit are of a standard and inexpensive nature. On the next page are shown the connections necessary for an Extenser, should you use one instead of an ordinary variable condenser and a wave-change switch.

Added with Ease

And now, no doubt those of you who have det. and L.F. sets would like me to tell you how to use H.F. amplification. Which is precisely what this article is for.

Of course, I could say build another set with an H.F. stage. But you would not thank me for that! So I am going to give you details of a highly efficient, simple-to-make-and-operate, dual-range, screened-grid H.F. unit.

The unit can be added to any more or less straight type of set so long as it does not make use of any H.F. amplification. Also, you will not have to alter your set in any way whatever.

The unit is absolutely complete in itself. But don't think that this means it will need batteries of its own, for it runs off the set's power supply even if it be a mains unit, although in the latter case the mains unit must have suitable tapings.

Let's just "run over" the circuit together. It will not take long because it is very simple and straightforward.

You will see immediately that the dual-range coil is one of the well-known "Explorer" coils, the reaction winding not being used. For this reason the latter is shown dotted.

Some Good Points

In series with the aerial lead is a .001-mfd. maximum compression type variable condenser. This is so that you can bring your aerial into line, and prevent selectivity being spoilt by aerial damping. It lives on the baseboard behind the panel, and once you have set it at the best value you can completely forget that it exists.

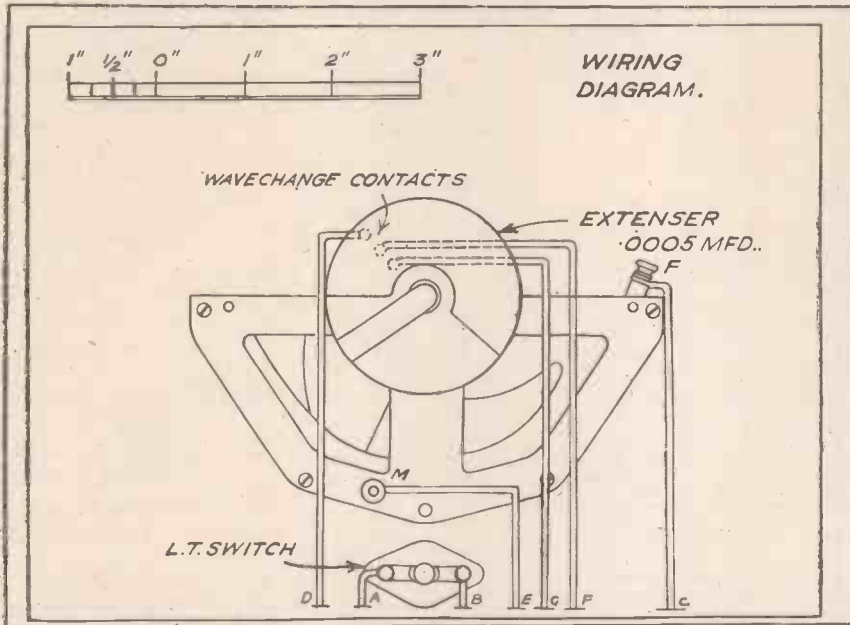
As one naturally expects to find in a modern circuit, G.B. is provided for the valve, which is carefully decoupled from the H.T. supply so that there can be no feed-back from valves

The "Explorer" H.F. Unit—continued

in the set. This de-coupling is carried out by the two 600-ohm resistances

You have only three holes to drill on the panel and there is a special

HOW TO USE AN EXTENSER



The leads that travel to the variable condenser and wave-change switch are lettered in the main wiring diagram, and above you see the way in which they are connected to an Extenser if such is employed.

diagram showing their exact positions. As this diagram shows the front of the panel, and the proper place to mark the hole positions is on the back of the panel, you must reverse the position of the L.T. switch hole. If you do not remember this, you will find the switch on the wrong side when you come to wire up, and what will you do then?

Grid-Bias Battery

Plugs are shown on the wiring diagram for the H.F. grid bias. These will be needed if you use one of the 4½-volt tapped batteries, but not if you employ one of the usual single cells, as these are provided with terminals.

Connection is made to the vertical screen by means of nuts and bolts passed through the slots or holes to be found along the bottom of all standard screens. One bolt can be made to

—incidentally of the Spaghetti type—and the two .25-mfd. fixed condensers.

The H.T. to the plate is parallel-fed via the H.F. choke. Just a warning about this component. On its quality largely depends the efficiency of the unit, so be sure to use a good one. You will not go wrong if you use one of the makes mentioned in the list of components given in another part of the article.

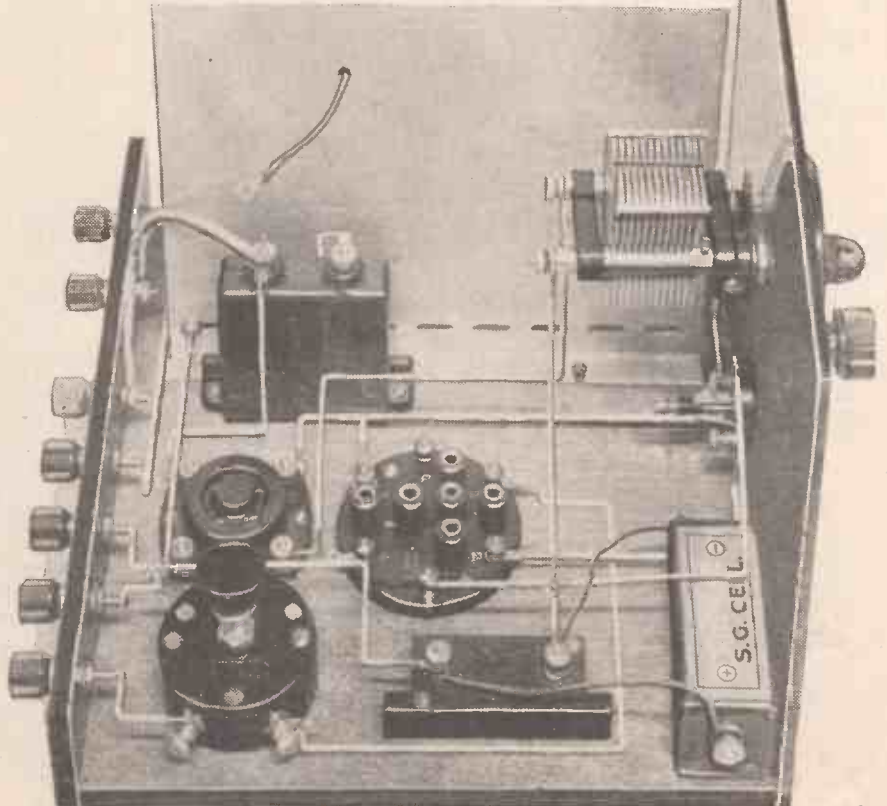
Now a point which I expect most of you have already spotted. There is no H.T.— connection to the unit.

This is, of course, quite O.K., the reason being that as the same batteries are to be used as for the set itself, H.T.— will already be joined up to the L.T. If we joined H.T.— to L.T.— on the unit and it happened to be joined to L.T.+ on the set, the accumulator would be shorted and there would be fireworks.

A Panel Hint

As usual, the draughtsman has made the diagrams so clear that it is hardly necessary to write a single word about the constructional work. Still, a few hints may be useful for those who have not quite reached the expert stage.

EXCEPTIONALLY EFFICIENT



The exceptional efficiency of this H.F. unit is largely due to the use of a properly biased S.G. valve and to a scientific layout of the components in the unit.

The "Explorer" H.F. Unit—continued

serve for the connections on both sides of this screen.

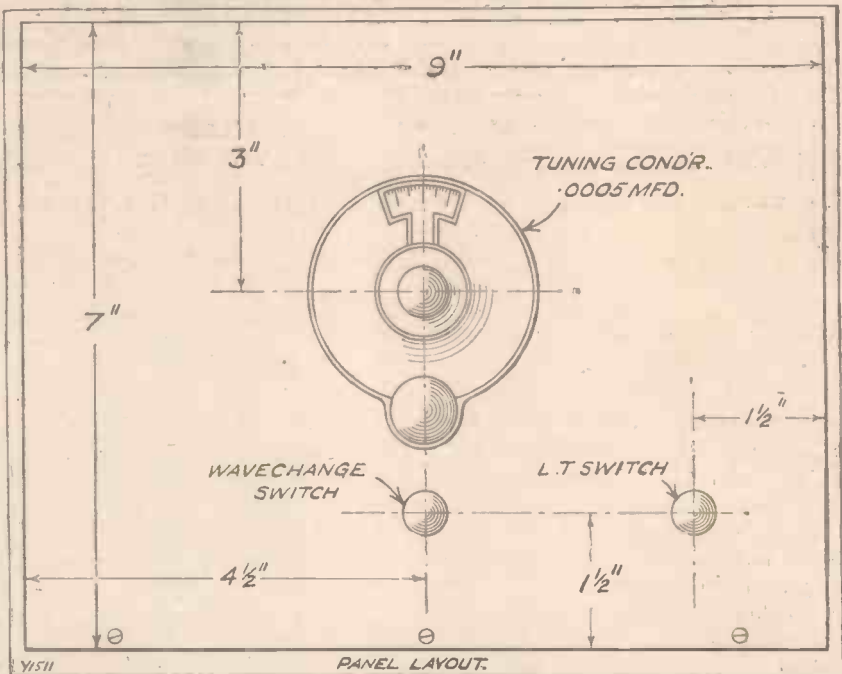
To help to keep your wiring efficient and neat it is drawn in such a manner that it is quite obvious whether a lead passes under or over other leads. Try and make your wiring as nearly as possible a Chinese copy of that in the original unit.

And now it's time I came to an explanation of the auxiliary wiring diagram of the panel. This shows the connections if you use an Extenser instead of the ordinary variable condenser and wave-change switch.

Include an Extenser

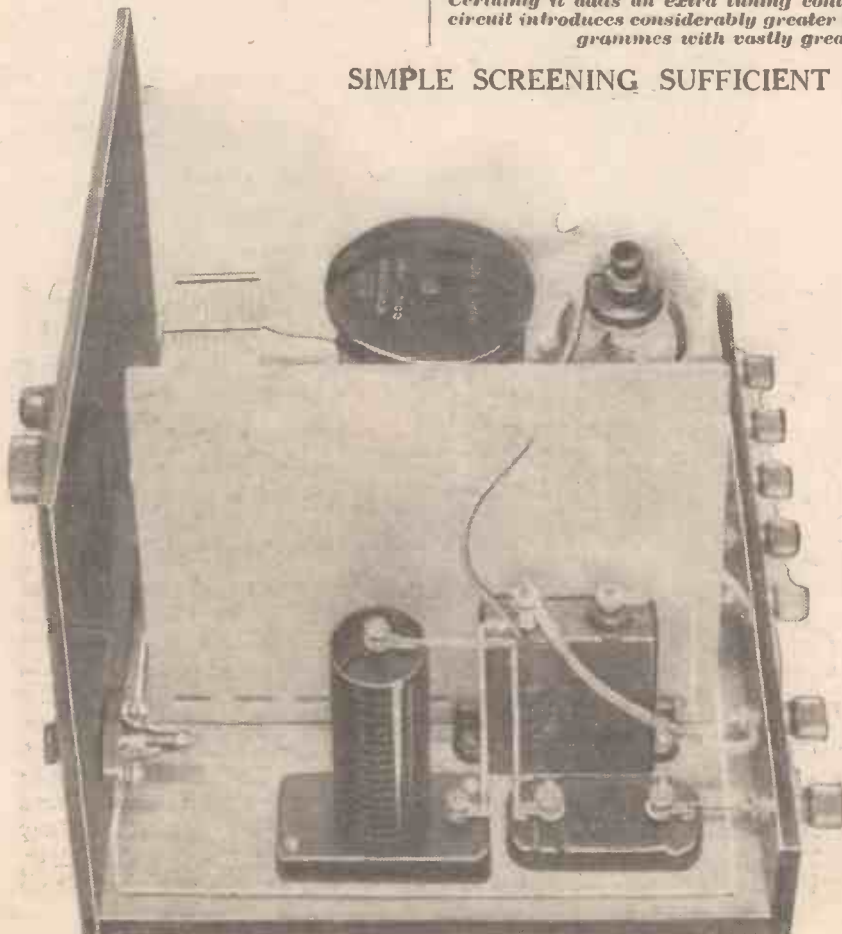
There is no need to go into the advantages of doing this, because they are quite obvious, and in any case have been fully dealt with in special articles on the subject in the WIRELESS CONSTRUCTOR. If you look through the advertisements in this issue you will see that Extensers are available commercially now, and we strongly

ANOTHER USEFUL TUNED CIRCUIT



Certainly it adds an extra tuning control to the outfit, but the accompanying tuned circuit introduces considerably greater selectivity and enables you to pick your programmes with vastly greater freedom from interference.

SIMPLE SCREENING SUFFICIENT



Although only the one simple screening partition is used, the unit is perfectly stable in operation.

advise you to use one if you intend making up this unit.

The alterations effect only the components on the panel, those on the baseboard remaining as shown in the full wiring diagram. With an Extenser it is possible to keep the panel very neat indeed by placing the L.T. switch in the position that the wave-change switch would otherwise occupy.

So that the difference in the wiring will be easy to follow, the seven leads that pass across the join between baseboard and panel are lettered in both diagrams. These letters correspond in both cases.

It Works Wonders!

All you have to do then is to wire up according to the larger diagram, and when you come to a lead to a panel component just note its letter and then turn to the other diagram and carry on with the lead bearing the same letter. You are bound to find the wiring simpler and shorter if you use an Extenser—these are two of the inherent properties of the scheme.

The most exciting part for you will be the testing out. But before you do this you must plug in the valve and connect up the grid-bias' battery.

(Continued on page 111.)



Mr. Whitley Gets Down to It—Programme Timing—Return of Adela Verne—The Audrey Chapman Orchestra—The Pall Mall Players—The Opera War—The New Light Orchestra—The North Region Starts—Dr. Boulton in Russia—Captain Eckerstey and the B.B.C.

Mr. Whitley Gets Down to It

MR. WHITLEY, the ex-Speaker of the House of Commons, and new Chairman of the B.B.C., has now been back from India for two months, and in the absence of Sir John Reith in the United States is thoroughly immersed in the numerous problems and intricacies of the broadcasting service.

This is really the first opportunity Mr. Whitley has encountered of introducing reforms or changing policies. My impression is, however, after a good deal of investigation, that there will be no sudden changes. The influence of the new Chairman will appear in the autumn work of the B.B.C.

Those who looked to the new Chairman to brighten the Sunday programmes will be disappointed. He is known to be in thorough agreement with Sir John Reith in this important matter. With regard to talks, however, there may be a notable extension into various controversial fields so far avoided.

Savoy Hill is still smarting under the effects of the attack by a London newspaper which led to a debate in the House of Lords early in the year.

With Mr. Whitley back, any recurrence of these attacks or others like them from the same quarter will be faced rather differently from the manner of reception of the last one. I look to see the B.B.C. initiate a vigorous counter offensive.

Programme Timing

There has been a good deal of criticism from music-lovers of the cutting of musical items and the dropping of items from the programmes because of timing difficulties.

Then when the items were allowed to run on, the news bulletins and talks were retarded, and this attracted another set of complaints.

Lately there has been a determined attempt at Savoy Hill to solve the problem on a permanent basis. As a result of greater care, the average number of items dropped in a week declined from just over fifteen to two or three. It has been decided to time all musical programmes and items just a little under the probable duration.

Return of Adela Verne

The distinguished international pianist, Adela Verne, now on her way back from a brilliantly successful tour

of the United States, is to appear in the Promenade season this summer.

The Audrey Chapman Orchestra

This orchestra, which does great educational work at the Northampton Institute, London, will be relayed by the B.B.C. in the early future.

The Pall Mall Players

The Pall Mall Players are an orchestra made up of members of the staff of Lloyds Bank. They have been "vetted" by the B.B.C. and passed as worthy of a broadcast. This news has caused some irritation in other banks, and more is to be heard of the matter.

POWER FOR THOSE NORTHERN PROGRAMMES



A corner of the Skithwaite Power House, showing one of the four 345-horse-power Diesel engines.

Savoy Hill News—continued

I am told that feeling is particularly strong among the officials of the Bank which holds the B.B.C. accounts. But I cannot see what they can do about it. It seems to me only right and proper that the B.B.C. should not hand any extra plums to its own bankers.

The Opera War

As soon as it became clear that Sir Thomas Beecham was not to be a party in the arrangement for the subsidy of opera, it was characteristic that he should engage himself at once in a competitive effort.

This bore fruit in the enterprise of the special season of Russian opera at the Lyceum, which will run during the time that the International season at Covent Garden expects to gather its harvest, if any. At least, this is an

B.B.C. has decided to form, will be broadcasting before long and should be most welcome to those listeners who have become thoroughly fed up with a great deal of the inferior and trashy music that the B.B.C. takes from outside to fill up the programmes.

Incidentally, there is a good chance that the new light orchestra may get a chance on Sundays. If so all the better. The B.B.C. can do a lot to broaden and enrich its Sunday programmes without departing at all from its fundamental policy points in that connection.

The North Region Starts

Mr. E. G. D. Liveing (" Red Ted ") and his staff are now well away with their new North Regional service from Slaithwaite. The B.B.C. should be careful to give Mr. Liveing full

I would put the saturation point of the North Region in times of depression at not less than another million. It would seem that the B.B.C. cannot hope to extend its licensees beyond four and a half millions, a figure which if it is ever attained will be reached within the next two years.

Dr. Boulton in Russia

Dr. Boulton's forthcoming visit to conduct in Russia is an event of unusual musical and international interest. Of course, Mr. Albert Coates is familiar enough to the Russian musical public, but it has been the custom at Moscow and elsewhere in the Soviet realms to suggest that England had no other conductor of any consequence. Whether this was ignorance or propaganda I do not know. But the wireless soon disillusioned at least the listening public in the east of Europe. Some of the Queen's Hall Concerts relayed by the B.B.C. have been keenly appreciated on the Volga and beyond. Now it is planned that Dr. Boulton will conduct some of the best Russian orchestras, including that in far-off Baku.

A RADIO SCIENTIST WHO FLIES KITES



An engineer at the Radio Research Station, Slough, with one of the kites used for special radio tests. They take up about 100 ft. of aerial wire and very small transmitters.

interpretation which many people are putting on the policy behind the competitive season. If Sir Thomas had taken on only the Covent Garden combine, with its political support, he would have had a much easier job. As things stand he has the whole power of the B.B.C. and H.M.V. against him. Anyway, it will be a good fight, with lots of fireworks.

The New Light Orchestra

The new light orchestra of from twenty to thirty players, which the

scope and resources to please his enormous population. Anyway, this is only a form of investment, because the industrial north is the only considerable area of the country where there is now a chance to add in a big way to the total number of effective licences. It is estimated that of the 18,000,000 inhabitants within the service area of Slaithwaite, about a million are now licence holders. There is room for expansion even allowing for the fact that a licence represents a household and not an individual.

Captain Eckersley and the B.B.C.

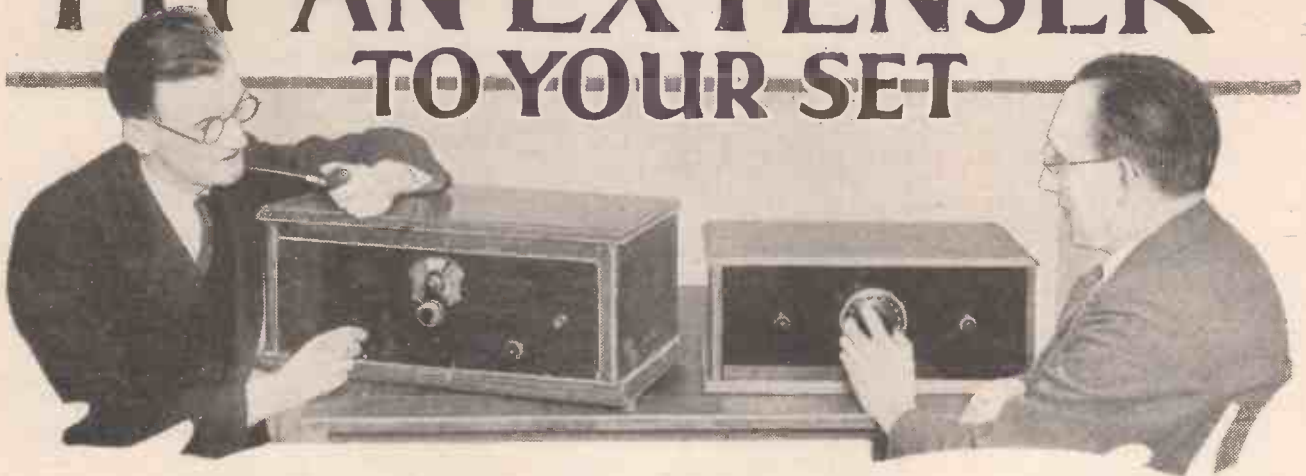
Captain Eckersley has been giving the B.B.C. some pretty hard knocks of late, and these have been carefully noted at Savoy Hill, where there is still an active movement to get the former Chief Engineer back into the fold.

Curiously enough, this does not exist among the engineers, who are more than satisfied with their present chief, Noel Ashbridge. It is in the Programme Branch that there is yearning for " P. P. E. "

Several of the most active and original of the rising personalities of " Programmes " would give a great deal to be able to work under Captain Eckersley, and they are untiringly working to this end.

The movement is not aimed at or against Roger Eckersley, the present head of the branch. On the contrary, it is believed to have his benevolent moral support. No, the idea is to split the branch, leaving entertainment with Roger, and giving the whole of the spoken word to his brother, Peter, thereby incidentally solving the difficulties that flow from the existence of no less than three talks directors working in competition.

FIT AN "EXTENSER" TO YOUR SET



As was only to be expected, the Extenser has during the past month been the main topic of conversation among all kinds of radio enthusiasts. Wherever wireless engineers forgathered you could hear our Extenser being discussed.

I've heard no criticism against it, and that alone makes the Extenser quite unique. But I have heard doubts expressed as to the commercialisation of the device.

"It undoubtedly is a fine scheme," one well-known engineer remarked, "but it'll be a long time before manufacturers will be producing the thing. They don't like new lines that aren't developed gradually and naturally in their own factories. And to make Extensers they will have to have costly new tools and, maybe, the value of their existing stocks may to some extent be jeopardised."

All of which may be true, probably is in the general sense at least, but the fact remains that already Extensers are in production. So you see, that critic has been confounded.

Rapidly "Taken Up"

It was inevitable that the Extenser would be commercialised, but I must admit that the rapidity with which it was "taken up" by the trade surprised me. No one who has not had some experience of the inner workings of a manufacturing concern is able to appreciate the enterprise, enthusiasm and hard work that must have been put into the proposition in order to get it ready for the market so quickly.

With commercial models of the

By VICTOR KING.

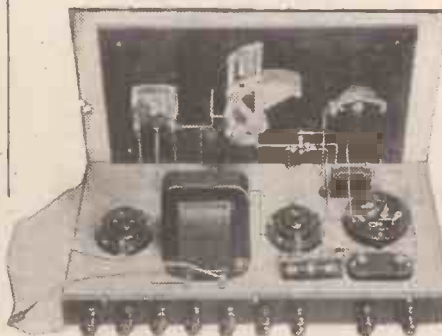
Our new tuning component will no doubt figure in practically all radio receivers of the future, but in the meantime it is very easy to fit one to an existing set. In the following article you are shown how to do so, and the famous "Explorer" sets are taken as examples of modern design that very readily lend themselves to a conversion of this nature.

Extenser available the Extensering of radio can really commence. And bearing in mind all that the Extenser stands for, there is nothing more certain than that the Extenser is destined to form an integral part of the majority of future sets.

Endless Advantages

I hope by now that WIRELESS CONSTRUCTOR readers will appreciate the fact that the new component stands for a lot more than the mere elimination of wave-change switches. Indeed, I have shown in

MADE FOR IT!



The "Explorer" Two is just that kind of set in which an Extenser reveals its advantages to the very utmost.

recent articles that its advantages seem endless and that new ones keep coming to light.

And that reminds me, the other day I was reading an article by Mr. G. V. Dowding on the subject (Mr. Dowding is, of course, the original inventor of the Extenser). This article appeared in "Popular Wireless," our associated weekly journal, and the author pointed out that one of the effects of Extensering radio is likely to be that the terms "long wave" and "short or medium wave" will probably fade out from the point of view of the ordinary listener.

Rather a queer thought that, isn't it? We engineers and amateurs can hardly visualise such an eventuality, but nevertheless it certainly does look possible. Inasmuch as a set fitted with Extensers will tune to any station within both "long" and "medium" bands without reference to any kind of switching, or to different calibration charts, scales or readings, the operator need not concern himself at all with this arbitrary division of wave-lengths that has so far existed as a vital necessity.

Influence on Technique

The station he wants may have a wave-length of 250 metres or a wave-length of 1,800 metres, but while certainly the one is a longer wave than the other, both come within the scope of the one station-selecting device, so that he hasn't got to concern himself with "bands" at all. He merely turns the one knob to the approximate point where he believes the station is to be heard, and that is that.

Perhaps all this is very obvious, but I mention it as an indication

Fit an Extenser to Your Set—continued

for short waves. And when one has an experience like that, one feels very sweet towards anything that will render it impossible in the future.

I am going to devote the rest of this article to the Extensering of ordinary receivers. The Cyldon Extenser, which, by the way, is a lovely piece of work, can accomplish practically any wave-changing.

It is the equivalent of a tuning variable condenser plus a four-point

to purchase the particular copy of the WIRELESS CONSTRUCTOR in which this set was described I am reproducing one photograph and a wiring diagram of this little outfit.

If you look at the wiring diagram you will see that the wave-change switch is of the normal three-point variety and has three leads going to it. These leads can be disconnected, and after that you can remove the switch itself. The Extenser replaces the variable condenser on

Extenser exactly as marked, while you can take the three wave-change switch leads to the three terminals at the end of the Extenser.

A better panel appearance might be accomplished by shifting the L.T. switch to a point just beneath the Extenser if there is room for it, but that would leave two holes requiring to be filled up, for such could not be left by the conscientious constructor.

However, it is quite a simple matter to make a good job of filling unwanted holes in ebonite panels. Probably you are already acquainted with methods of doing this. One of the simplest is to obtain a small quantity of "heelball," as used by cobblers. This material is very easily softened by the application of moderate heat. Chatterton's Compound also can be used for the purpose.

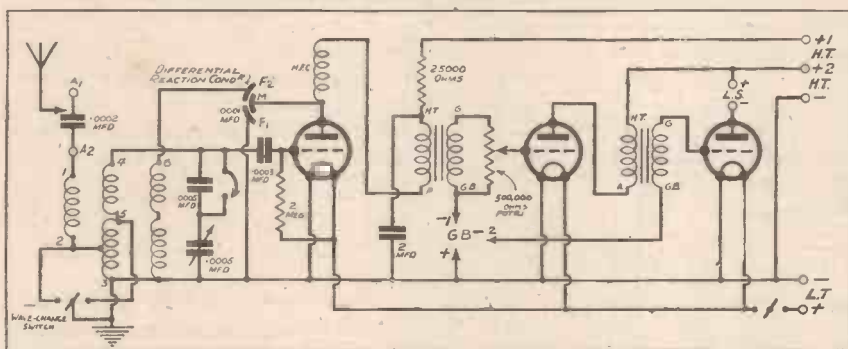
The "Explorer" Three

It is probable that many of you will consider it worth while obtaining and drilling a new panel in the case of the "Explorer" Two, for only a small quantity of ebonite is involved, and the expense is not great.

Fitting an Extenser to an "Explorer" set does not in any way interfere with its normal operation. You can still interchange the coil units and tune in the short waves as and when desired.

It is every bit as easy to modify

THE EXTENSER SIMPLIFIES A CIRCUIT



Instead of TWO components needing between them FIVE connections, you can use ONE Extenser needing only FOUR connections. That means a simpler circuit, simpler layout, simpler wiring and better results. The above diagram is of the original "Explorer" Three.

switch. There are three terminals at the back in addition to the usual fixed and moving vane terminals. And those three terminals correspond with the terminals of a wave-change switch in most diagrams. They are all shorted together during the rotation of the moving vanes through 180 degrees.

And inasmuch as they are metallically in contact with the moving vanes themselves during this period, it is obvious that the moving vanes' terminal can figure in many switching operations as well as provide for its normal connection.

An Easy Job

You will see this point more clearly when I come to specific examples.

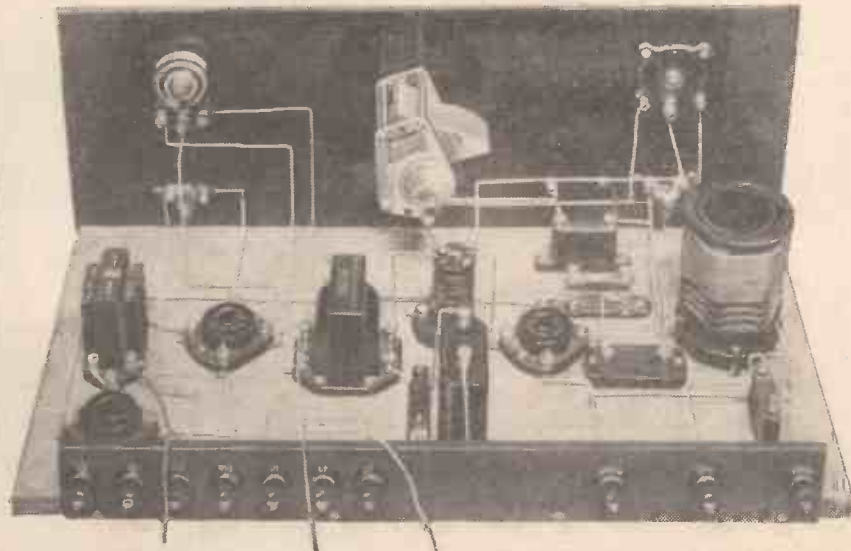
I intend to show how Extensers can be fitted in any of the "Explorer" sets. I have chosen these, for they constitute one of the most popular series of sets the WIRELESS CONSTRUCTOR has introduced, as well as forming an excellently diverse series of constructions for our immediate purpose.

I will first of all deal with the "Explorer" Two, and for the benefit of those readers who did not happen

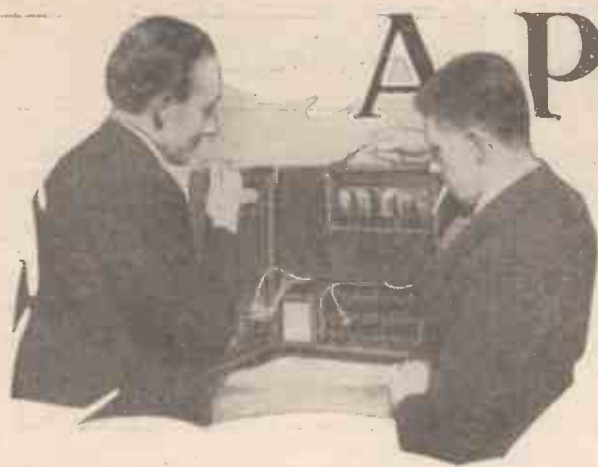
the panel, and you will find that there is plenty of room for it even if the existing variable is of a small kind.

The two leads going to the variable condenser are taken to the fixed and moving-vane terminals of the

AND YOU GET REAL SERVICE



The "self-changer" on the Extenser eliminates all troubles due to switch operation. Owners of "Explorer" Threes, a photo of the original of which appears above, should find the Extenser a most attractive proposition, and be eager to fit it to their sets.



A PRACTICAL MAN'S CORNER

Some useful tips for home constructors.

By R. W. HALLOWS.

Adjusting Spaghetti Resistances

THE Spaghetti resistances now made by several firms are exceedingly useful for all kinds of wireless jobs. Each consists of a core of asbestos string or some such material round which is wound the resistance element of fine wire.

Outside the winding is an insulating covering of flexible material, and each end of the resistance is provided with a tag. "Spaghetthis" may be used conveniently to replace plain wire connections between points where a given amount of resistance is required.

ALTERING RESISTANCES

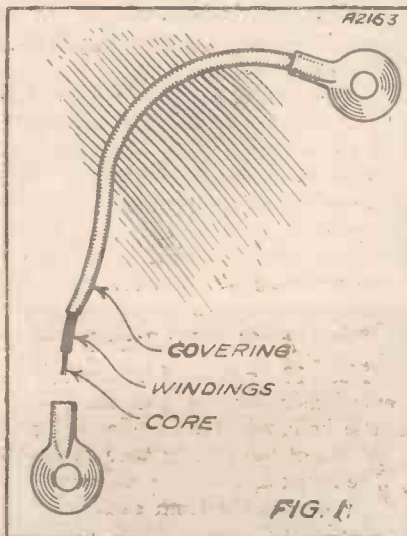


Fig. 1. An easy way to reduce the value of a "Spaghetti" resistance.

For example, in resistance-capacity circuits the connection between the anode of the first valve and high-tension positive can be made in this way instead of by a wire. Should the resistance be of a high value, and therefore rather long, you can get it neatly out of the way by tying a loose knot in it.

Now it happens sometimes that you want a resistance of rather smaller value than anything you have on hand. The purpose of this note is to show how easily Spaghetthis can be adjusted to any required value.

Suppose, for example, that you want a 5,000-ohm resistance, but have nothing by you smaller than 10,000 ohms. Fig. 1 shows how the deed is done.

First of all cut the resistance into half; then very carefully remove the insulating sleeve for about half an inch, as shown in the drawing. Be careful that the wire does not unwind itself.

To prevent it so doing, peel off half a dozen turns or so, so as to give you a loose end, and with this tie a single knot round the core. Next take an ordinary tag, slip it over the bared end, pinch down tight, and solder. There is not, as a rule, any need to scrape the resistance wire in order to make a good contact or to get solder to stick.

Exact Values

The method above suggested enables you to change a 10,000-ohm into two of approximately 5,000 ohms apiece. In the same way, remembering that the total resistance is roughly proportional to the length of the Spaghetti, you can make all kinds of values from a given piece.

Nor is it difficult to obtain exact values provided that you have one resistance of this value to act as a pattern. Here is a handy method.

Fit up the pattern resistance in the plate circuit of a valve, adjusting the plate voltage until you get a reading of, say, 5 milliamperes. Cut the Spaghetti to a length estimated to give a resistance rather above the value needed and reduce this length until exactly the same milliammeter reading is obtained when it is sub-

stituted in the valve circuit for the pattern resistance.

All of us, I suppose, have been faced at one time or another with the problem of the screw or the terminal shank which is just too short to allow sound, tight connections to be made to it at the back of the panel. Sometimes a terminal shank becomes just too short because the thread has stripped at the very end.

Insufficient Length

We know that if it were just a sixteenth longer the nut would bite as it should. Well, you cannot lengthen screws or shanks, but there is a method, illustrated in Fig. 2, whereby you can find a simple way out of the difficulty.

Having drilled through the panel a clearance hole of the right size, take a 1/4-in. drill and counterbore the back of the panel. The more obtuse the angle of the drill's point, the better.

Counterboring means really nothing more than deep countersinking. Take a small 6 B.A. nut, fix it in a vice, and run a No. 33 or 34 Morse drill through it.

THOSE SHORT TERMINALS

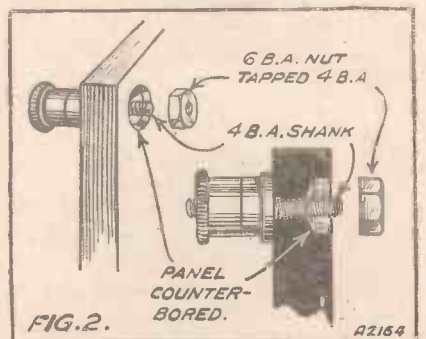


Fig. 2. How to fix a short-shanked terminal to your panel.

Then re-thread with a 4 B.A. tap. You will now have no difficulty in making the nut bite if you turn it

A Practical Man's Corner—continued

firmly down with a 6 B.A. box spanner. If you don't care about the job of tapping the nut, use a $\frac{3}{8}$ -in. drill for your counterboring, and you can then employ a 4 B.A. nut.

HOW IS YOUR ACID ?

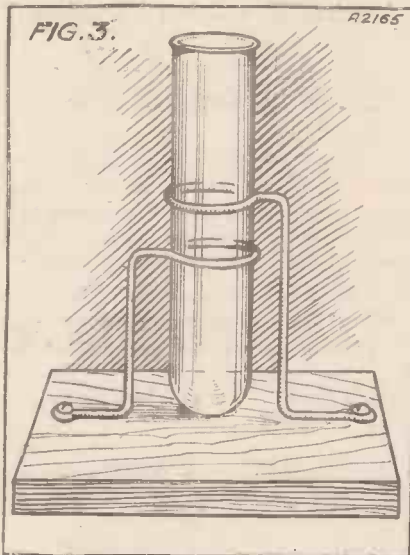


Fig. 3. An accurate way of testing the S.G. of your accumulator acid.

Stripped Threads

If it is the thread stripped at the end which has made your terminal just too short, there is another way of dealing with the business, though this demands the presence of a 6 B.A. die in the tool kit. Fix the terminal into the vice with its shank protruding, and with a fine file remove most of the threads.

Work carefully so as to keep the shank round. Now take your 6 B.A. die and run it on to the shank, thus producing a brand-new thread.

Taps and dies, by the way, in 4 B.A. and 6 B.A. sizes are exceedingly useful and their cost is small. If you don't already possess them, acquire them at the first opportunity. It is best, of course, to purchase tools of good quality if you want them to last, though serviceable taps and dies in the B.A. sizes can be bought at Woolworths' for sixpence apiece.

The Modern Valve Pin

A year or two ago if a valve pin did not fit its appropriate leg in the holder tightly it was an easy business to make it do so. In those days valves were provided with simple split-pins, and all that one had to do was to

splay them out with the aid of a penknife.

Almost all valves to-day are provided with banana pins. It is comparatively rare to find one that is a loose fit for a leg, but when this does happen difficulties arise. The main trouble is that the pin is hollow and that the fine lead from the bulb of the valve passes right down it, being secured by a blob of solder at the very tip.

If you try to splay a banana pin by inserting the point of a penknife into the slots in it there is considerable risk of breaking the fine lead running through it. A better way is this: Scrape the surface of the pin bright, apply a very small amount of flux, and then tin it over with solder. The layer of solder increases the diameter of the pin, and you can make it as tight as you like for the leg.

Hydrometers

Wireless folk are beginning to realise that if you want to keep a check on the doings of those who charge accumulators you must have

a good hydrometer—and use it. One of the most convenient types of hydrometer is that which looks like a glorified syringe with a float inside it.

These, however, have the drawback that they are not as a rule particularly accurate. In any case,

SO SIMPLE

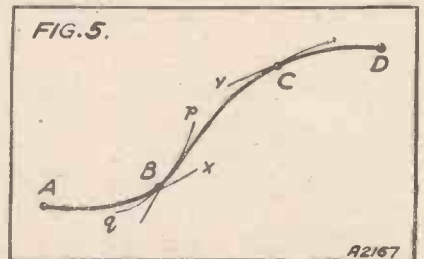


Fig. 5. This is a case where a "French Curve" proved useful.

only very rough readings can be taken with them, since the floats are so small.

There is a far better method for those who want to know exactly the state of the electrolyte in their accumulators. Don't buy a syringe hydrometer; purchase instead a good float 6 in. or so in length, graduated from about 1,100 to 1,350. At the same time, acquire what is known as a boiling tube.

This is a glorified test-tube about 9 in. long by $1\frac{1}{2}$ in. inside diameter. Make a little stand for the tube on the lines shown in Fig. 3. Almost any piece of good wood will do for the base, upon which are mounted, as shown in the drawing, two supports made of stoutish copper wire.

A Simple Stand

No. 16 gauge Glazite answers excellently for the purpose. Cut a little hollow in the baseboard for the bottom of the boiling tube to rest in. When you are testing accumulators, draw electrolyte from each cell with an ordinary glass syringe; a piece of rubber tubing slipped over its nozzle will enable it to reach right down into each cell. Put the acid solution into the boiling tube, and you will then be able to measure by means of your float what the gravity is.

Unless one has a natural gift in that way it is an exceedingly difficult business to make good drawings of curves of any kind, unless they happen

(Please turn to page 112.)

MAKING NEAT CURVES

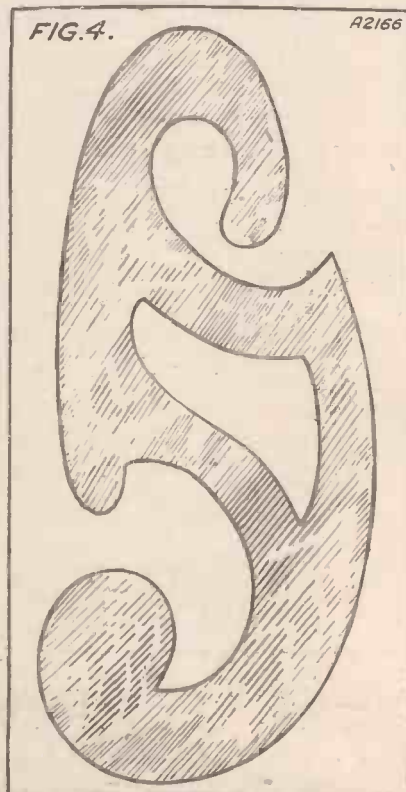


Fig. 4. Have you any difficulty in drawing neat curves? If so, this gadget will help you.

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1 ReadRad "Duograph" S/M dial			6 6
1 ReadRad 3-pt. wave-change switch			1 8
1 ReadRad "Explorer" dual-range coil			10 6
1 "Lowcos" 6-pin coil base			2 0
1 ReadRad screen, 6 in. X 7 in., to specification			1 6
1 Formodenser, type G			1 6
1 T.C.C. .01-mfd. fixed condenser			2 6
1 Telsen .001-mfd. fixed condenser			1 0
2 T.C.C. .25-mfd. fixed condensers			4 6
1 Telsen 4-pin sprung valve-holder			1 0
1 ReadRad "Hilo" H.F. choke			4 6
2 Link resistances, 600 ohms.			1 6
7 Belling-Lee "R" terminals			1 9
1 Ebonite strip, 9 in. X 2 in. X 3/16 in.			1 3
1 Siemens S.G. cell			1 0
1 Packet "Jiffilix," for wiring			2 6
1 Valve to specification, S.G. type			1 0 0
Flex, screws, plugs, etc.			1 0
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	£	s.	d.
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2 Jackson (Tluy No. 2) .0005-mfd. variable condensers			17 0
1 ReadRad .00015 differential reaction condenser			5 0
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1 Wearite 2-way rotary switch			3 8 6
1 ReadRad "Hilo" H.F. choke			4 6 6
1 Telsen H.F. choke			2 6 6
1 Telsen .001-mfd. fixed condenser			1 0 0
2 T.C.C. .01-mfd. fixed condensers			5 0 0
1 ReadRad .0005-mfd. fixed condenser			5 10
1 ReadRad 1-megohm grid leak and holder			1 4
1 Graham-Earish 2-meg. grid leak, with terminals			1 0 0
1 W.B. Universal type valve holder			1 3 0
3 Telsen 4-pin sprung valve holders			3 0 0
1 Igranite Midget L.F. transformer (ratio 3-1)			10 6 6
1 T.C.C. 2-mfd. fixed condenser			3 10
1 T.C.C. 1-mfd. fixed condenser			2 10
3 Link resistances—600, 25,000 and 100,000 ohms			5 0
1 ReadRad L.T. switch			10 6
1 ReadRad screen and foil			3 6 6
2 ReadRad coils, wound to specification			12 6 6
1 Set Balcin frame-aerial spacers			2 2 0
1 lb. No. 24 gauge D.S.C. wire			1 3 0
1 lb. No. 30 gauge D.S.C. wire			3 0 0
1 Mullard portable loud-speaker unit			1 8 6
4 Valves to specification—S.G., Det., L.F. and power			2 7 6
1 Pkt. "Jiffilix" for wiring			2 6 6
Flex, wander plugs, wire, screws, tapping clips, etc.			1 5
TOTAL (including valves and cabinet)	£11	0	0

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1 Fuller J.A.P.11 non-spillable accumulator .. 13 6
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1 ReadRad L.T. switch			10
1 Telsen 4-pin sprung valve-holder			1 0
1 Igranite "Midget" L.F. transformer			10 6
1 ReadRad 25,000-ohm link resistance			1 6
1 T.C.C. 2-mfd. fixed condenser			3 10
1 Valve to specification (small power type)			10 6
Ebonite strip, 1 in. X 3 in. X 3/16 in., wire, screws, etc.			10
	£1	9	0
Kit "A" (less valve)			18 6
Kit "B" (including valve)			£1 9 0

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1 Cabinet, with 9-in. baseboard			15 0
1 Cydon .0005-mfd. "Extenser" condenser			15 0
1 ReadRad .00015 differential reaction condenser			5 0
1 ReadRad "P.W." dual-range coil			12 6
1 ReadRad L.T. switch			10
1 Telsen .001-mfd. fixed condenser			1 0
1 ReadRad .0003-mfd. fixed condenser			10
1 Telsen sprung valve-holder			1 0
1 "Lowcos" .001-mfd. compression condenser			2 6
1 ReadRad "Hilo" H.F. choke			4 6
1 ReadRad 2-megohm grid leak and holder			1 4
1 Ebonite strip, 10 in. X 2 in. X 3/16 in.			1 0
8 Belling-Lee "R" terminals			2 0
1 Packet "Jiffilix," for wiring			2 6
1 Valve to specification (detector type)			8 6
Screws, flex, plugs, etc.			1 0
	£3	18	0
Kit "A" (less valve and cabinet) ..	£2	14	6
Or 12 monthly payments of 5/-			
Kit "B" (including valve, less cabinet) ..	£3	3	0
Or 12 monthly payments of 5/9.			
Kit "C" (including valve and cabinet) ..	£3	18	0
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*That Interval Signal—
A Real Thrill—Tapped
Output Chokes—Noisy
Pick-ups.*

I BELIEVE the B.B.C. is quite proud of its interval signal, or "death tick in goloshes," as someone has aptly described it. Unfortunately, however, their pride seems to be making them use it for longer and longer periods.

Indeed, it is surprising what long intervals are being filled in with this monotonous noise. Intervals that I am sure, previous to the new arrival, would have been devoted to those cute little piano pieces.

A little while ago we could pride ourselves on having hardly any intervals at all, or, at the most, very tiny ones. But now—well, have an interval signal by all means, but even if it is a novelty that is no reason for imagining it to have programme value!

Enter—the "Extenser"!

Some people are always moaning that all the thrill has gone out of radio now that distant reception has become so easy an everyday event.

But I am sure they cannot be readers of the WIRELESS CONSTRUCTOR.

For a long time I have longed for a component such as the Extenser, and I remember saying some months ago at a meeting of the Ideas Committee (reported on page 252 of the Sept., 1930, issue of the WIRELESS CONSTRUCTOR), "I consider automatic wave-changing by means of condensers with 360-degree movements might receive more attention."

In spite of thus fully appreciating their advantages, and although I "live on" radio, and am therefore naturally inclined to take things as a matter of course, I was really thrilled—nothing less—when I first handled my set with Extensers in it. All I can say is—you just wait till you try one!

* * *

Sometimes the use of two output chokes in series is advised as a substitute for a proper tapped choke when a pentode valve is in use. Of

course, the idea is to have both chokes in the plate circuit and tap the speaker via a condenser across one.

By this means, it is alleged, the effect of a centre-tapped choke is obtained. It is not the same thing, and I have been caught out by it myself!

True, one gets a voltage step-down effect, but along with this comes a volume step-down in about the same proportion. What has to be remembered is that a proper tapped choke has both its halves inductively coupled.

The other scheme is like trying to use two plain coils, uncoupled, in place of a centre-tapped one in an aerial circuit. They will work, but in not quite the same way as the real thing.

A Pick-Up Grouse

Oh, for a really silent pick-up! By this I do not mean I hate to hear electrical record reproduction—just the reverse.

The trouble is that with many such instruments half the volume comprises a scratchy tone which emerges direct from the pick-up. Personally, I use a home-mounted turntable, and the lid is not one of your heavy close-fitting ones as found on expensive consoles.

Result, much packing round the edges with rag and other dodges. Yes; and this despite proper tracking. That is the *first* thing to check when a pick-up is extra noisy.

A. S. C.

THE outstanding short-wave event of last month was undoubtedly the special WIRELESS CONSTRUCTOR transmission from Nairobi. And it seems to have met with whole-hearted enthusiasm from all you CONSTRUCTOR readers, for when I poked my head round the Research Department door a few days after the show I had difficulty in locating certain members of the Research staff on account of the deluge of correspondence that had been showered on them regarding the transmission.

Nairobi News

Apart from the tremendous amount of interest attaching to an effort of this sort, I always think it is particularly valuable from the point of view of determining reception conditions in different parts of the country.

Cornwall, for instance, seems to have done particularly well on the

* THE MONTH ON *
* SHORT WAVES *

"percentage-of-the-whole" received, and, curiously enough, most of the good reports, not only from Cornwall, but from all parts of the country, were from readers using Det. and 1 L.F. short-wavers. Those who tried two L.F. stages found the same as I did, that the proportion of X's to signal strength was much too great to be bearable on 'phones.

I thought the Research fellows at the main CONSTRUCTOR receiving station did jolly well considering that the night of April 20th was hardly remarkable for reception on 49 metres. But, then, they had been preparing for it in their usual enthusiastic manner for the previous two months, so it was not really surprising.

I received 7 L O at much better strength than he has been coming over for some while, and I should have received pretty well all the programme had it not been for interference caused by an atrociously distorted telephone transmission which *could* only have been a French amateur. Apparently a lot of you fellows had the same difficulty, although I did come across one or two reports of severe interference from H V J.

Less Fading

Have you noticed how well H V J is coming over just at present?

I receive him very well on both his wave-lengths (19.84 and 50.26 metres), but I find the longer wave suffers less from fading, and that is the one on which I usually listen. On the Sunday prior to the Nairobi broadcast I logged him on the 50.26 wave at about 6 p.m. at loud-speaker strength.

ARE WE OVERDOING IT?



ARE the valve manufacturers overdoing this high-magnification business? That is the question that inevitably crops up in one's mind when examining some of the latest products from our leading valve factories.

A few years ago a valve that had a mutual conductance of over unity was looked upon as something out of the ordinary, but nowadays we have battery valves with "goodness factors" of four, and promises of even "better to come."

Where Will It Lead?

Where will it all lead? And how does it affect the ordinary home constructor?

Personally, I think that the valve people *are* rather overdoing it. A few months ago we got just what we wanted with three valves, say, for loud-speaker work on the local stations. Now, if we use three of the latest high-mag. valves we shall be in grave danger of finding we have distortion, due either to overloading or instability; the latter being caused by the fact that the extra magnification is causing any small coupling effects between circuits to be far more disastrous in their results.

"But," you will argue, "you should have *no* interstage back-coupling."

Quite true, you shouldn't. But how many home-constructed sets are perfect from that point of view?

New Sets Needed

Take a set of a year old—a set that gave perfect results with the valves of that day—and use it with the latest high-mag. valves, and what is the result? Chaos, as likely as not. The set wasn't designed for these valves.

In this pertinent article our contributor questions the wisdom of the modern battle for high valve magnification.

By G. W. EVANS.

So, though progress is a very fine thing, it is apt to be a bit expensive, for these new valves mean new designs. Not complete breakaways from all usual practice, but better screening, and better de-coupling; more careful choice of components and so on.

If we do not take these precautions, then there is imminent danger that

instability will occur whenever really up-to-date valves are used.

I mentioned overloading as being one of the little troubles liable to beset the user of modern valves. This is due directly to the high-magnification factors, coupled with small grid swings, possessed by most of the new valves. It means that valves have to be chosen very much more carefully, and a lot of thought is required in the actual choosing of valves for any receiver having over two.

A Screening Development

A recent move of the valve manufacturers to assist the set designers is to be commended. This is the

LISTENING TO THEIR LUNGS



Testing the invention of a Berlin doctor by means of which the noise made by the breathing of a patient can be transmitted by radio.

Are We Overdoing It?—continued

provision of a metallic shield, either inside or outside the bulb of the screened-grid valve, both in the battery and mains classes, and also, I believe, in the detector types of valve.

This is to help in obtaining really complete screening in high-magnification receivers, and to assist designers of mains sets in the always prominent struggle to eliminate hum.

It Sounds Nice!

The H.F. pentode is also "on the way," to enable even more amplification per stage to be got out of an H.F. amplifier. It is too early to judge the effects of this valve, whether or not it will revolutionise H.F. work, and whether or not it will prove such a boon as some people make out.

It *sounds* very nice. But so does the steep-slope L.F. valve and the ordinary pentode. It is when their

battery valves and all the 4-volters are mains types, and leave it at that.

We don't need all these different voltages nowadays. The best of the 4- and 6-volters on the market have been equalled, and in some makes excelled, by 2-volters of similar type. There was a time when if we wanted a good super-power output valve one *had* to have a 6-volter. Now a suitable battery valve for any particular purpose can always be found among the "two's."

And it is cheaper to use 2-volters. The wattage of the filament consumption is less than that of the fours and sixes, the H.T. consumption is no more, and the results are quite as good—often better. Why, then, keep on the other two battery voltages?

True, not so many new types are being added to the 4- and 6-volt classes as to the ranks of the two's. Perhaps the valve concerns are going

emphasise the vital importance of using good valves. So many queries come before the WIRELESS CONSTRUCTOR Queries Department from readers "who have done everything and still it doesn't give good results," in which only the valves are at fault,

NEXT MONTH

THE JULY

"WIRELESS CONSTRUCTOR"

WILL BE

ON SALE JUNE 1st. Price 6d.

that it behoves me to say this very strongly indeed.

"Cheap" Enough!

You cannot get real success with inferior valves.

I know many valves are on the market sold at 2s. 6d. and a few shillings over. They *work*. No one could deny that, and in some cases work pretty well. Detectors seem sensitive and amplifiers do amplify. *But* except in rather rare cases they are very inferior to good British valves.

If you want good results out of a motor car you don't run it on paraffin. Why, then, use inferior stuff in your radio set? It's cheaper I know, but then so are the results!

And talking about cheapness, don't spoil good valves—if you are using them—by employing poor associated components.

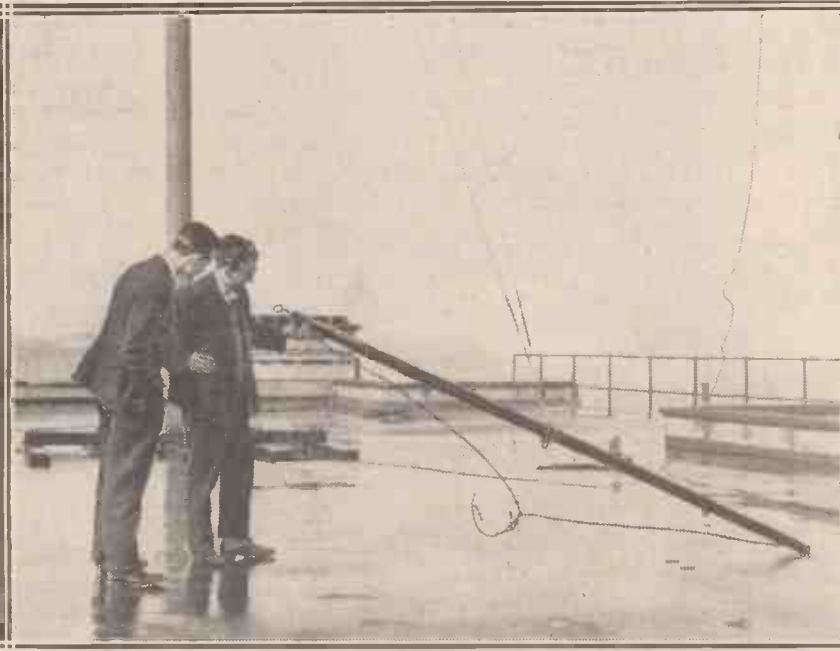
The other day I tried an A.C. set (2-valver) with a certain cheap component in it. The results were passably good. They might have satisfied 60 per cent of listeners, but they wouldn't have raved over the set.

Results Entirely Changed

I then removed the component and put in one that was very much more expensive. The results were entirely changed. New life came into the set, and from a "pretty fair" standard we immediately leapt up into the first rank.

One component, that's all. The valves were good ones, but they were tied down by the poor component, and it was only when a good make was substituted that they really gave of their best.

WHEN NATURE TAKES A HAND



Examining an aerial spreader that was blown down during a storm. But if progress in radio design is maintained at its present rate outdoor aeriols will soon be hardly necessary and such events as that depicted above will be obviated.

practical application is considered that we find the true worth, or otherwise, of valves.

But with all this progress the valve firms are still keeping all three D.C. voltages going. We still have 2-, 4-, and 6-volt valves for battery working. How very much more convenient if we could say—all the 2-volters are

to let the higher voltage valves die a natural death due to neglect. If so, the sooner the better. I can see no reason why they should not be withdrawn from public attention from now on, and except for A.C. mains valves the 2-volter could reign supreme.

And before I finish I would like to



THE "SERIES - SHORTER"

By A. S. CLARK.

A neat little time and trouble saver for "all-wave" sets.

A COUPLE or so years ago no one reckoned to hear much on short waves bar a lot of Morse and a few amateurs calling: "Hallo! Hallo! This is 10 PM calling! One, two, three, four, five. Hallo . . .!" or something just as entertaining. And no sooner had we tuned in the raucous voice than—"Over!" and we started our searching again.

But now there are many regular broadcasters to listen to as well as the amateurs, and it is such fun going to all parts of the world via radio that many broadcast sets are so arranged that they will also "go down" to the very high frequencies.

Getting Down To It

Such sets practically always use plug-in coils of some sort which have to be changed when going down to short waves. Sometimes only one coil has to be changed, and this coil is arranged to cover both so-called "broadcast" bands, as with the well-known "Explorer" scheme introduced by the WIRELESS CONSTRUCTOR.

Whatever the scheme when changing the coil or coils to go down to short waves, a fixed condenser has to be unshorted by some means.

This condenser then comes into series with the tuning condenser to make the effective capacity of the latter suitable for short-wave working.

An Excellent Example

Now there is no earthly reason why we should do two things in this world when one can be made to give the same effect. So here is a scheme applicable to any all-wave set, such as has been outlined, that automatically shorts the series condenser when the broadcast coil or coils are put in place.

Especially is the scheme applicable to "Explorer" sets, for with it, to go down to short waves, you have merely to change the 6-pin coils, and you are "down." In the illus-

trations you will immediately spot that an "Explorer" coil is utilised.

The construction of the gadget is simplicity itself. Just bend two bits

IT DOES THE TRICK



The little piece of pointed ebonite is the only addition needed on the coil, but by means of it a condenser is shorted as the coil is inserted into its holder.

of springy brass or copper to the shape shown and mount them on a little piece of ebonite which is even-

tually screwed to the baseboard near the coil holder.

The spring, which is bent at right angles at the top, should be cut to a blunt point, and the two springs should be mounted so that there is a little gap at this point.

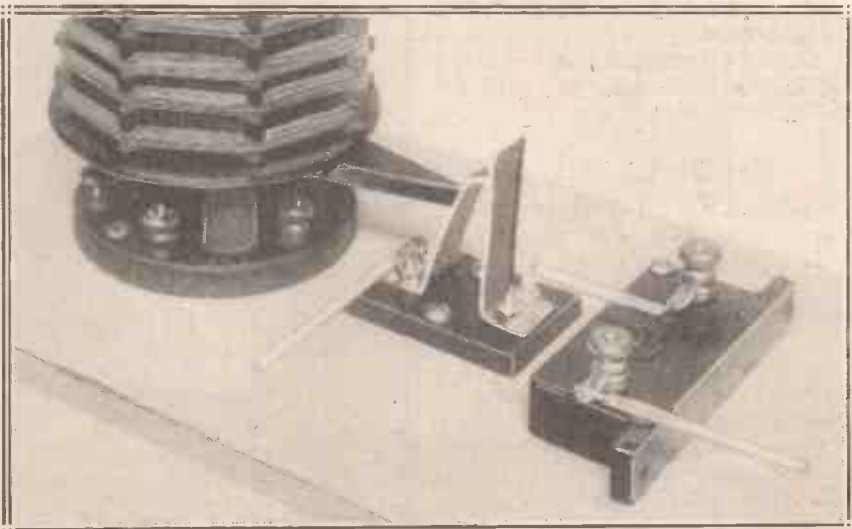
Cuts Out the Condenser

On the *broadcast* coil (don't go and put it on the short-wave one) a small piece of ebonite is so fixed that when the coil is inserted in its holder this piece of ebonite comes up against the bent spring and closes the gap.

In the case of separate plug-in coils of the two-pin type, the ebonite projection should be put on the most convenient one; and don't forget that if you change coils to go from medium to long waves you will want a projection on one medium-wave coil, and also on the corresponding long-wave one.

Don't alter the present wiring, just run extra leads from each side of the series fixed condenser to the springs.

COIL AUTOMATICALLY CONTROLS SWITCH



When the two springs are pressed together by the ebonite projection from the coil, the fixed condenser seen in the foreground is short-circuited. This fixed condenser is in series with the tuning condenser for the purpose of reducing the effective capacity of the latter for short-wave work.



RADIO-STRASBOURG

All about a well-known French station that is very easily receivable in this country.

BY A. A. GULLILAND.

IT was at the beginning of last summer that I read the announcement that the French Post Office had completed the new Strasbourg transmitter and that it shortly would be on the air. Incidentally, it only took up broadcasting on Armistice Day, 1930, as a number of technical difficulties had cropped up unexpectedly.

From the studios a very special cable has been laid to the transmitter at Krautwiller-Brumath. So very special is the cable that it passes up to 14,000 cycles per second without distortion.

The engineer in charge of the station said that if all broadcasting stations actually transmitted that frequency and receivers handled it properly we should all be astonished at what broadcast reception could be. As it is, about 7,000 cycles per second are the highest ever handled and passed out, higher frequencies being fully cut off.

Horrible Dialect!

I wished I could have travelled along that cable, for I discovered that the train service to Brumath was not too good unless one wanted to risk jumping off the Basle-Ostend express or pulling the emergency cord. Eventually, however, I arrived at Brumath, where I asked the station-master-ticket-collector-luggage-porter-etc. if he could tell me the way to the new radio station.

He stared. I had questioned him in my best French, which is quite good. Then I tried my best German, which is even better. He heard the word "radio," and, repeating it

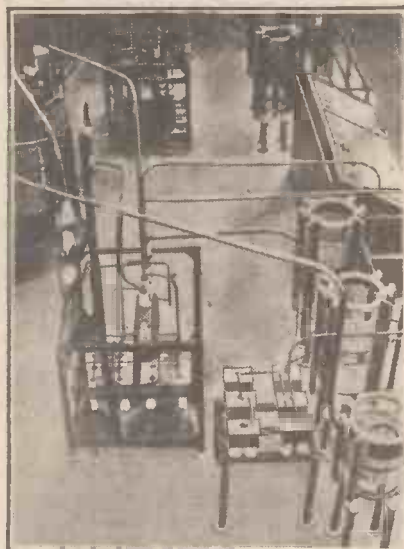
several times, gesticulated a lot and let loose long explanations in the most horrible dialect I have ever heard.

It strongly resembled the original Swiss German, and was quite as guttural and as difficult to understand. I said "Thank you," and, not much the wiser, left the station.

Peculiar Design

Turning round once more, I caught a glimpse of two aerial masts and made a bee-line for them. The bee-line turned out to be a very tortuous road and a walk of some twenty minutes. The station reminds one strongly of some kind of a mosque standing exactly in the centre between two giant aerial masts.

SOME AERIAL TUNER!



The aerial tuning arrangement at Radio-Strasbourg.

The engineer in charge was just back from installing the Algiers station, and let me wander round at will. He was greatly amused at my wish to climb the aerial masts to get a good photo of the building.

After 60 ft. or so I came down again. He told me with a grin that there was a lovely view of Strasbourg and the Rhine from the tops of the masts, but I looked meaningfully at my watch and spoke of my train, and went back to the transmitter.

In the round hall forming the centre of the building the apparatus has been erected, leaving plenty of space for further amplifying stages. I understand that should necessity arise the station can be enlarged to 100 kw. in aerial; that is, five times the present 18-20 kw.

The French firm SFR is responsible for the transmitter. It is very much like any other broadcasting station except for the round hall and the curious arrangement of the last power amplifying stage. The last stage is in the form of a short truncated tower, the cooling pipes for the water forming the centre, the water-cooled valves being grouped around.

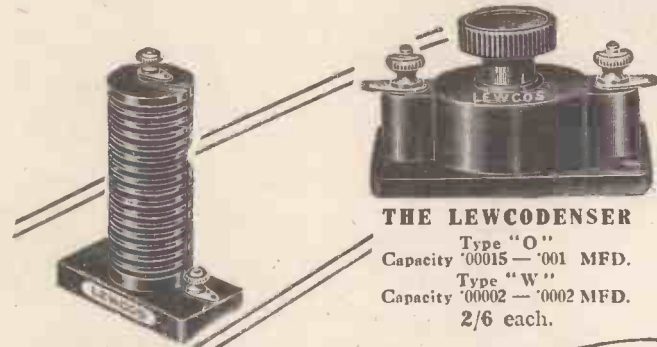
German and French

The aerial masts are 325 ft. in height, and every traveller on the Ostend-Brussels-Basle line knows them well by sight. The announcements and news service are given in both French and German, though a number of French papers have expressed their surprise at a French Post-Office station giving announcements in German as well as French.

But the greater part of the population speak their own patois, which is closer related to German than to French, but which is very difficult to understand.

These LEWCOS^{REGD.} RADIO PRODUCTS—

THE LEWCOS H.F. CHOKE AND THE LEWCODENSER TYPE "O" ARE SPECIFIED FOR THE "EXPLORER" H.F. UNIT DESCRIBED IN THIS ISSUE



THE LEWCOS H.F. CHOKE

is specially constructed to eliminate self-oscillation. Price 7/9
Write for fully descriptive leaflet. Ref. R.33.

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2/6 each.

AND

Many of the most successful receivers in the past depended in a large measure on the superlative qualities of LEWCOS Radio Products.

You will find that the LEWCOS components illustrated on the left will improve your receiver to an astonishing degree.

"Perfection in every detail" is the keynote of the LEWCOS factory where these components are made.

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(600, 25,000, 100,000 OHMS

PRICES: 9D. AND 1/6 EACH)

ARE SPECIFIED FOR THE "VI-KING" PORTABLE DESCRIBED IN THIS ISSUE



LEWCOS RADIO PRODUCTS FOR BETTER RECEPTION

THE LONDON ELECTRIC WIRE COMPANY AND SMITHS LIMITED, CHURCH ROAD, LEYTON, LONDON, E.10

A PERFECT EARTH AT THE TOUCH OF A MATCH!

Cup containing solder and flux. Twist earth wire round here. Then—



—fill this cup with methylated spirit and apply match—that's all.

The new Wearite Earth Tube gives perfect earth contact and is provided with a most ingenious device by which a perfect and lasting soldered joint is obtained just by striking a match! Every listener who has attempt-

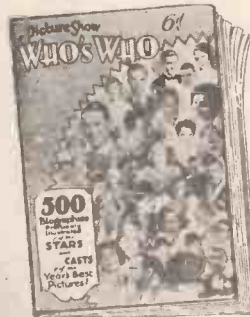
ed to make a good soldered joint out-of-doors will appreciate this special Wearite feature. Made of solid drawn copper of substantial thickness and fitted with cast-iron driving head.

Price, only 3/6

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Electric Radio."
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The Weather Report probably causes more sets to be switched on for the first and second bulletins than any other item in the course of the day. This article tells how and when the bulletins reach the "mike."

By OUR SPECIAL CORRESPONDENT

THANKS to the regular weather reports, those cheery "depressions approaching from the Atlantic" and the "anti-cyclones extending eastwards" seem quite old friends.

Hosts of meteorological terms, involving all kinds of technicalities, are now the property of the man-in-the-street, but what ordinary listeners do not know is how the weather bulletins are compiled, how they reach the microphone, and whether they really are as accurate as they might be.

Too Highbrow?

Some people affirm that the reports are worded in too highbrow a fashion, but the reason for this will be explained. That, despite the official wording, millions do listen to the reports, and rely on them, is certain. In fact, "Punch" even went so far as to base a joke on the result of the broadcast bulletins.

Says one country yokel: "Sky be very bad to-night, Jarge. What do that mean?" Says the other: "Can't tell 'e, 'Erbert. Us'll 'ear it on wireless later."

Perhaps—that's an exaggeration; but even if the country folk don't rely on the B.B.C. weather forecasts, the fisher folk do, and that is the reason for the special shipping forecasts from 5 X X.

Here is the life story of a weather forecast. It commences existence as

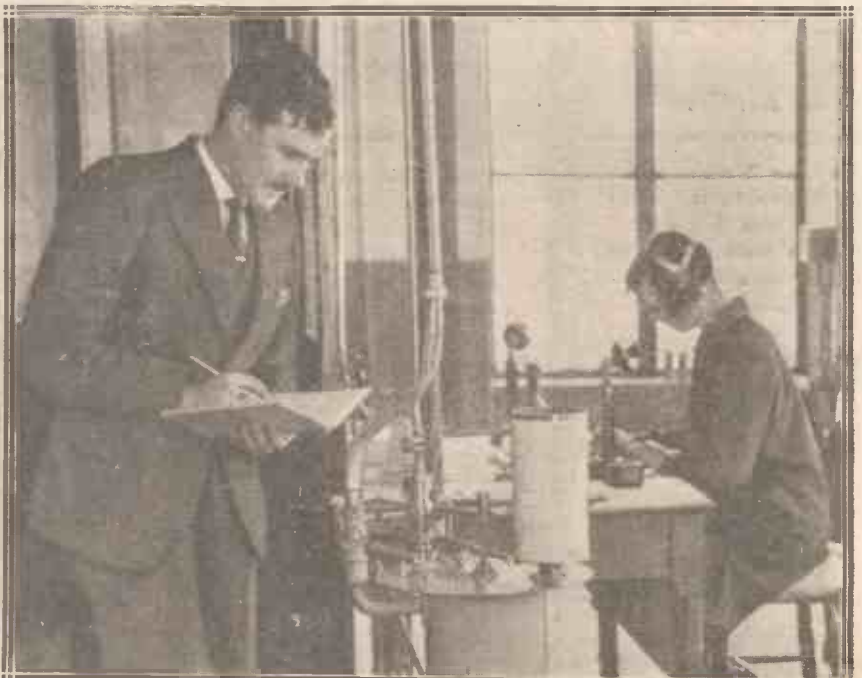
a separate entity in the Air Ministry Meteorological Office.

From aerodromes such as Howden, Yorks, which has a very large meteorological department, and from local meteorological centres all over the country, reports are received by radio and telegraph. If you have a

smattering of Morse code you can often pick up these reports.

They are transmitted from aerodrome and coastal stations as a string of letters and figures in what is known as the "nine" code. As trawlers and passenger boats come into port, and when the mail 'planes land,

MESSAGES OF VITAL IMPORTANCE



A corner of the Meteorological Office in the control tower at Croydon Aerodrome, where weather reports are prepared. These are primarily for the use of pilots negotiating the various air routes.

LITTLE STORIES OF GREAT MOMENTS



"I never saw such an idle boy!"

Little did James Watt's well-meaning aunt guess that if her dreamy nephew had heeded her reproaches, the invention which transformed the entire life of mankind would not have been made! But young Watt would not be deterred, and, after long years devoted to doing one thing and doing it well, he solved at last the riddle of his mother's kettle, and the steam engine became a reality.



It is this same spirit of "doing one thing and doing it well" which has for years been behind all T.C.C. endeavour. That is why T.C.C. have never made anything but Condensers, and that is why T.C.C. Condensers are unmatched—for accuracy and for dependability.

One of the many types is shown here. It is the T.C.C. 1 mfd. type (for maximum working voltage of 1500 D.C. peak value.) Price 10/-



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That we are behind this new motor is sufficient warranty that it marks a step forward in correct design; it is really superfluous to add that Singers' 46 years' experience in the World's largest Small Motor Plant is also backing and positively guaranteeing this proposition. NEW FEATURES INCLUDE: Bakelite Non-Rusting and Non-Warping Turntable; Spring Suspension; One-Hole Fixing; Induction Motor; Guaranteed Humless; Non-Interfering; No Brushes; Worm-Driven with Single-Plate Cork Clutch; Speed Indicator; Automatic Stop and A.C. Snap Switch—IN FACT, DEFINITELY THE BEST MOTOR NOW AVAILABLE. AND WHAT A SURPRISINGLY LOW AND ATTRACTIVE PRICE ONLY 84/- COMPLETE! THE DEMAND IS ENORMOUS.

Special Folder Free on Request by Return. Large Stocks. EXCLUSIVE DISTRIBUTORS IN GREAT BRITAIN:

CLAUDE LYONS LTD.,

70, Oldhall St., LIVERPOOL. LONDON, 40, Buckingham Gate, S.W.1 (Demonstration willingly given at either establishment without obligation.)

Technical Talks

No. 1. Types of Electricity Supply.

When building a mains radio-receiver, the first difficulty that confronts the amateur constructor is the fact that electricity supplies are by no means standardised. These supplies may, however, be simply classified as either alternating current or direct current, and the voltage may be from 100 to 120, or from 200 to 250. The nature of the supply available can, of course, be ascertained by studying the label on the electric-light meter, or by enquiry at the office or showroom of the supply company.

The term "A.C." is a short way of expressing alternating current, i.e., a current which is not continuous in one direction, but alternates or pulsates, the voltage of one terminal continually changing from positive through zero to negative, and back again, alternating with the voltage on the other terminal.

The frequency at which this takes place is not standardised, but may be anything between 25 and 100 times a second, and such a supply connected to any apparatus which changes electrical energy into sound energy produces a steady noise, comparatively low in the musical scale, and generally described as "hum."

The first step towards rendering an A.C. supply suitable for use in wireless sets is known by the technical term "rectification."

Most good radio dealers stock the Westinghouse Metal Rectifiers, and are pleased to give advice as to the most suitable unit for any particular purpose. If any difficulty is met with, however, write to us and we will give you the name of your nearest stockist.

WESTINGHOUSE METAL RECTIFIERS

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

Those Weather Reports—continued

general weather reports are taken from those in charge (often the radio operator) and, together with the local barometer reading, are sent to the Air Ministry "H.Q."

Barometer pressure, strength and direction of wind, and degree of visibility are sent, each in turn being represented by a number from one to nine. There is no particular "secret" about the code, which is used only to save time, and by arrangement with the Ministry anyone in an official position can have an explanation of the "nine" code.

The Weather Map

At the Ministry's meteorological office is a large map on which are marked the areas from which the reports are received, and on this are recorded the movements of the "cyclones" and "anti-cyclones" (not half so fearsome as their names imply, being only areas of low or high pressure) and the various

directions of the wind and degrees of visibility.

Large aerodromes, such as Croydon, have duplicate maps so that pilots who 'phone up to know what it is like "on the other side" (of the Channel) can instantly be told how the weather stands. At regular periods during the day an Air Ministry official makes up a combined bulletin from the separate reports, and that is sent to the many news sources in need of it—the B.B.C. included.

At Savoy Hill there is a news room near one of the studios, and a man here has as his job the reception of news bulletins from Central News, Reuters, and the other agencies, and the weather reports from Adastral House; and he prepares them for the "mike." The weather reports are duplicated, crinkly paper (as you can often hear when the announcer turns over the leaves), and a copy is pinned to each announcer's news bundle.

There is hardly ever a hitch, nor even a late bulletin, and matters are made easier by the fact that the weather reports are given at regular times of the day. Listeners should make a note of these times so that they can be sure of knowing, at any one of five times during the day, what the weather will be like.

Regular Broadcasts

At 10.30 in the morning a forecast for ships is broadcast twice, the second time slowly enough for it to be copied in longhand. This is a fine idea.

Then at 6.15 and 9.0 p.m. general forecasts are given in the National programme. A quarter of an hour later 5 X X gives another shipping forecast, and at 10.15 the Regional programme gives the final forecast for the morrow.

In addition, gale warnings are broadcast with the shipping forecast, and at 1, 4.45 and 6.15 p.m., and on Sundays at 3 p.m., when received from the Meteorological Office. The day's weather is fairly well covered you see.

Here is the weather forecast for the day of writing; just as the announcer has given it:

"An anti-cyclone on the south-west coast is gradually extending north-eastwards, while small secondaries are moving eastwards. Weather will be mainly fair, but cooler, and temperatures will continue high for the time of year. There will be a few local showers, and morning mist or fog will be rather widespread. Local showers will be accompanied by thunder. Further outlook mainly fair and warm over southern districts; slightly unsettled in the north."

No More "Isobars"

You see, for the benefit of people who really depend on the weather, a full and detailed account comes first, while the "further outlook" summary is for the average man who just wants to know what the weather will be like during the next twenty-four hours.

A year or two ago it was decided to drop the long lists of "isobar" and "millibar" figures supplied by the Ministry, at least so far as the general forecasts are concerned; and since last year, at the request of a Jersey listener, the Channel Islands are included in the forecasts.

THE INVISIBLE LINK 'TWTXT SHIP AND SHORE



The "Homer" keeps in touch with land by means of short waves. Here is the short-wave receiver.

460,000



DUBILIER CONDENSERS CHOSEN ON MERIT

A well-known firm of Set manufacturers has recently placed with us a contract for this huge number of Condensers. Competent engineers on their staff subjected samples of our Condensers to rigorous tests together with other makes and Dubilier Condensers came out on top. This manufacturer entrusted his reputation to Dubilier—can there be better testimony to Dubilier quality? Ask for Dubilier and be sure.

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MAGNUM



H.F. CHOKE

As specified for the "Vi-King" Portable, "Plus-Stage" Three and many other modern circuits. Price **7/6**



SPAGHETTI RESISTANCES (WIRE WOUND)

are specified for the "Vi-King" Portable and many other modern circuits.

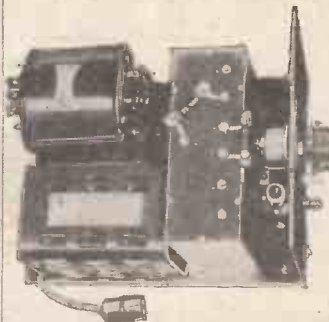
600 ohms to 50,000 ohms **1/6**
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We supply "Wireless Constructor" sets as constructional kits or ready wired and tested. Lists including particulars of the "Band Pass" Four A.C. Mains Set, "Universal" Three, and list of leading short-wave stations, free on request.

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I Built my Heyberd Unit in less than an Hour!



This is the boast of the Heyberd Home Constructor—the only radio man who can achieve such a record. He buys his Kit with all the powerful! hum-free Components already assembled in the handsome Metal Case. Then, with the simplified point-to-point diagram, he wires up rapidly and efficiently. He knows the result will be unbeatable, for his Unit carries a signed

TWO YEARS' GUARANTEE against breakdown—a warrant that only Heyberd can give.

A.C. Kits, from 69/6. D.C. Kits, 52/6
 Send 3d. stamp for List 947 showing how easy it is to build the Mains Unit best suited to your particular Receiver

F. C. HEYBERD & CO., 10, Finsbury St., LONDON, E.C.2

High-Grade RADIO GRAMOPHONE CABINET

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

Figured Oak 25 : 19 : 6
 Figured Walnut or Mahogany 26 : 17 : 6
 Carriage paid

THE ACME OF CRAFTSMANSHIP

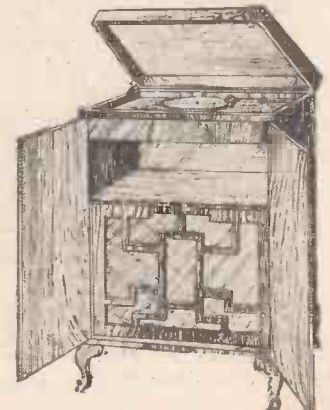
Radio-Gram. Cabinets from £3 : 19 : 6 to £21
 Wireless Cabinets - - - - - from £2

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.





Big Business

There are 605 broadcasting stations in America, and the capital involved is not less than £47,000,000, with an annual pay roll of £44,000,000.

Public investments in radio amount to £300,000,000, with an addition of £40,000,000 for operation and upkeep every year. This total includes £20,000,000 annually for batteries and accumulators, and £12,000,000 a year for valves.

In 1930 America sold 3,828,000 new receivers and 52,000,000 valves. These figures show a decline over those of the year before, when 4,438,000 sets were sold.

The Mühlacker Freak

Arthur Burrows, who made a welcome return to the microphone

recently, is optimistic about ether traffic. In an interview the other day he said:

"As far as the wave-length situation is concerned, I think conditions are working out pretty well. The original principles of the high-power system, as put forward five years ago, have not needed much modification. Where there has been trouble it has been for some exceptional reason. We know for a fact, for instance, that Mühlacker's interference with London is a freak of the ether.

"Giant stations do not cause trouble, except through some such freak."

Maybe; but it's a form of freakishness we're getting a bit sick of in this country. And what will it be like when the new German and Russian giants are in full swing?

Broadcast Friction

It was stated a few days ago, by a doctor, that broadcasting causes friction in thousands of homes when and where there is not entire agreement as to whether the wireless should be on or off.

And the doctor thinks that for brain workers who follow sedentary occupations fresh air and exercise after business hours would be much better than encouraging indolence by listening to the wireless in an arm-chair.

Well, we have heard of theories which seek to prove that radio causes bad weather, injury to birds, etc., etc., but we believe this is the first time the theory has been put forward that radio is bad for the listener's health. It may be for the listener's temper, though.

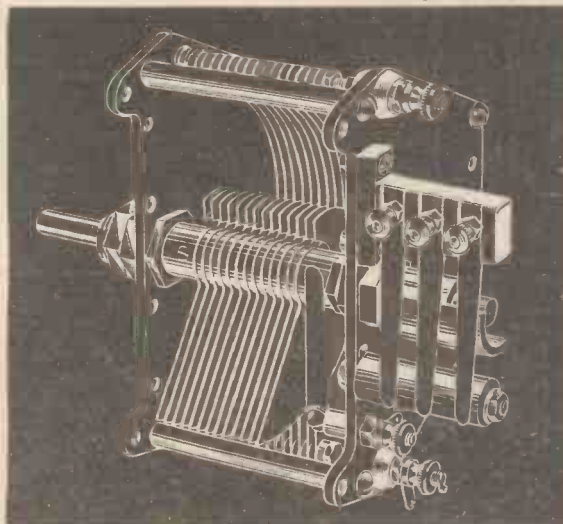
Moorside Mileage

Listeners who have been disappointed in the reception of Moorside Edge will find little consolation in the B.B.C.'s statement that the new station is designed for reception within a radius of 100 miles, and that outside this range good results cannot always be guaranteed.

(Continued on page 106.)

EXTENSER TRIUMPH

SWEEPING SUCCESS OF CYLDON DESIGN



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 Absolute 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.
- 6 Six point insulation suspension.
- 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.

Full technical instructions for adapting the Extenser tuning system to existing receivers are included with all CYLDON EXTENSER CONDENSERS.

Prov. Pat. applied for.

15/- From all dealers in the country. In case of difficulty send direct to the makers

4-in. Bakelite 360° dial 2/- extra
 SYDNEY S. BIRD & SONS LTD. CYLDON WORKS,
 SARNESFIELD ROAD, ENFIELD, MIDDLESEX

cyldon
FIVE YEARS GUARANTEE

LOTUS VALVE HOLDERS



Specified for the "Vi-King" Portable and "Plus-Stage" Three Sets
Described in this issue.

Lotus Valve Holders are constructed to give immediate and lasting connections. Maximum efficiency is assured by the automatically expanding and locking leg sockets. These are fixed on floating platform suspended by four phosphor bronze springs which give sufficient resiliency to absorb all external shocks.

Prices: Miniature Type Sprung Anti-Microphonic Valve Holder, 4-pin (with or without terminals) 1/6
Rigid Type Valve Holder for A.C. Valves 5-pin (with terminals) 1/-
" (without terminals) 9d.
Other Types, from 1/6

From all Wireless Dealers.

Lotus Radio Ltd., Lotus Works, Mill Lane, Liverpool.

THE ETHER IS FULL OF PROGRAMMES ! DO YOU GET THEM? IF NOT "MODERN WIRELESS"

WILL HELP YOU!

This magnificent magazine includes a Special Supplement for the long-distance listener entitled:

"THE WORLD'S PROGRAMMES"

It is profusely illustrated, and is packed with information of utmost value to every set owner. You will

find station-getting easy if you read

THE WORLD'S PROGRAMMES.

Quite a magazine in itself, this wonderful section is, however, only a part of "MODERN WIRELESS," which is undoubtedly the finest radio magazine ever published. It covers every phase of radio and is renowned the world over for its reliability and authenticity.

Get a Copy To-day.

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SPECIFY



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



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Grid Leak. All values, 1 meg-ohm to 5 meg-ohms.

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 104

Reports so far published seem to show that Moorside Edge, throughout the whole of England, jams Langenberg and Prague. But its own programme is so mutilated by fading as not to be worth hearing. "Are we to lose good foreign programmes and in return have a few snatches of one doubtful English one?" asks the "News Chronicle."

"As the Romans Do"

That paper's Radio Correspondent goes on to say: "Listening in Sussex recently I made an interesting contrast: Rome, distant about 900 miles, and with the same rated power as Moorside Edge, roared in with consistently good quality, and only the merest trace of fading. On the other hand, Moorside Edge, 200 miles away, was a little louder at its maximum, but the fading and intermittent distortion were intolerable."

Strong Criticism

"Whatever excuse the B.B.C. may make, Moorside Edge is at present a poor advertisement for British broadcasting. If Italy can make its voice heard all over Europe, why can't Britain? It is a little ironical, too, that Rome happens to be a British-built station."

This is strong criticism. Although we have received a good many grumbling letters from our readers about Moorside Edge, we believe the dissatisfaction with the new Regional is not so widespread as some people think.

Germany's Giants

In Germany to-day, despite the high tax, there are more than 3,500,000 licence-holders. The income of the German Broadcasting Company is now £4,250,000 per annum, the expenditure of which is controlled by the Government, which owns 51 per cent of the shares.

Supposing the B.B.C. had an income like this!

Before the end of this year Germany will have seven stations transmitting with a power of 75 kilowatts, and according to the plans already made known, this number will be increased to twenty by the summer of 1932.

German manufacturers are preparing for these conditions by the mass production of two-valve sets which are being retailed at prices ranging from £2 10s. to £4, according to finish.

The Radio Lesson

It is reported from New York that nearly 25,000 pupils living in widely separated parts of the United States have begun a course of piano lessons by wireless.

Each pupil in this strange radio class has been provided with a key-chart to help find the keys as tunes are broadcast.

Just imagine! Twenty-five thousand potential virtuosos all thumping out the Rachmaninoff Prelude in C sharp at the same time!

Shades of Liszt and Wagner! But piano makers, tuners, and makers of "ear-stoppers" should benefit.

Paying for Plays

News is to hand of an agreement concluded with the Society of Authors, Playwrights and Composers, the B.B.C. having agreed to a scale of fees for certain kinds of performances. In the past it has been the custom to pay at the rate of three guineas for the right of performing each act of a stage play. This meant that a possibly excellent production in only two acts might yield the author only half as much as a four-act play of less merit.

The new arrangement allows for a minimum fee of twelve guineas for a full-length stage play, and a minimum of three guineas for a one-act stage play occupying no more than twelve minutes; or four guineas for one exceeding that time.

That Tick, Tick!

The B.B.C.'s interval signal—variously described as an asthmatic alarm clock ticking in a cigar box, and a death-watch beetle working overtime—seems to be getting more and more on the nerves of listeners. It is certainly a depressing and even morbid method, or device, or whatever it should be called. The old style—pianoforte interludes—was by far the best. Please, B.B.C., tread on the beetle and go back to the old style.

The Hallé Orchestra

Members of the Hallé Concert Society of Manchester allege that the B.B.C. is, by its actions, causing grave injury to the Hallé Orchestra.

One member of the society has stated that he could only conclude that the B.B.C. was trying to disorganise the Hallé Orchestra by taking all its best members and reducing it to the level of a third-rate orchestra.

"There is no society that can live against the resources of the B.B.C., which wants its band of 114 players to be the only first-class band in the country," he said.

(Continued on page 108.)



NEW broadcasting houses are cropping up like mushrooms in Germany. A beginning was made in 1929 by Breslau and Munich, both having been preceded by Budapest and Cologne. And now one after the other three new German broadcasting houses have been opened: Frankfurt, Hamburg, and Berlin.

They Were Makeshifts

Frankfurt very badly needed new premises. The old studios were in a Post Office building and were hardly more than makeshifts. The new house is situated immediately behind the present office building.

It is away from the street, with all its accompanying noise. Great care has been taken to insulate the main studio from the remainder of the building. Thick pads of insulite and other special materials form buttresses which absorb all noise.

The Südwestfunk, as the Frankfurt company is called, operates the Frankfurt and Cassel broadcasting stations, and together with the Südfunk of Stuttgart actually operates the high-power station Mühlacker.

Complete with Cinema

A friendly engineer took charge of me when I paid a visit recently to the Frankfurt broadcasting house, and led me through the comfortable entrance hall into the big broadcasting hall. It measures 66 ft. in length, and 33 ft. in height, and can well be called a hall.

At one end there is a special gallery for visitors, above that a cinema operator's cabin, from where performances can be projected on to a screen in front of the big radio organ.

Some news of a favourite station gleaned on a recent visit.

By Our Special Correspondent

When not in use the screen can be removed.

As one cannot open any windows for airing purposes special air-change apparatus has been fitted. In summer the air is cooled and then passed into the studios, in winter it is first heated up and given the required degree of moisture before being passed in.

Apart from the big studio, a medium one is provided, together with talks studios, a press room, waiting rooms,

orchestra's waiting-room and conductor's office, announcer's office, a kitchen and small restaurant.

Hearing Themselves

Loud speakers are fitted in every studio, and these are connected to the gramophone-room and to a special microphone in the tone-master's cabin, so that during rehearsals he can give orders to the various studios, or can switch on the record of the performance which has just taken place for self-correction by the performers.

Miles and miles of wire have been laid in the new house, and every care has been taken to prevent breakdowns.

WHERE THE POWER COMES FROM



All the amplifiers are fed from accumulators, and over one mile of wire is necessary merely for the battery connections.

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Telephone: Museum 6x16/7.

OUR NEWS BULLETIN

—continued from page 106

“Last year there was an outcry against the B.B.C. taking several of our best players. They were offered such salaries that they could not refuse.”

The Salary Lure

Another member of the society is reported to have said:

“The B.B.C. have big resources, and naturally they want the best, and they are entitled, from their point of view, to get it.

“So far as the actual musician is concerned, they offer higher salaries and greater security than any other society can possibly offer.

“This does not, however, blind us to the effect upon the Hallé Orchestra and other similar orchestras.”

An official of the North Regional station of the B.B.C. at Manchester replied that:

“The B.B.C. are most emphatically not trying to smash the Hallé Orchestra.”

Well, that was obvious. And we must say it strikes us as absurd that any such suggestion should ever have been made.

THE “VI-KING” PORTABLE

—continued from page 65

While on the subject of coils, we may as well deal with the frame-aerial windings, and for these you will require a quarter pound of No. 24 D.S.C. wire, a quarter pound of No. 30 D.S.C. wire, and one set of frame-aerial spacers. (These latter are for the long-wave frame aerial only.)

Fitting the Frame

First remove the fret from the lid of your portable case (it is not necessary to undo any screws in order to remove this fret, as the whole thing comes right out), and behind you will find the skeleton framework upon which the frames are wound. Before you can make a start at the actual windings it will first be necessary to fix the spacers for the long-wave windings.

These are secured by small screws, one to each corner support of the skeleton framework, so that the long-wave winding is the farthest removed from the actual fret.

So that there shall be no possibility of damage to the windings when

they are completed, you may as well fix the wave-change switch which is accommodated on the loud-speaker fret before actually commencing to put the turns on. The position for this switch can be determined from the diagram in which the frame connections are shown.

The frames themselves are really very simple, and if I give you the turn numbers and spacing details that is about all you will require to know. The short-wave winding (the one nearest the loud-speaker fret) consists of 17 turns of the 24 gauge wire, spaced just a trifle more than the thickness of a turn, and the ends are connected up as shown in the diagram.

The Long-Wave Winding

The winding for long waves is carried out in the slotted spacers (you will find there are ten slots, but only eight are used), and it consists in all of 64 turns of the 30 gauge wire, eight turns per slot. It doesn't very much matter whether this winding is carried out in the same direction as the short-wave frame, but it is, of course, important to get the connections to the switch correct.

Before passing on to the construction of the actual set, I may as well make a brief reference to the loud speaker, because this, too, is fitted in the skeleton arrangement which accommodates the frame windings. In making the original set I used one of the Mullard portable cone assemblies, although as a matter of fact there is no real reason why the loud speaker should not be home-constructed if you happen to have a loud-speaker unit not in use.

The only thing is that if you do decide to make your own loud speaker, the cone must be kept shallow, and the unit will have to be placed inside the cone instead of, as is more usual, outside. The method of fixing the speaker to the fret will, of course, depend upon whether you build your own or buy the complete assembly.

Home-Made Speakers

If you decide on the former course, then I'm afraid the question of fixing will have to be left to you, but in any case it should not be a difficult matter. If you buy the complete assembly, all that you will require is a strip of wood, which when the speaker has been screwed on to it can be fixed to the fret by means of ordinary wood screws.

Now for the actual set part of the outfit.

(Continued on page 109.)

THE "VI-KING" PORTABLE

—continued from page 103

The chassis into which the set is built is made entirely from the spare wood supplied with the case. The panel (side A) is the piece of polished three-ply wood, and side B on to which it is secured is one of the strips of $\frac{3}{8}$ -plywood.

The "shelf" on to which three of the valve holders are secured is 12 in. by 2 in., and it should be fixed to side B so that the underside is $\frac{3}{8}$ in. up from the bottom.

Chassis Construction

You will get a better idea of the general arrangement of this chassis if you refer to the various photographs and diagrams, and you will notice, incidentally, that I used two squares of $\frac{3}{8}$ -in. plywood as corner pieces, to obtain greater rigidity between the panel (side A) and side B. I strongly advise you to follow the original in

NEXT MONTH

**A Really Special
"Four"**

WORTH WAITING FOR!

this respect, as otherwise in time the weight of the "panel" components may tend to warp the plywood on to which they are fixed.

When your chassis is made, proceed by lining the underside of the panel and the side of side B on to which the coils, etc., are fixed with copper foil. The top side of the valve "shelf" should also be covered with foil. The side pieces holding the panel to side B should *not* be covered with foil.

Although, at this stage, the holes for the panel components can be drilled, the actual components cannot be secured in position until all the other components are mounted, and as far as possible wired (because otherwise you will find you cannot get your fingers into some of the awkward corners for purposes of wiring up).

An Important Point

When you do reach the stage for fixing the panel components, notice particularly that the foil *must* be cut away where the reaction condenser is fitted, as shown in the principal wiring diagram. If you don't cut away

(Continued on page 110.)

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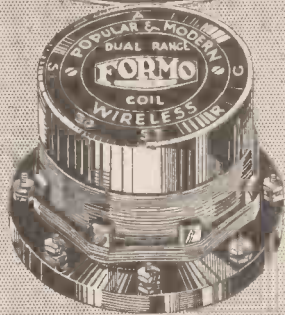
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THE "VI-KING" PORTABLE

—continued from page 109

the foil to clear all the metallic parts of this condenser you will find yourself getting sparks instead of results when the set is switched on for the first time! There are only two further components to fix.

Final Fittings

The first is the L.T. switch, which for convenience is fitted to the lid of the battery compartment. The second is the H.F. bias by-pass condenser, which, as you will see by reference to one of the small diagrams, is secured to one side of the battery compartment.

There are two points to which I think it might be desirable to refer. The first is that it may be necessary to remove the right-angle screen round the first condenser in order to make the connections to this component.

Secondly, since the fixing screws for the various components make contact with the copper foil, it is vitally important to make quite certain that none of the wiring or soldering tags come into contact with the fixing screws. In this connection, perhaps I should add that all wires passing through the foil must also be insulated.

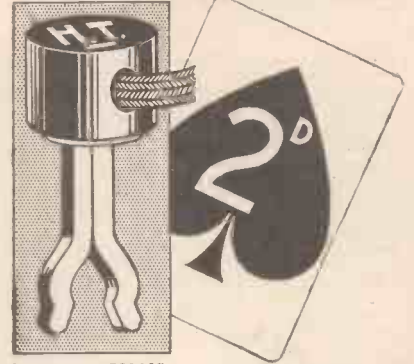
With regard to accessories, the H.T. battery should be of the 100- or, better still, 120-volt portable type, but the size must not be greater than 10in. by 5 in. by 3 in. The L.T. accumulator required is one of the many 2-volt unspillable types now available but again, the question of space must be taken into consideration, and the size must not be greater than 5 in. by 3½ in. by 3½ in.

The H.F. grid bias is a 1½-volt cell, and for the ordinary set bias a standard 9-volt battery will fit in quite nicely.

The valves required, which should be of the 2-volt type, are one S.G. H.F., one ordinary H.F. or special detector type for the detector position, an L.F. valve for the first L.F. stage, and a valve of the small power rating for the output stage.

(Continued on page 111.)

THE ACE OF SPADES



Patent Nos. 329465 and 12425/30.

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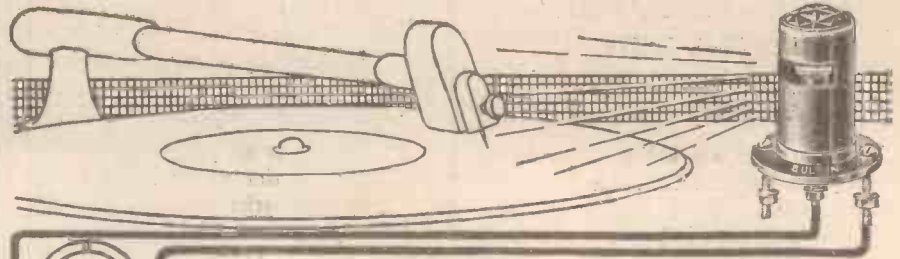
—continued from page 110

As a rough guide to H.T. voltages, you will need about 100 to 120 volts for the S.G. plate, 60 to 80 for the screen (marked S.G.), 60 to 90 for the detector (marked det.), and the highest voltage available for the tapping marked max. Grid bias will depend upon the valves chosen, but if you use 3 to 4½ volts for G.B.—1, and 7½ to 9 volts for G.B.—2, you will not be very far wrong.

Now as to operation. First join the coil tapping clips—in the case of the long-wave coil to tap A, and in the case of the medium-wave to the 20- or 30-turn tap—and place both the wave-change switches in the medium position.

If you now switch the set on and turn the two dials more or less in step with one another, using, if necessary reaction, you should hear the local stations.

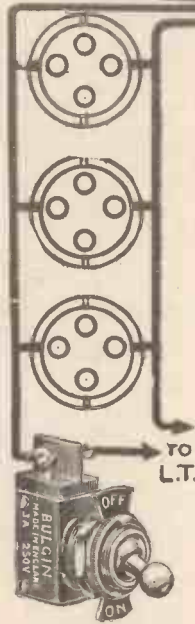
The positions for the coil tapping clips should be determined by experiment.



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THE "EXPLORER" H.F. UNIT

—continued from page 84

The valve you need is an ordinary screened-grid, and must be of the same filament voltage rating as those in use in the present set. If you are using 6-volt valves and you go and put a two-volter in the unit it will "go west" before you can snatch it out of the holder again. I know, I've done it! So be careful.

Connecting Up

Here are the connections to make. First, join up the flex lead that comes through the screen to the terminal on top of the screened-grid valve. Next run leads from the L.T. terminals to the accumulator.

Now join H.T. positive (plate) to 100, 120 or 150 volts, according to the amount of H.T. your pocket permits you to use, and put the other H.T. tapping in a value around 70 or 80 volts. You can use your mains unit

(Continued on page 112.)

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THE "EXPLORER"

H.F. UNIT

—continued from page 111

so long as it will oblige with voltage tappings approximating to those just mentioned.

The next step is to move the aerial and earth connections from the set and take them instead direct to the two terminals marked for them on the new unit. Possibly you would not notice any difference if you left the earth connection on the set, on the other hand you might notice a difference, and that is why the earth terminal is provided on the unit itself.

Position of Unit

All that now remains to be done before you can switch on is to run a lead from the remaining terminal on the unit to the aerial terminal on the receiver. There is just one point that I should really have mentioned before, but it won't be too late now, as I do not suppose you have yet commenced construction.

It is this. For the vertical screen to be effective the unit should be placed close beside the receiver and at its left-hand end. Perhaps you will think this a rather obvious point, but it is not unlikely that someone might place the unit on top of the set, or even underneath it.

The first part of the operation consists of pulling out the L.T. switch. It is not likely that you will forget to do this, but it is quite possible that being used to one switch only you will forget to turn the H.F. unit off as well as the set when you switch off for the night, so be on your guard against this unless you want to test the continuous discharge life of the H.F. batteries, or at least until the L.T. gives out.

The wave-change switch is pulled out for medium waves, and pushed in for long, unless you are using an Extenser, when it simply doesn't exist. The main thing to get used to is keeping the tuning of the unit in step with that of the set, but this will not be difficult, for you will already know the settings of the receiver tuning for a good many stations.

Start with the .001 condenser on the baseboard set at maximum, and only reduce its capacity if you want a little more selectivity. If you have to reduce its capacity, find the best positions for it on both the long and medium waves and then compromise between the two, which is the only compromise about this efficient little unit.

A PRACTICAL MAN'S CORNER

—continued from page 92

to be parts of a circle, in which case a pair of compasses can, of course, be used. If you are fond of experimental work which involves the taking of valve and other graphs the most difficult part of the task comes when you have to draw in a curve to pass through the points corresponding to your readings which you have plotted.

Really Curving Curves

Again, in marking out ornamental frets for loud-speaker baffle-boards, in designing wireless cabinets, and for many other jobs, it is a great advantage to be able to draw curves that really are curves. You will find it of the very greatest assistance if you purchase one or two French curves of the kind shown in Fig. 4.

These are obtainable at any shop

which deals in drawing materials in useful sizes. They cost about nine-pence apiece, cut out of thin wood. They can also be obtained at a rather higher price in transparent celluloid. These friends in need enable you to rule in curves almost as easily as you make straight lines with the help of a foot rule.

Ruling Them In

Fig. 5 gives an example of the way in which a curve can be ruled in. The problem is to draw a smooth curve passing through the four points A, B, C and D. An examination of the positions of the four points gives us a rough idea of what the final shape of the curve will be—a flattish part between A and B, an upward slope bulging a little to the left between B and C, and a flattish curve again between C and D.

Taking the pattern, we move it about until its edge lies upon A and B, giving what is obviously about the right sort of curve. We then rule in lightly the line A, B. Working in the same way, we get the curve DCY, passing through both D and C.

A Huge Success

Then we find a piece with a very shallow curvature which will lie upon B and C. Again we rule in the line lightly. We can see that this part is almost right, but the curve is not quite smooth at B.

We therefore find a more sharply bent portion of the edge of the pattern curve and rule in the portion PQ running through B. It is now a simple business to thicken in with the help of the French curve the regular sweep running from A to D by way of B and C. We are thus able to produce very rapidly a curve that would have been far beyond the powers of our free-hand draughtsmanship.

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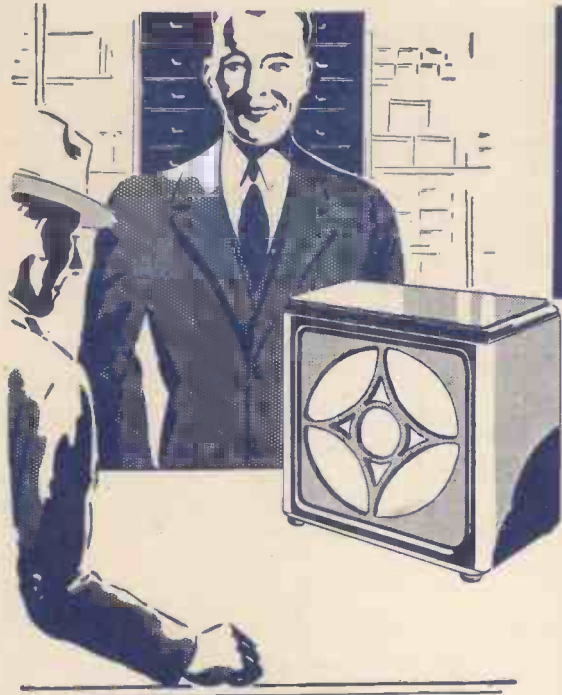
INDEX TO ADVERTISERS

	PAGE
Belling & Lee, Ltd.	110
Benjamin Electric, Ltd.	111
Bird, Sydney S., & Sons, Ltd.	104, 111
British Blue Spot Co., Ltd.	Cover iii
Bulgin, A. F., & Co., Ltd.	111
Burne-Jones & Co., Ltd.	103
Burton, C. F. & H.	112
Carrington Mfg. Co., Ltd.	109
Cossor, A. C., Ltd.	58
Dubilier Condenser Co. (1925), Ltd.	103
Eastick, J. J., & Sons	111

	PAGE
Ferranti, Ltd.	Cover ii
Formo Co.	110
Gilbert, J. C. (Cabinets)	103
Graham Amplion, Ltd.	57
Graham Farish, Ltd.	108
Heyberd, F. C., & Co.	103
Jackson Bros.	109
London Electric Wire Co. & Smiths, Ltd.	99
Lotus Radio, Ltd.	105
Lyons, Claude, Ltd.	101
"Modern Wireless"	105
Paroussi, E.	111
Peto-Scott Co., Ltd.	110
Pickett's Cabinet Works	110
"Picture Show" Who's Who	99
Radio Instruments, Ltd.	Cover iv

	PAGE
Ready Radio	93
Regentone, Ltd.	99
Six-Sixty Radio Co., Ltd.	108
Technological Institute of Gr. Britain	110
Telegraph Condenser Co., Ltd.	101
Varley Products	108
Westinghouse Brake & Saxby Signal Co., Ltd.	101
Whiteley Electrical Radio Co., Ltd.	108
Wright & Weaker, Ltd.	98

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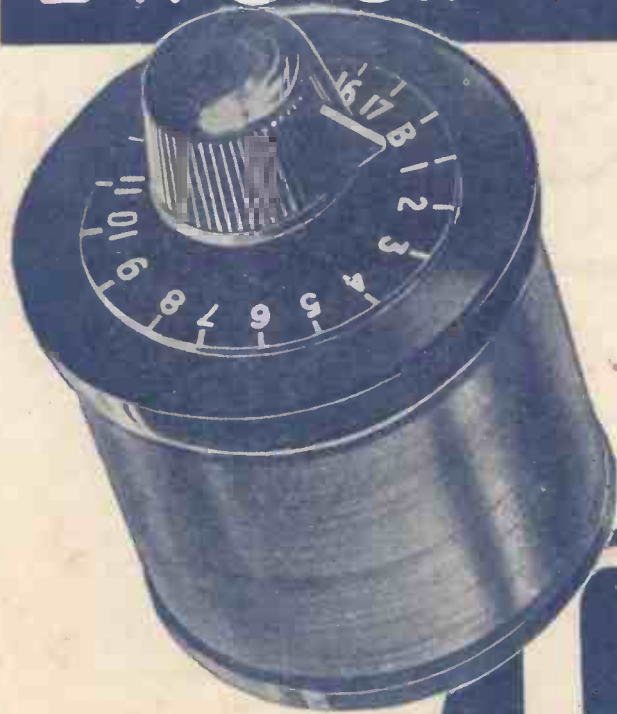
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