

AN ALL-WAVE REINARTZ ONE-VALVER (See Page 909)

Popular Wireless

Every Thursday
PRICE
3d.

No. 273. Vol. XI.

INCORPORATING "WIRELESS"

August 27th, 1927.



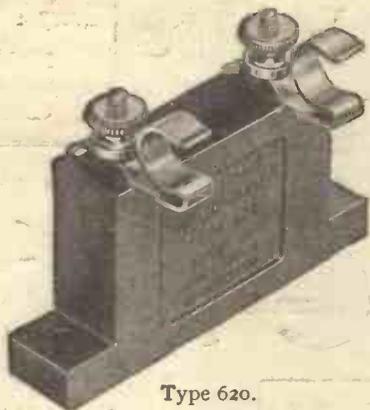
Features in this Issue

**A New "Super" Circuit
Teddy Brown and Broadcasting
5XX and 5GB**

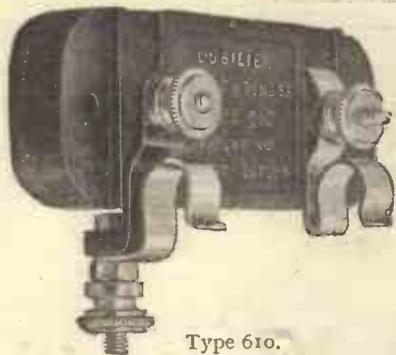
The first of a new series of special articles, constituting an impartial and comprehensive survey of Britain's Broadcast Stations

**One- and Two-Valve Reflex Circuits
Empire Broadcasting**

M. Edouard Belin, the French inventor, is making great progress with his television scheme, and our cover photograph shows his latest transmitting apparatus. Mirrors project the image on to a photo-electric cell in the large cylinder, and this is the vital link in the conversion of light impulses into radio waves.



Type 620.



Type 610.



Type B775.

Dubilier Mansbridge
Condenser.

Prophets—and Losses

THE RADIO EXHIBITION is now less than a month off. What will be the most discussed feature this year? We reserve our own opinions on this, but we do predict that one very remarkable feature will be the evidence of the struggle of the Radio designer to eliminate losses.

Low loss is the war cry of modern radio. To-day we ask two valves to do what we were formerly glad enough to get from four.

We are all agreed that it is better practice to have efficient components than to add stages of amplification to make up for the deficiencies of poor ones.

Losses resulting from poorly designed condensers can be as serious as their source is unsuspected.

That is why we invite you to fit your sets with Dubilier Condensers this season and so take advantage of our seventeen years of experience in the elimination of losses.

Type 620. This is the familiar vertical counterpart of the Type 610, but you will notice that it is now fitted with screw terminals and Dumetohm Clips. The series insulated clip shown attached to the Type 610 can also be fitted to the Type 620.

Type 610. Both 610 and 620 types are made in 21 different standard capacities between 0.00005 and 0.015 microfarads. Between 0.00005 and 0.0005 microfarads they are supplied with Dumetohm Clips. The clips separately cost 3d. per pair. The insulated series clip costs 6d. Types 610 and 620 Condensers cost from 2/6 to 4/6, according to capacity.

Type B775. This is a Mica Condenser of large capacity designed particularly for use in Resistance Capacity amplifiers where high anode potentials are employed. Introduced a few months ago, it has met with extraordinarily favourable reports and a warm reception. In handsome polished red bakelite case, and made in 14 standard capacities from 0.02 to 0.3 microfarads, it sells at from 5/6 to 22/6, according to capacity.

DUBILIER MANSBRIDGE CONDENSER. The inventor of this Condenser, Mr. G. F. Mansbridge, is personally associated with the manufacture of this and no other condenser. To his incomparable experience in the direction of this particular condenser has been added the sum of our seventeen years' experience in the design and manufacture of Radio Condensers.

Dubilier Mansbridge Condensers are made in a great range of capacities from 0.01 microfarads upwards and for a wide variety of test voltages. Prices from 2/6 up.

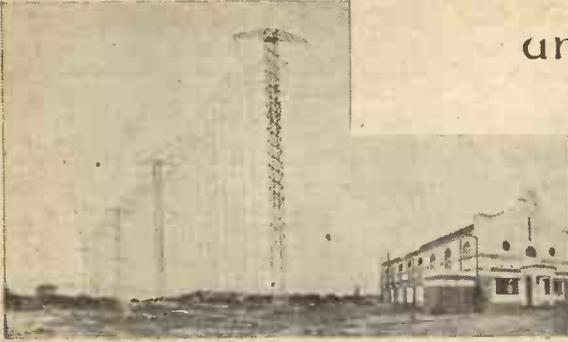
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North Acton, W.3.

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The Marconi Short Wave Beam Stations established in England, in India, in the Dominions and in a score of other countries represent a development in radio telegraphy of immense commercial value. Actually these stations are capable of dealing with telegraphic traffic at speeds far beyond anything hitherto attained. The guaranteed speed is 500 letters per minute, enabling each station to handle about 160,000 words per day in each direction.



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The benefit of this unique experience and the same successful principles are incorporated in every Marconi valve you buy.

Full particulars of the complete series of Marconi 2, 4, and 6 volt Economy Valves sent on request.

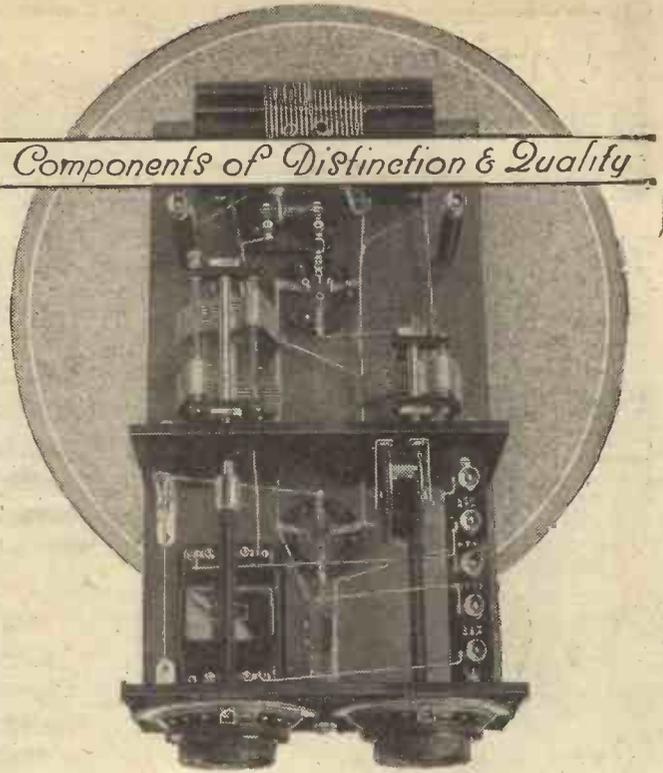
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Made in six sizes.
7/-



"POPULAR"
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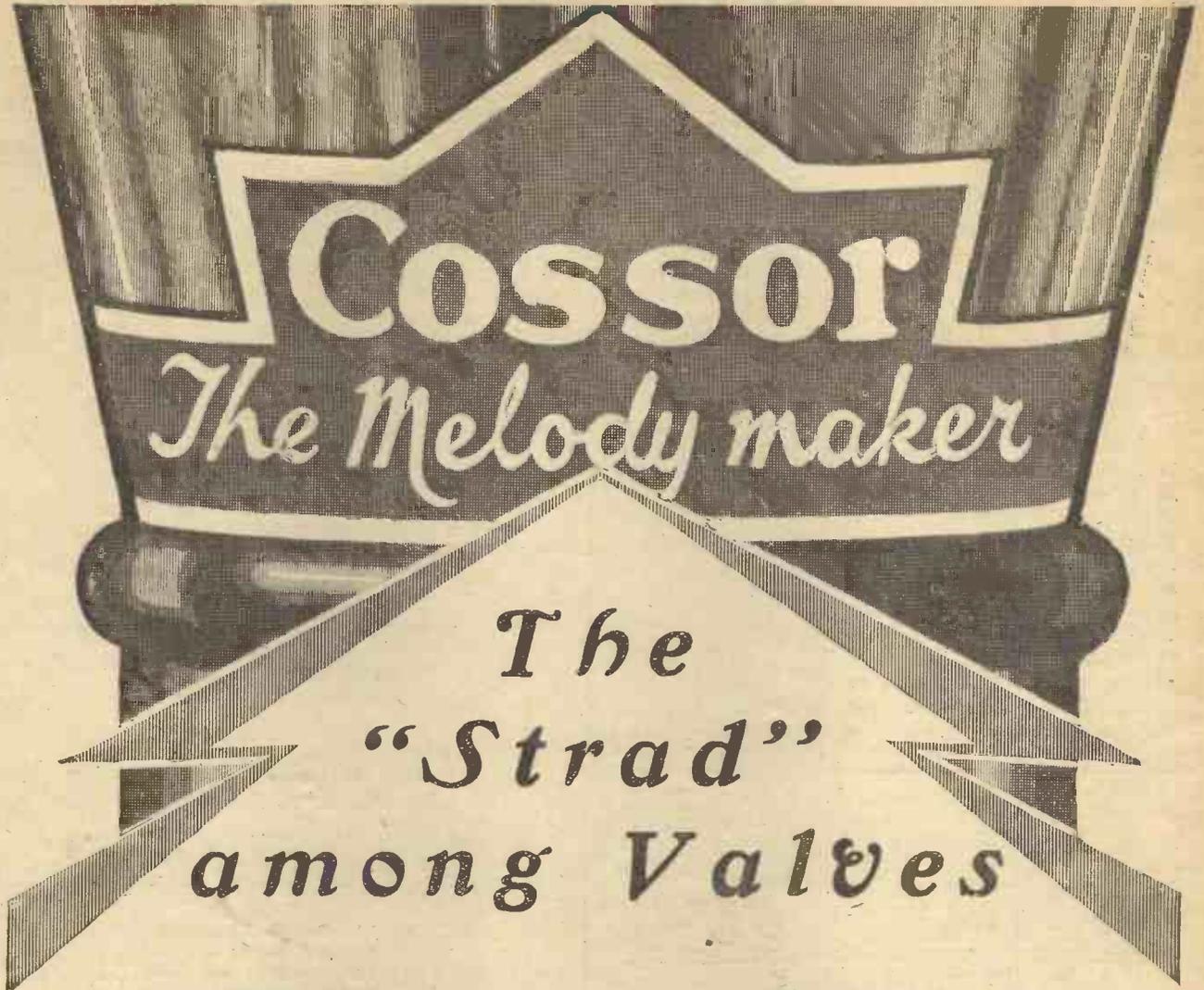
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BOWYER-LOWE CO., LTD., LETCHWORTH



504



DON'T spoil the ship for a ha'porth of tar. Your Wireless set has cost you money. It is foolish economy to use any but the best valves. Choose your valves carefully—for upon them rests the responsibility of providing you with good music. Choose Cossor Valves—and your Set will give the most faithful reproduction. Superb tone, with all the richness and sweetness of the original—majestic, full-throated volume with absolute freedom from microphonic noises—these essential features of the Cossor valve have won for it the title "The Melody Maker." The music lover accepts it as the Stradivarius among valves—no higher praise can be accorded.

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Popular Wireless



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 Technical Editor: G. V. DOWDING, Grad.I.E.E.
 Assistant Technical Editors: K. D. ROGERS, P. R. BIRD,
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RADIO NOTES AND NEWS.

Crystals, Farewell!—Empire Broadcasting—Ariel's Selections—Errors of Judgment—
 "Beachcomber's" Programme—Good-Bye, Langenberg.

A Sighting Shot.

IT seems to be a growing custom amongst ministers to take extended tours abroad at the public expense, ostensibly for the purpose of getting information which could be sent home by the representatives which are maintained abroad, also at the country's cost. The War Minister is off to India and the Colonial Secretary to Africa, but what about the P.M.G.? Why does he not take a trip to America, and find out how to treat wireless amateurs?

Crystals, Farewell!

THE welcome reductions in valve prices is undoubtedly another nail in the coffin of old man Crystal and thus a blow at the ancient and honourable order of the Knights of the Cat's-whisker. Still, it is better so, for not so many years ago a man had to pay close on £60 for a three-valve set, with equipment. But I shall always entertain kindly memories of carborundum, for it relieved us of the reliable but tame magnetic detector.

Multum in Parvo.

NEWS from Berlin is to the effect that by 1930 there is to be completed for that city a wireless tower 2,160 feet high; that is about twice as high as the Eiffel Tower, and I hope it won't provoke thoughts of a *revanche* in the minds of the French. Half-way up this new tower is to be a restaurant on a slowly-revolving floor, whilst there is to be a light at the top, capable of being seen a 100 miles away. All very fine, but I have no faith in slowly-revolving lunches.

Empire Broadcasting.

THE news that Mr. Marcuse has got the word "Go" out of the P.O. arrives as I write. Meanwhile, there are stories about his wonderful "secret" studio, and so forth. There is no such hanky-panky about Mr. Marcuse, and we can rely upon his success—if only he is left alone, by which I mean, if he is not tripped up with red-tape and prohibitions. He will hearten up the boys of the Empire—and you just-hear them shout when he does.

Could It Be Done?

EDGAR WALLACE, author, is advocating the equipment of every other seat in the theatres with a small receiver and head-telephones of those who are a little hard of hearing. A grand idea—but man! just think of the repairs! The instruments would be used as ashtrays, hatpegs, chocolate-shelves, emergency seats, and goodness knows what not. 'Twill be a bold manager that first adopts the idea.

on 1,070 metres. These lectures took place during the International Congress of the Order of the Star in the East. "Amongst those present," Mr. J. Krishnamurti and Mr. C. Jinarajadasa!

How's This?

MR. A. S. INNES, Radio FOA 4 E and FOA 3 Y, of Johannesburg, recently established the first day-time radio communication between South Africa and North America. Using a V.O.250

Mullard transmitting valve, he startled the ether and was at once answered by 6AZS of California. I have not had news of any long-distance jobs by home "P.W. fans" for some time. Come on!

The H.T. Problem.

DEALING with this question—and it is one which in innumerable instances cannot be solved by recourse to electric lighting mains—a reader tells me that he has had two Columbia 60 volts H.T. dry batteries in constant use on sets ranging from three to

six valves for the past twenty months and they are still adequate to his needs, one of them now reading 55 volts. That sounds pretty good. Nevertheless, *my* choice would be the mains wherever possible or accumulators for the really big stuff.

"Ariel's" Selections.

AUGUST 25th, Mabel Constanduros, from the Aberdeen Station, in a comic opera burlesque. August 27th, A. J. Alan, in two of his stories. August 31st, broadcast of Sir Arthur Keith's opening speech at the annual meeting of the British Association in Leeds.

(Continued on next page.)



Clay Smith and Lee White are very popular with 3L.O, the Melbourne station's listeners, and are here seen at the microphone during one of their radio turns. Photo: C. J. Fraser, Melbourne.

Amateur Transmitting Note.

MR. H. HARDING, Treve Radio Service, Ebbw Vale, Mon., asks us to publish his call signal, 2HH. No doubt anyone who hears and recognises his signals will give him a report, but I wish he had told us his favourite kilocycle or wavelength.

Theosophical Broadcasting.

I WONDER if any of our readers picked up early in August some lectures which caused them mild wonder. On August 7th, at 2.30 (Dutch Summer Time), and on August 10th, at the same hour, lectures on theosophy were broadcast from Hilversum

NOTES AND NEWS.

(Continued from previous page.)

An Amateur Enquires.

F. C. S. (26 Sellincourt Road, Tooting, London, S.W.17) wishes to know the identity of these short-wave telephony stations:—British: 5 Y S, 2 G F, and 6 A S. (This is probably C. S. Chadfield, 13 Albert Street, Melton Mowbray), 6 F N, 6 N F. Dutch: North A X. Spanish: E A R 5. All received on July 31st, and August 2. Replies direct to querist, please.

Errors of Judgment.

I WAS amused to read recently in the "Saturday Review" the attempts of one to write "smartly" upon the supposed decline of interest in broadcasting. The published licence figures are sufficient answer. But I cannot refrain from calling attention to that writer's opinions; firstly, that radio will be saved from oblivion because "any programme is cheap at a third of a penny"; and secondly, that the "abstainers are becoming a multitude." As to the first, nothing is cheap which is as bad as he says; as to the second, our superior friend should read a few trade reports and judge whether the "abstainers" are not more than balanced by the new disciples.

And Here Are the Figures.

THE growth in the number of "listeners-in" is shown by the fact that on June 30th the number of wireless licences issued reached a total of 2,234,988, exclusive of the 4,403 free licences granted to the blind.

There were on October 31st, 1922, a week before the British Broadcasting Company began broadcasting, 10,371 holders of the old-type experimental licence, the only one then issued. This number grew by leaps and bounds, and the million mark was reached in November, 1924. The total reached 1,500,000 in October, 1925, and 2,000,000 six months later.

The Postmaster-General has stated that he has based the estimate of £805,000 to be paid to the British Broadcasting Corporation from licence fees this year, on an estimated increase of 200,000 in the number of licences issued between now and March, 1928.

A Humble Suggestion.

3 LO Melbourne, is offering a prize for a one-act play. In this matter of the adaptation of the dramatic art to the conditions of broadcasting there is still much to be done, despite the successful items, such as "The White Chateau," and "R.U.R.," already presented by the B.B.C. Would it not be in the interest of all concerned if the B.B.C. were to publish the rudiments of the new technique required, as indicated by its experience, for the guidance of recognised writers—and others?

A Distinct Hiatus.

ONE good thing—to mention but one for the moment—which has always been "conspicuous for its absence" from B.B.C. programmes, is the universally popular "Gilbert and Sullivan." If only the difficulties which, we are given to believe, stand between the listening public and its desire to hear those entrancing

operas could be removed, broadcasting would take a great bound forward. After all, one supposes that the trouble is mainly a matter of hard cash. Well—?

"Ariel's" Exclusive News.

IT is reported, anonymously, that the Republics of Andorra and Monaco are looking for a third republic to combine with them in a bit of community singing. Three sopranos and a falsetto are still required. They propose to go fifty-fifty in a new microphone if the third republic can spare an announcer. Monaco is budgetting for throat lozenges, and its taxes have accordingly got to stretch to another seven francs.

New Time Signals.

THE time signals formerly emitted from Arlington were on 2678.57 metres at noon and 10.0 p.m. (American time). As from August 1st, they are transmitted at the same times, but on wave-lengths of 74.47 metres, 37.36 metres, and 24.9 metres. This is an instance of how the kilocycle ramp muddles even Yankee editors, for I had to work these figures out from kilocycles and the paragraph in the New York journal in which I found the kilocycles was headed, "New Time Signals on High Wave-lengths." High-frequencies, of course. It's a warning to the B.B.C.

British Legion Result.

THE Hon. Secretary of the Birmingham No. 1 Branch of the British Legion announces that 3,223 was the lucky number in the "R.C. Threesome" Competition. The holder should communicate with J. Jones, Esq., 4, Bartholomew Street, Birmingham.

SHORT WAVES.

"Women are again going in for ear piercing," we read. We've certainly noticed it over the radio.

SAFETY FIRST.

Pal: "Say, Hal, did you get the fight on the radio last night?"

Hal: "I should say not; think I want my wife to get more points on fighting?"—
"Radio Program Weekly."

"As for those who design the instruments . . . there you'll see them pouring over their work."—"The Brown Budget."
One of those heavily damped sets, no doubt.

APOLOGIES TO LONGFELLOW—

I sang a song into the air
It fell to earth most everywhere,
For I sang it, quite modern like,
Right in front of a radio mike.

—"Radio News."

"If you've spotted the fellow who stole your radio set, why don't you get it back?"
"I'm waiting for him to fit new valves."

A number of new yodelling songs were broadcast recently. It is feared that many milkmen listened-in intently.—"London Opinion."

"Wireless talks for sea travellers," runs a headline in the "Western Morning News and Mercury."

Haven't they enough to swallow already?

The latest fad in radio,
Is not around the world to go—
Imaginary visits here and there.
It's to sit with eyes that glisten
In a hypnotised condition,
While funny sounds are wafted through the air.

Hark to a gentle April rain;
A Porto Rico hurricane;
The drop of stocks in Wall Street's gloomy chasm;
If other sounds you've never heard,
Just ask for them—the more absurd
The surer is it that your station has 'em.

A Word in Your Ear.

THE August "Modern Wireless" is better than ever, but still costs only one shilling. It contains a number of fine constructional articles, including one dealing with a wave-meter and another dealing with a valve voltmeter. There are fascinating articles on the Grimsby "Beam," the Loewe valve, picture broadcasting and other up-to-date topics. I do not think I ever saw such solid money's-worth packed in a monthly—as they seem to get in "M.W."

"Beachcomber's" Programme.

(6 A.I. 84751 kc, 394,286842 m.)

- 7.30 Last year's weather.
- 8.15 Time from the Town Hall clock in Ealing.
- 8.30 Next year's weather.
- 8.45 Pianoforte rendition of "O Sole Mio," by Miss Utta Wretch.
- 9.0 Crochet hints (Mrs. Wretch).
- 9.30 How lamp-wicks are made.
- 9.45 Talk on Hygiene and Efficiency (Mrs. Wretch).
- 10.30 More Hygiene and Efficiency (Mrs. Wretch).
- 10.50 Reading from Mr. Milk's Poems, by Mr. Milk.
- 11.30 Children's Hour. Readings from Rabelais, by Mr. A. A. Milne.
- 12.30 Medieval Drinking Songs, by the entire staff of "Punch," a funny newspaper.
- 1.0 Epigrams for diners-out.
- 1.30 Pianoforte rendition of Rachmaninoff's Prelude, by Miss Utta Wretch.
- 1.45 Rutland Folk Songs.
- 2.30 Time from an alarm clock at Sydenham.
- 2.35 Postage Stamps (Mrs. Wretch).
- 3.30 Chess Criticism (Bogomizlyi).
- 4.30 The neigh of a horse from Copenhagen.
- 4.50 Night-club Hour. Nigger noises from the "Mixed Vermouth."
- 5.0 Four plays of Ibsen in Welsh.
- 7.30 "Good-night and good-morning, everybody" (Uncle Beastly speaking).

This programme is guaranteed to provide twelve continuous hours of undiluted fun and merriment. It is a great advance on old methods of entertainment.

—"BEACHCOMBER," in "The Daily Express."

Good-bye, Langenberg!

JUST as this page of notes is about to be sent down to the tender mercies of the printers—a band of heroes who regularly go into fits of laughter when they receive my "copy" to set into type—(It's his bad writing—ED.)—I hear from my friend Mr. Percy W. Harris concerning reception conditions for Daventry Junior. P. W. H. tells me he tuned in 5 G B at Wimbledon, and at the same time Langenberg was "on the air." The result? Well, P. W. H. says he was using a very selective receiver—and only just managed to stop 5 G B signals from swamping Langenberg's!

In his opinion—and it's one I'd bank on—P. W. H. reckons 99 listeners out of every 100 will find Langenberg washed out by 5 G B. Not very cheerful, is it?

5XX and 5GB

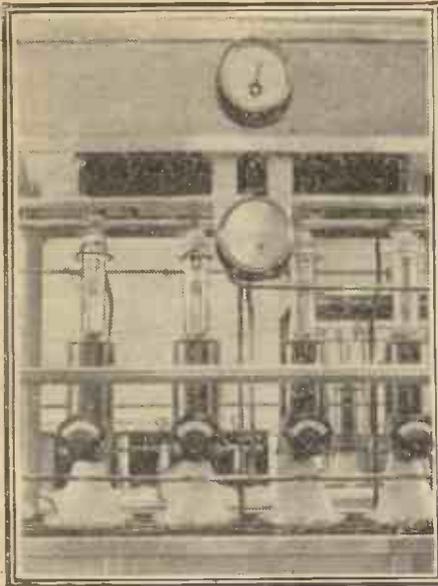
By G. V. DOWDING, Grad. I.E.E.
(Technical Editor).

additionally, it contains a full-size billiard-table.

Naturally I asked Mr. Hotine whether the B.B.C. people had ever considered the idea of broadcasting a running commentary on a game of snooker played by the Daventry engineers during their hours of relaxation!

We then went along to the main transmitter hall. This is a huge affair, and it is very hard to describe in words one's first impressions when entering it. Large windows and ceiling lights throw every nook and cranny into view, while the giant pieces of radio gear are so excellently spaced and arranged that the whole might well be an exhibition of high-power wireless transmitting apparatus. The splashing of the

Mr. Hotine, one can plainly see, is extremely proud of his station, and he appears to take a real pleasure in showing one around and explaining the various processes of radio involved. But I must admit that I gained the impression that there is a considerable amount of scientific "window dressing" at Daventry. The plant seems almost unnecessarily large and needless precautions appear to have been taken in respect of its disposition and assembly for the power that is handled. Nevertheless, the idea of having a Titan to do the work of but a big man is a good one—to endeavour to reverse this order would be fatal. There are some who say that the B.B.C. people play too much on the chords of "margins



The magnifier unit, one of the many panels in the main hall at 5 X X.

ONE can see the masts of 5 X X at a very great distance, for they are erected on a hill that rises to some 500 or so feet above sea level. Shortly after leaving Towcester one catches a glimpse of them delicately threading themselves into the sky, but after one has wearily trudged up the hill towards the station buildings, one discovers that the delicacy of the masts is a quality only lent them by distance. Actually they are solid great erections of steel capable for all their 800 or so feet of height, of standing unperturbed amidst the wildest of winter storms.

The Daventry station is about two miles away from the town, and it stands alone; isolated and apart, yet a monument to the great fellowship of radio broadcasting. And as I neared the main building a couple of Shakespeare's lines flashed to my mind—"Hamlet," I think it is.

"A station like the herald Mercury
New lighted on a heaven-kissed hill."

And I thought them very applicable to 5 GB whose masts I could see nestling behind those of 5 X X.

Mr. Leslie Hotine, the engineer-in-charge of 5XX, met me at the door. He was smoking a pipe, and during my visit I had it whispered to me that the poor chap had been driven away from the cigarettes he loved by continual friendly raids on his stocks of these by the voracious 5 X X staff.

A Unique Studio.

"You find it pretty lonely up here, don't you?" I asked Mr. Hotine, after we made ourselves known to each other.

"Yes, we do, but there is plenty of work to occupy our time," he replied. "And as you will see, we have a 'table' upon which we can spend a few of our spare moments."

As he concluded, he opened the first door on the left, as one enters the main building, and invited me to enter the room. This is the studio of the Daventry station. And, surely, it must be the most unique broadcasting studio in the world, for it has only been used once, and that for the broadcast opening ceremony of the station. It is a nice, well-lighted little studio, and is still, I should imagine, in perfect working order, for it is fitted with a regulation microphone and a piano and gramophone. But,

SPECIAL NOTICE

For the first time a tour of all the main B.B.C. stations has been carried out on a special investigatory basis, and "5 X X and 5 GB" forms the first of a new series of illustrated articles in which Mr. Dowding makes an impartial and complete survey of Britain's Broadcasters. In succeeding weeks the following stations are dealt with in "P.W.," and you should make sure of obtaining your copies by placing an order right away with your newsagent.

Article on B.B.C. Station	Week Ending	Article on B.B.C. Station	Week Ending
BOURNEMOUTH	September 3rd.	NEWCASTLE	October 1st.
CARDIFF	September 10th.	GLASGOW	October 8th.
BIRMINGHAM	September 17th.	ABERDEEN	October 15th.
MANCHESTER	September 24th.	BELFAST	October 22nd.
	LONDON (2 L O)		October 29th.

Don't miss these candid, informative, and interesting articles. Order your copies of the above "P.W.'s" NOW.

water used for cooling the valves reminds one of fountains and aquariums and sounds beautifully cooling. But upon close examination one discovers that the cascading water is gently steaming and cannot be many tens of degrees away from boiling point.

of safety" and that they sacrifice too much in so doing, but I am of the opinion that their policy in this respect is one that deserves support and commendation. And anyone who has listened to some of the foreigners who endeavour to pour out etheric gallons
(Continued on next page.)



A general view of some of the transmitter units at 5 X X. To the right are the modulating panels, the oscillating panels being in the background.

5 X X AND 5 G B.

(Continued from previous page.)

from pint size transmitters will unreservedly be with me in this.

Whilst we were wandering round the huge panels and units, I found it interesting to compare the components employed with those used in ordinary radio receiving sets, for both have in many cases identical elec-



The studio at 5 X X. This has only been used once, and that on the occasion of the opening ceremony of the station.

trical properties and purposes, and the only differences are in sizes and capabilities of handling energy.

There was a grid leak and condenser, for instance, the former large enough to make a garden roller, but one could use it in a receiver, although the normal receiver grid leak is not much bigger than a match-stick!

"That is the grid condenser," said Mr. Hotine, pointing to an object bigger than an average umbrella-stand. "You will remember that some time ago a mouse got between the bottom plate of this and the floor, and that by causing a short circuit was instrumental in putting us out of action for a few minutes."

Hew 5 X X "Tunes-In."

"An excellent mouse-trap, but I suppose you have taken precautions against similar occurrences?"

"Yes," replied Mr. Hotine. "Merely by reversing the two wires which are connected to the condenser we have made it quite 'mouse-proof'!"

Standing by the aerial tuner, which is but a large edition of an ordinary tuner assembly of coils and variometers, Daventry's chief explained the novel method adopted of tuning 5 X X's wave. In the first place, it appears, the transmitter is switched on and a "carrier" is sent out of a frequency as near as can be guessed to the one desired. The B.B.C. receiving station at Keston picks up this "carrier" wave, combines it with a wave emitted by precision apparatus of exactly the correct frequency, and sends back the two together to Daventry. These two frequencies are conveyed by ordinary telephone receivers

to the engineer, who, standing by the aerial tuner at 5 X X, varies this instrument until the two frequencies exactly coincide.

The great advantages of this method are that it is both speedy and extremely simple, and that wonderful accuracy results.

In the great "machine-room," which is immediately adjacent to the main hall, there is a gigantic switchboard and a whole string of generators. I noticed with interest that enough electricity was entering the station from the mains to drive a couple of tramcars, and that the power actually

fed into the aerial was but a tenth or so of this — comparatively speaking merely motor-bike power, in fact! But, as Mr. Hotine pointed out, such "waste," if it can be so called, is inevitable, and that, in a small way, the case is much worse with an ordinary valve receiving set.

As we again entered the main transmitting hall, I noticed that a number of engineers were emerging from obscure sources and were taking up their stations at various points. One man in particular began carefully to rearrange an ashtray on a large control table, in a manner that suggested that something of a very business-like nature was about to occur! And sure enough, very soon it did. Red lights began to flicker up at various points, the subdued roar of mighty generators broke the silence, and the familiar "tuning note" resounded through the whole building.

Daventry Town's "Local Station."

"Transmission to schools," succinctly explained Mr. Hotine.

"They'll be able to pick you up easily enough in Daventry town, anyway," I remarked.

"The villagers can listen to us on anything down there," chuckled the engineer-in-charge. "Lumps of sugar and bent pins, bits of coal and nails—Daventry sets in Daventry do not have to be ultra-sensitive!"

Mr. Macharty, who was at that time in charge of the 5 G B transmitter, then joined us and we sojourned to examine this latest product of the B.B.C.

The 5 G B Transmitter.

5 G B is housed in a separate building some two or three hundred yards from the main Daventry buildings, and for all its power, does not appear to be much larger in size than one of the standard B.B.C. transmitters. Mr. Macharty very carefully described the whole outfit to me, and I was impressed both by his enthusiasm and the care that has been taken in the assembly of the transmitter to ensure success.

"You see," he explained, concluding his technical description, "it is very much like a receiver working backwards. We have neutralised it and it is beautifully stable. And at every point there is an enormous margin of safety. The people who have criticised us for being a long time on the task fail to realise that before we can pass such an installation as 'O.K.' we must be certain that it is capable of giving an absolutely reliable service. As you will see, this is only an experimental 'hook-up,' but it is to form a model for the permanent set and must be absolutely perfect before being duplicated."

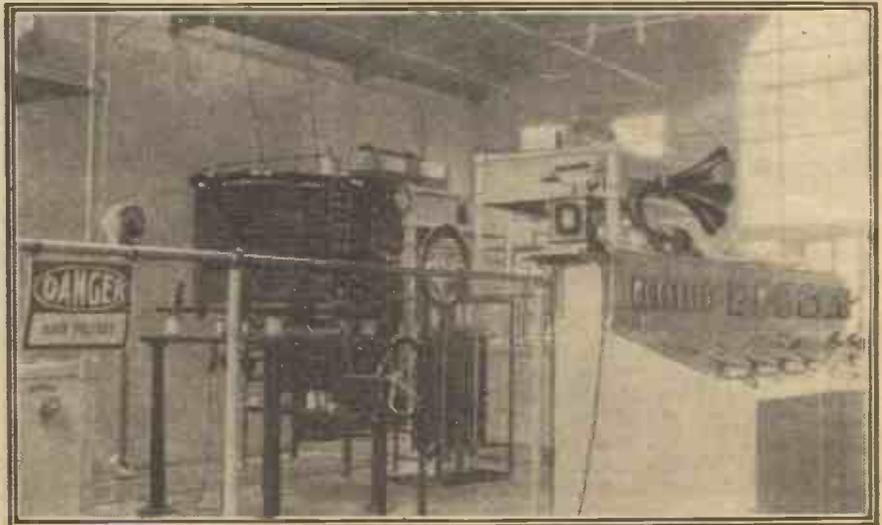
"How about purity?" I asked. Mr. Macharty led me into a small room.

"Here," he said, "is a unique instrument. With this we can produce almost perfect sine waves of any frequency from ten to ten thousand cycles. With this instrument I have taken 5 G B's 'curve,' and it is almost flat."

"Then you consider, I suppose, that your transmission is far too good for the average receiver, and that such will be quite unable to do it justice?"

"For the average receiver, yes, but at the same time I think the listening public is rapidly developing, and that more and more sets are daily being put into commission which are capable of really good performances."

(Continued on next page.)



This photograph shows the main control table at 5 X X (on the right), and the closed circuit tuner. Note [the latter's "motor-car wheel" controls.

5 X X AND 5 G B.

(Continued from previous page.)

"Do you people consider that you are keeping pace with other countries in respect of progress in the technique of radio-telephony?" I addressed the question jointly to both engineers. It was Mr. Macharty who answered.

"I do not think other countries can teach us much," he said. "We read all

'Yanks' are picked up in this country in their dozens, and K D K A is almost as well-known in Great Britain as it is in its home country. You B.B.C. people even make a feature of relaying such stations, but other countries have not the opportunity of relaying one of ours. Surely," I concluded, "it is time the B.B.C. considered the question of national radio 'window dressing.'"

But, as I anticipated, neither of the engineers would make any statements on this controversial subject although I continued to drive my point home!

"By the way," I said, to change the subject, "have either of you people ever had any nasty shocks from your gear?"

Mr. Hotine burst out laughing.

"One day 'Mac' here got hooked up to two thousand volts—I expect that he found that a nasty shock!"

"Yes," retorted that worthy aggrievedly, "I did, and it so paralysed me that I could not let go. And would you believe it, the other fellows just roared with laughter and wouldn't stretch out a hand to help me!"

Are They "Keeping Pace"?

I commiserated with the unfortunate engineer and prepared to take my departure. And as I wended my way down the hill through the sloping fields I asked myself the following question:

"The B.B.C. engineers are for the most part young and enthusiastic, they are capable, or appear to be, and they have ideals and are loyal to their service, but are they really 'keeping pace' or are they merely maintenance engineers?" You see, paradoxical though it may sound, one cannot keep pace with progress unless one continually leaps ahead. It is useless to rely on the other fellow all the time, for in that direction lies stagnation or even deterioration. Radio is still capable of considerable development—forgive me if I add that it is "still in its infancy"—and if we are going to keep our end up I am convinced our broadcasters must expand their so-called "development" department.

I will admit that the B.B.C. engineering staff has done wonderful things and is doing wonderful things, but they could do even greater work were they to apply themselves as skilfully to development as they do to maintenance. I do not think that it is their own fault, my belief is that they are severely handicapped for funds. But if the B.B.C. continues to pare the technical exchequer in favour of the programme side, it is my opinion that it will defeat its own ends. Theirs is admittedly a most

difficult position and they have few precedents to guide them, but from a national point of view, it is vital that our broadcasters should do some more development work than they are doing.

And then he went on to discuss the latest radio activities on the Continent, and his own much-boosted K D K A's, 2 X A F's, and what-not. At that time 5 G B was merely a rumour, so that I could not bring this station into the argument, although even if I could have done so, it yet remains to be seen whether or not this would have been advisable!

However, in conclusion, I must add that 5 X X and 5 G B appear to me to be two first-class examples of modern radio transmitting practice. But while they may



Another photograph taken in the main transmitter hall at 5 X X.

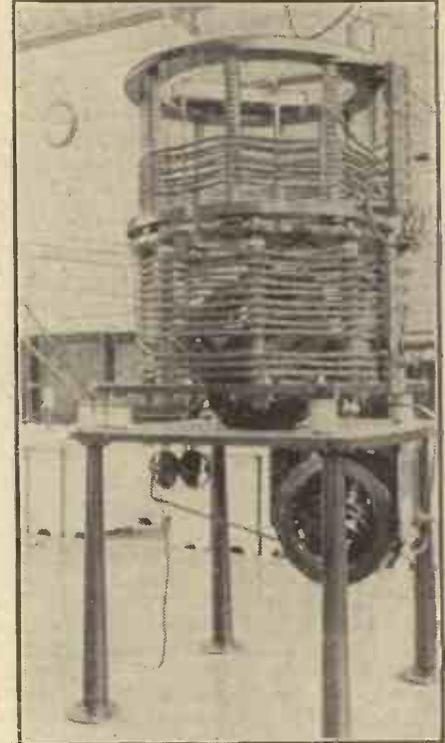
the scientific reports issued by America and other countries concerning their latest installations, and I really do think we are taking the lead. 5 G B, for instance, is everything we anticipated and more, and look at 2 L O! There can be but few stations in the world to equal it, especially in regard to purity."

A Controversial Subject!

"But you will admit that in carrying power it falls far short of many foreigners," I said.

"Perhaps so, but there are reasons for that. With its aerial right in the centre of a huge town, it hasn't the clear 'get-away' that others have while the B.B.C. will never sacrifice purity for 'punch.'"

"Everything points to the desirability of a British short-waver," I remarked. "A radio station that spans the world is a national asset—it is a national advertiser.



5 X X's aerial tuner. Note the large variometers employed.

arouse the admiration of honest critics, it is my hope that one day the B.B.C. people will erect a station that will cause consternation in the hearts of foreign designers. Am I hoping for too much? Judging by what I saw at Daventry I do not think so, providing the B.B.C. engineers are given scope for REAL experiment.

CRACKLING NOISES

THE other evening, after switching on the wireless set to listen to the broadcast programme the loud speaker began to emit loud crackling noises reminiscent of the worst of atmospherics. While appreciating that during the summer months these "X's" are rather more prominent than in winter, I felt that their nature and persistence was rather untoward. Adopting the usual expedient of opening the aerial switch to ascertain whether the noises were Nature's own or home-made brought about

no change, so attention was immediately turned to the set. Careful examination of all joints for intermittent connections proved fruitless, everything being intact, but on looking at the H.T. battery and trying each wander plug position, soon revealed the trouble.

Eliminating the Trouble.

The battery in question was a new one of the "dry" type which, in transit through the post, appeared to have had rather a rough passage. The wax top was broken in places, this causing some of the sockets to be loose, and insertion of the H.T. plugs into any of the sockets not affected cured the trouble from noises. It was felt advisable to repair the slight damage,

however, and a little molten wax was run into all the cracks and the previous solidity of the top surface restored. This appears to be quite a likely source of those unpleasant cracklings, for any rough handling of the dry batteries during the course of cleaning, etc., is sure to show up on the wax layer, especially when this happens to be thin in parts. A lighted taper and a sealing-wax rod, however, soon puts the matter right.

Do not forget to obtain your copy of the September

"MODERN WIRELESS"

Price 1/-

BROADCAST NOTES.

By OUR BROADCASTING CORRESPONDENTS.

Welcome News—New Radio Play—An Aberdeen Feature—Dundee on Wallace—A New Thriller at Cardiff—Talks Features—League of Nations Broadcasts—Harvest Home Customs—The Return of Richard Hughes—"The Romance of the Solway"—Dunbar Relay to Edinburgh—Battle Music—Harrogate on the Air—Kingsway Hall, Special Relay—A Humperdinck Anniversary.

Welcome News.

HURRAH! No talks at all on 5GB! That's the stuff for listeners! Now at long last Savoy Hill will learn what a mistake they have been making with all their dreary educational twaddle!

New Radio Play.

"The Hour of Prospero," a play by C. E. Lawrence, which gives a glimpse of Shakespeare the Man, as opposed to Shakespeare the Poet, will be performed for the first time over radio at the Liverpool Station on Thursday, September 1st.

An Aberdeen Feature.

Light variety programmes are proving very popular with Aberdeen listeners, and on Friday, September 2nd, a programme of this nature will be given, when the following well-known artistes will take part.

The Aberdeen Vaudeville Players in two Revue Sketches: "A Tragedy at Midnight," by Lawrence Anderson; and "A Matter of Business," by Muriel Levy. Florence Oldham, in songs at the piano; Nellie O'List, instrumentalist in flute and piccolo solos; Wallace Cunningham, entertainer.

Dundee on Wallace.

All Scottish Stations are to broadcast a special transmission which the staff of the Dundee Station, where the programme will be produced, has devised around incidents in the life and doughty deeds of William Wallace. A number of outstanding events in Wallace's life will be portrayed, and those taking part in the programme are the Mackenzie Pipers, the Hartly Quintet, and Miss Margaret F. Stewart (soprano).

A New Thriller at Cardiff.

Mr. Vivian Tidmarsh, whose play, "Landing the Shark," was produced at the London Coliseum by Mr. George Grossmith, with Miss Heather Thatcher in the leading rôle, after it had successfully toured every station of the B.B.C., has just finished writing another drama, entitled "In Chinese Waters." The new play is to be produced at the Cardiff Station on Friday, September 2nd, and those who have read the script say that it will be a real thriller. All the seven members of the cast are men, but as the characters concern such diverse individuals as a pirate, the captain and purser of a steamship, not to mention a globe-trotter, there is plenty of contrast between the voices.

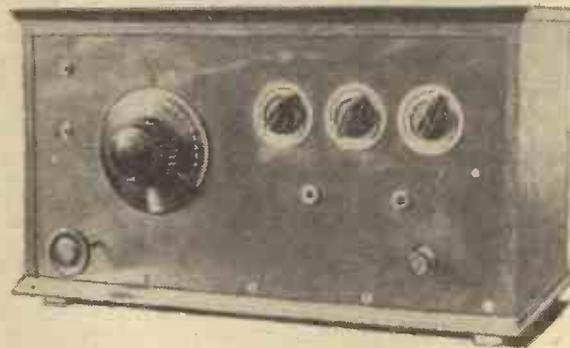
Mr. Tidmarsh, who, by the way, is a member of the staff of a London daily newspaper (the "Evening News"), is one of the few authors to discover the new technique required in writing plays for radio: The explanation lies, perhaps, in

the fact that Mr. Tidmarsh has always been an ardent listener, and therefore appreciates the possibilities as well as the limitations of radio drama.

Talks Features.

Several new features, additional to those announced previously, have been inserted in the series of talks for next autumn. Among them a series on "New Novels," by Mrs. Mary Agnes Hamilton, and on "Music in the Theatre," by Mr. Francis Toye. These will be given on alternate Thursday evenings, while the present series on music, drama, literature and films, will be continued on Mondays and Fridays.

Later, another series of afternoon talks on the work being done for the growing



A "P.W." three-valver built by one of our Derby readers.

generation will be given by Mrs. G. M. Trevelyan, on "Play Centres"; Dr. Saleeby, on "Fresh Air and Sunlight"; and by Dame Janet Campbell, D.B.E., on "Mothers and Babies."

League of Nations Broadcasts.

Arrangements are being made to broadcast special reports of the proceedings of the September Assembly of the League of Nations at Geneva. These will be given in the London studio each Monday evening at 9.20 p.m., during the three weeks that the sittings of the Assembly will occupy. Then, at its close, it is hoped that one of the leading delegates will describe to listeners what has been accomplished. Meanwhile, on Wednesday, August 31st, Mr. Vernon Bartlett, of the League of Nations, will give a talk describing the sitting of the Assembly before the actual gathering takes place.

Harvest Home Customs.

Some of the customs, many of them of great antiquity, connected with the ingathering of the harvest and the "harvest home," will be dealt with in a talk having the intriguing title "The Hollering Pot," which Miss L. F. Ramsey is giving in the

London Studio on Tuesday, August 30th. Miss Ramsey is well known to listeners, having been heard on more than one occasion from London and quite frequently by Bournemouth listeners.

The Return of Richard Hughes.

Mr. Richard Hughes, the author of many plays, short stories and poems (incidentally, he was the author of one of the first plays specially written for radio in this country), is reading a short story in the "Writers of To-day" series, on Saturday, September 3rd. Mr. Hughes has not been able to appear before the microphone for some time owing to illness, and he will soon be leaving England for an extended voyage to the South Seas.

"The Romance of the Solway."

Mr. J. H. Herries is to re-explore the Solway in a coracle, and will describe what should be an interesting experience, in the course of a talk he is giving from Edinburgh on September 2nd. The title of the talk is "The Romance of the Solway."

Dunbar Relay to Edinburgh.

Edinburgh's stay-at-home listeners will have a pierrot show as their evening concert on Saturday, September 3rd. It will be given by the Zenith Entertainers at Dunbar, from whence it will be relayed. The time is 7.30 to 9 p.m.

Battle Music.

The special incidental music for the Naval film depicting the memorable battle of Coronel will be relayed from the New Gallery Kinema on Monday evening, September 12th. The King and Queen are expected to witness the film that evening, and there is also the possibility that listeners will hear a speech by Lord Jellicoe. The transmission begins soon after 9.30 p.m.,

and is to last about an hour.

Harrogate on the Air.

London and Daventry are to broadcast an orchestral concert from Harrogate on Thursday evening, September 15th.

Kingsway Hall—Special Relay.

Part of the Saturday night concert at the Kingsway Hall, London, on September 17th, will be broadcast from London, Daventry, and other stations.

A Humperdinck Anniversary.

The anniversary of the birth of Englebert Humperdinck, on September 1st, 1854, will be remembered on that day this year at the Newcastle Station by the performance of a short programme of music from his pen. As most people know, the music of the opera "Hänsel and Gretel" was written by Humperdinck, and the programme will include the overture to this as well as several other of his works.

PLEASE NOTE

THAT THE SEPTEMBER ISSUE OF
MODERN WIRELESS
IS ON SALE NEXT WEEK.

An All-wave Reinartz One Valver

Designed and Built in the "P.W." Technical Research Department.

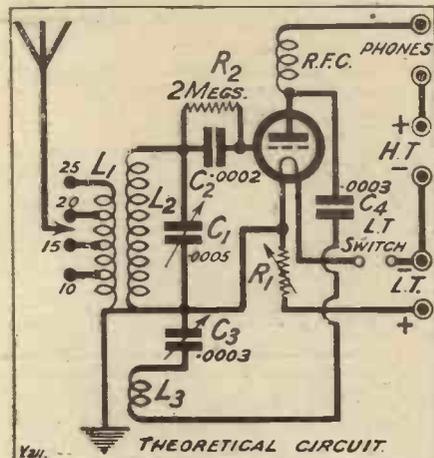


THERE is just one single-valve circuit to which one returns again and again when in search of simplicity and consistent powers of long-range reception, however much one may become enamoured for spells of various "freakodynes," and that is the improved Reinartz circuit with separate aerial and reaction windings. With one of the forms of coils which have been found in practice to suit

it must be understood that such reception is dependent upon conditions, and there are numerous evenings during the summer when only one or two stations can be heard properly. Further, really effective long-distance reception on one valve should only be expected after dusk on most occasions.

Plenty of Stations.

The main point is that reception conditions vary widely from night to night for any given station, and with a small set one must not expect to pick up the same alternative programmes every night. There are so many strong stations working every night, however, that there is a great probability that at any given moment several of them will be within reach of an efficient one-valver working under proper conditions. On different nights it will often be found that a different group of



LIST OF COMPONENTS.

- 1 Panel, 12 x 7 x 1/8 in. (Radion, etc.)
- 1 Baseboard, 12 x 9 in. (Radion, etc.)
- 1 Cabinet to fit. (Camco, Peto-Scott, Pickett, etc.)
- 1 Variable condenser, .0005 mfd., square law or S.L.F., with slow motion or vernier dial. (Any good make. Actual one used was a "Utility.")
- 1 .0003 or .0002 mfd. ditto.
- 1 On-off switch. (Lissen, Igranic, Wearite, etc.)
- 1 Grid condenser, .0003 mfd., and leak, 2 meg. (Lissen, Dubilier, Mullard, etc.)
- 1 Fixed condenser, .001 mfd. (Lissen, Mullard, Dubilier, etc.)
- 1 Sprung valve socket. (Lotus, Benjamin, Burndept, etc.)
- 1 H.F. choke. (Lissen, R.L.-Varley, McMichael, etc.)
- 1 Tapping clip.
- 1 Terminal strip, 5 1/2 x 1 in.
- 1 Baseboard rheostat and resistor. (Lissen, Igranic, Burne-Jones, Peto-Scott, etc.)
- 8 Terminals.
- 4 Sockets and 8 plugs (Eastick).

the circuit the results which can be obtained with just a little practice in handling are a perpetual surprise when one returns to a simple little set like this after handling "fives" and "sixes," and perhaps beginning to feel that no set without H.F. stages is of much use for DX work.

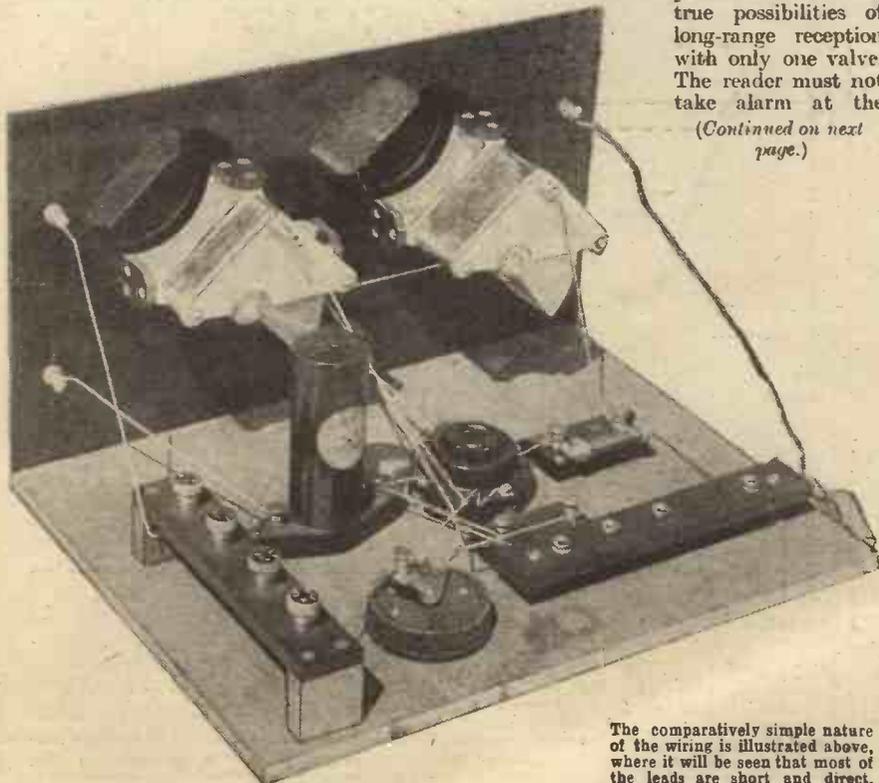
Single Valve Possibilities.

Now that there are so many comparatively high-powered stations working regularly on waves within the 200-500 metre band, both in Britain and on the Continent, it is really possible to get alternative programmes at enjoyable 'phone strength with an efficient single-valve set, provided that certain conditions are fulfilled. But

them can be heard, but this fact must simply be accepted as one of the handicaps of a small set.

Now as to the conditions which must be fulfilled before a single-valve set can become an effective distance-getter. It is desired to give a clear idea of these points, and the others which have already been considered, in order that there may be no misunderstanding and subsequent disappointment as to the true possibilities of long-range reception with only one valve. The reader must not take alarm at the

(Continued on next page.)



The comparatively simple nature of the wiring is illustrated above, where it will be seen that most of the leads are short and direct.

AN ALL-WAVE REINARTZ ONE-VALVER.

(Continued from previous page.)

warning tone of these introductory remarks. Their object is not to frighten him off single-valve sets, but simply to ensure that he shall not commence to build one in ignorance of the limitations of the instrument he is going to use. When all allowances have been made a really efficient single-valve set remains a very fascinating little receiver which will enable one to get a real taste of the pleasures of long-distance reception, and will on very many nights provide several alternative programmes at a strength quite worth listening to on 'phones.

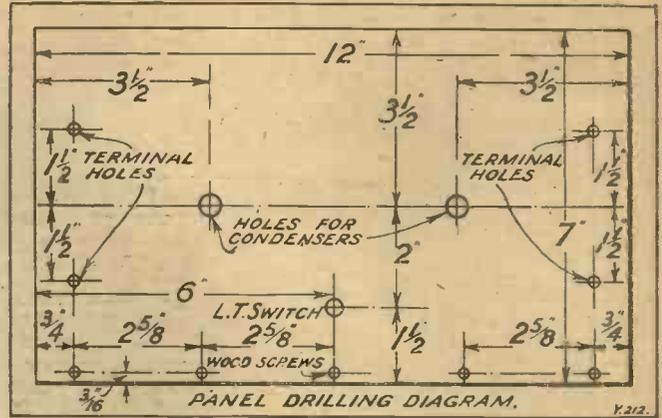
Slow Motion Dials.

It has already been remarked that certain conditions must be fulfilled, and we can now proceed to see what these are. Now, first of all it must be realised that there is little reserve of power in a single-valver, and therefore pains must be taken to operate it in its most sensitive state. Evidently, then, the first requirement is

that the operator shall devote a little time and patience to learning to work the set and make the necessary tuning and reaction adjustments with sufficient skill to ensure that the maximum results shall be forthcoming. A little persevering practice will soon yield sufficient skill for all ordinary purposes, especially since the modern tendency to use slow-motion dials has made the whole business very much easier.

Next, it must be understood that to do much with a single-valve set an aerial of at least average efficiency is essential. A small or poor aerial means that more valves, preferably with a stage of H.F., will be needed for long-distance work, and the idea of a single-valve set must be abandoned unless it is intended simply for the reception of the nearest British station.

Finally, a suitable valve must be used,



and care taken to adjust H.T. and L.T. carefully until a really smooth control of reaction is obtained. It is true that some sort of results can be obtained with almost any valve, but for really good long-distance reception it is necessary to use one which gives the desirable gradual and smooth reaction control, and for this reason one of the special H.F. type dull emitters is desirable. It is worthy of note, also, that some of the very cheap foreign dull emitters of the general purpose or H.F. types also make excellent detectors.

Simple and Straightforward.

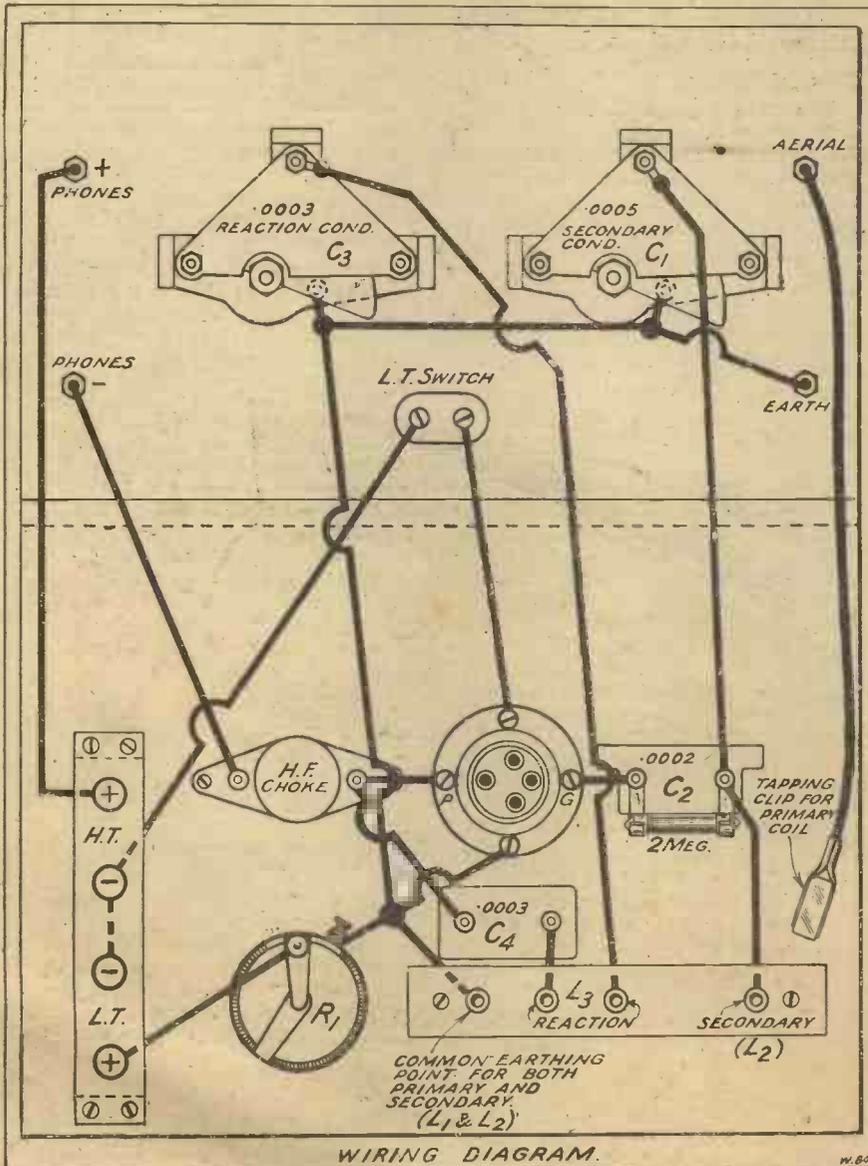
The set illustrated on these pages has been produced as an example of a simple and straightforward but highly efficient design using the Reinartz circuit and a particularly effective coil arrangement. Sensitivity is high, and quite a useful degree of selectivity is given. The set is built on the American plan, with a vertical front panel carrying the tuning condenser (on the left), reaction condenser, on-and-off switch, and the aerial, earth, and 'phone terminals. On the baseboard inside are mounted the special coil, the valve socket, filament resistance, H.F. choke, grid leak, condenser, etc.

The actual construction of the set is very simple, and all the guidance needed will be found in the diagrams and photos; but the details of the coil call for further explanation. It is wound upon a piece of "Pirtoid" tube, 3 in. in diameter and 3 1/2 in. long, and consists of three separate windings. The largest is the secondary, consisting of 50 turns of No. 24 double cotton-covered wire in a single layer, the ends being secured by passing them through small holes in the tube in the usual way. The beginning of this winding is half an inch from one end of the tube, and the finish is about an inch and a quarter from the other end of the tube, leaving a space upon which the reaction winding will be placed. This consists of 30 turns of No. 32 double-silk-covered wire in the same direction as the secondary.

The Aerial Coil.

Over the top of the other end of the secondary is wound the aerial coil, consisting of 25 turns of No. 24 D.C.C. in the same direction as the secondary. This winding is supported away from the secondary by a simple scheme. Eight pieces 1 1/2 in. long are cut from one of the sticks used as stiffening in a packet of "Glazite," and equally placed round the coil, being held by a rubber band until gripped by the winding. Tapping points are made at the

(Continued on next page.)



AN ALL-WAVE REINARTZ ONE-VALVER.

(Continued from previous page.)

tenth, fifteenth, and twentieth turns as winding proceeds by twisting up a small loop in the wire which is subsequently scraped bare, so that a tapping clip may be attached. The end is also fastened off and left projecting to the extent of about half an inch for the same purpose

Note that the grid leak and condenser are adjoining the grid terminal of the valve holder.

The coil is mounted upon a strip of ebonite $5\frac{1}{2}$ in. long and 1 in. wide, carrying four "Ealex" plugs. It is attached by two brass screws and nuts, and spaced away from the strip by means of two of the insulating sleeves which are supplied with the plugs, and which are not otherwise required. These are slipped over the screws, between the ebonite strip and the coil former. The screws, of course, are placed near the ends of the former.

The base or socket into which the coil plugs consists of another strip of ebonite 6 in. long and 1 in. wide, carrying four "Ealex" sockets, and fastened to the baseboard by means of two screws passed through two more of the insulating sleeves, so supporting it just clear of the wood. Looking at the wiring diagram, the spacing between these sockets is 1 in., 1 in., 2 in.

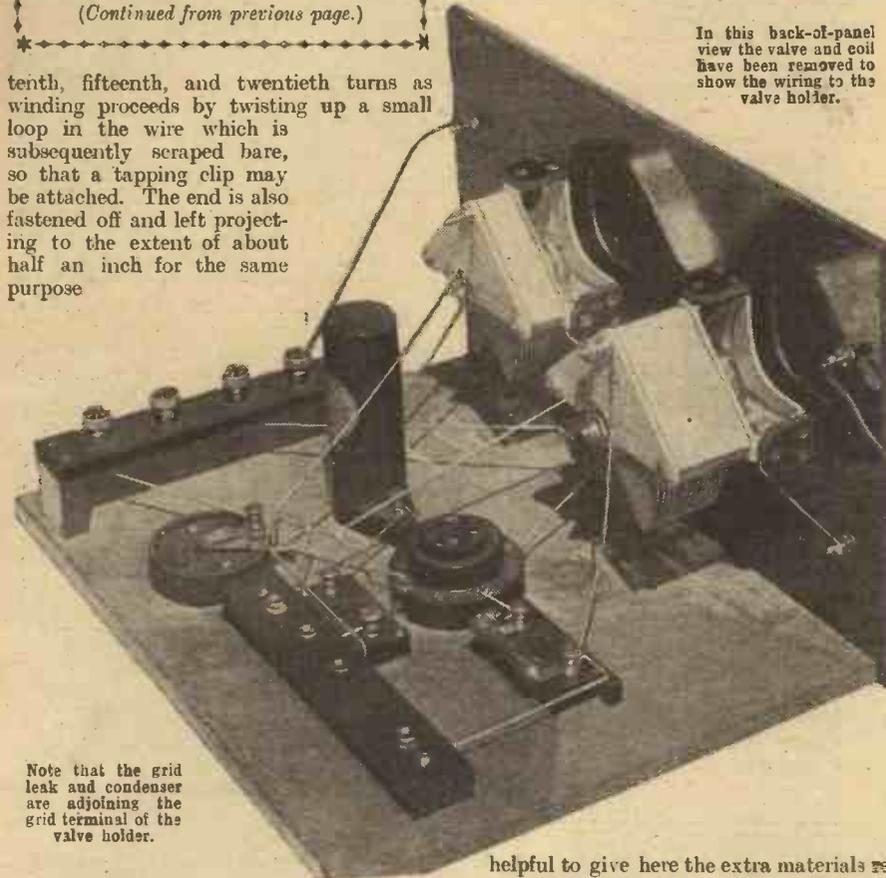
Connections.

The connections are as follow. With the coil placed in the set, imagine that you are looking at it as it would be seen in the wiring diagram. Then to the left-hand pin is connected the beginning of both aerial and secondary windings. The other end of the secondary goes to the right-hand pin. The reaction coil is connected to the two middle pins, the end nearest the secondary going to the right-hand pin, and the end furthest from the secondary to left-hand pin.

The coil for the Daventry range is made in exactly the same way, but on a $3\frac{1}{2}$ -in. diameter former, and the details are as follow: Aerial, 80 turns of No. 34 S.S.C. wire (with a tapping at 60); secondary, 170 turns of No. 34 S.S.C. wire; reaction,

60 turns of No. 34 S.S.C. wire. It will be seen that it is quite a simple matter to make up a coil for any desired wave range between or below those given. It may be

In this back-of-panel view the valve and coil have been removed to show the wiring to the valve holder.



A USEFUL HINT.

By M. V. W.

THE majority of amateur constructors now rely on soldered joints when building their sets, and for those who use flux for this purpose the following will be found an extremely useful little gadget. Secure about three inches of square section copper wire, of heavy gauge, and bend back about one inch so as to form a "button-hook" handle. The other end is then hammered as flat as possible, forming a rough spoon or spade shape.

In the centre of the flux tin lid punch a hole sufficiently large to admit the "spade" freely. It will now be found quite simple to apply the flux in small quantities wherever desired.

Other advantages of this gadget are, that dust and other foreign matter is excluded from the tin (it is more economical than the usual method of an open tin and a match stick); and last, but not least, it is now impossible to discover that the tin of flux has firmly adhered to your elbow, just as you are in the middle of a tricky joint.

After a time it will be found that no flux is withdrawn on the wire; it is then necessary only to open the tin and press the contents to the centre.

The wire, when not in use, can be left in the tin, and will lie almost flat on the lid.

NEXT WEEK

The September Issue of
MODERN WIRELESS

On Sale everywhere Sept. 1st.

Price 1s.

helpful to give here the extra materials required for the coils. One Paxlin or Pirtoid tube $3\frac{1}{2}$ in. long and 3 in. diameter and one $3\frac{1}{2}$ in. diameter, two ebonite strips $5\frac{1}{2}$ in. by 1 in. by $\frac{1}{4}$ in., supplies of No. 34 S.S.C. wire, No. 24 D.C.C., No. 32 S.S.C.



A general view of the interior of the All-Wave Reinartz One-Valver, ready for placing into its cabinet.

TECHNICAL NOTES

By Dr. J. H. T. ROBERTS, F.Inst.P.

AN H.T. INVENTION

MAINTAINING QUALITY—CURRENT IN LOUD-SPEAKER WINDINGS.

An H.T. Invention.

REPORTS are to hand with regard to an invention by two wireless experimenters, Messrs. Standbrook and Feild, for providing the H.T. for a wireless receiving set from the L.T. battery. At the time of writing, no details of this invention have been disclosed, but it would appear to employ some form of converter principle with presumably the usual smoothing devices.

Of course, there is the well-known M.L. rotary converter, which operates quite satisfactorily from an L.T. battery and generates the H.T. supply.

It seems to me, however, and I have often had letters from readers in the same strain, that what is wanted is not a method of producing the H.T. from the L.T. battery, but a method of producing the L.T. from the H.T. battery. In other words, of the two, the L.T. battery seems to be the one with which the average user would most like to dispense.

Too Much Volume.

The question often arises how best to decrease the volume from a receiving set, particularly on local stations of a considerable power, so that, whilst maintaining the best quality of tone, the loudness shall not be beyond the limits of comfort for an average size room.

There are several simple and well-known ways of reducing the volume, but, as a rule, these introduce some modification in the quality of reproduction, and this, of course, is always to be avoided if possible.

A simple way, where more than one stage of L.F. amplification is used, is to have an arrangement for switching in or out the second L.F. stage—that is to say, the loud speaker may be connected after either one or two L.F. stages, as desired. Of course, even here questions of the suitability of the loud speaker impedance to that of the first or second L.F. stage are important and should be taken carefully into consideration.

Maintaining Quality.

Another simple method is to reduce the filament current to all valves by means of a master rheostat, or to reduce the filament current of the last L.F. valve by means of an individual rheostat. This, however, is apt to interfere with quality and, as a general rule, it is better to operate the valves at their rated filament current.

Another method is to connect a resistance across the secondary of the last transformer or across the loud speaker. Provided the resistance is entirely non-inductive this method is probably satisfactory, but it does not effect any saving either in the L.T. or in the H.T. supply.

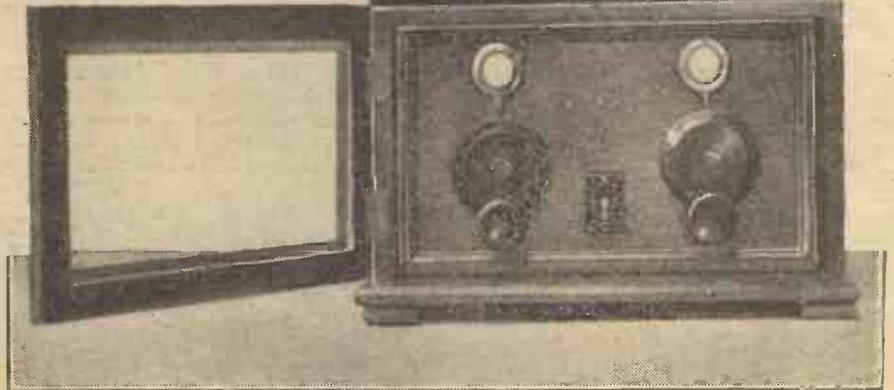
Of course, detuning of the aerial is probably the simplest of all methods of reducing volume, but this is apt to interfere with quality, especially where reaction is

employed, and moreover if a set is very selective it may be difficult to tune out one station without at the same time tuning in another. In this connection, a method which has been suggested is to introduce a variable resistance of a few hundred up to two or three thousand ohms into the aerial circuit. This has the effect of reducing the strength of the received signal energy and consequently does not interfere with the quality.

Current in Loud-speaker Windings.

Talking of loud speakers, it is important for the best results that the impedance of the loud speaker should be suited to that of the last valve. It is hardly fair to the loud speaker to pass a steady plate current through its winding, which current, in the case of a "power" valve, may be quite considerable. Here the well-known choke-coil-and-condenser filter-circuit should be used.

A high-resistance loud speaker should hardly be connected into the plate circuit of a small



The "P.W." two-valve "Ranger" set, as built by a Leeds reader.

power valve. If the resistance is, say, 2,000 ohms, there is an appreciable drop of potential from one terminal to the other, and with so-called "power" valves or "super-power" valves, the conditions are still worse. In any case, the current passed through the windings is unduly heavy and the filter-circuit arrangement is preferable.

Neutralising.

The addition of a balancing or neutralising device does not necessarily add to the efficiency of a radio-frequency intervalve coupling. In fact, an arrangement of this kind may cause a reduction of signal-strength. Unless designed with the greatest care the neutralising device cannot of itself add amplification, but it makes possible the use of undamped, or only slightly damped, and therefore efficient circuits, and, in particular, the use of a loose-coupled and selective aerial-grid coupling. If it were not

for the introduction of the principle of neutralisation, the application of such devices to a receiver using a considerable amount of H.F. amplification would be impossible, or, to put the matter perhaps more accurately, it would be of little use, as artificial damping would have to be introduced in order to obviate self-oscillation.

Aeroplane Loud Speaker.

Owing to the popularity in the United States of Colonel Lindbergh, the famous Atlantic pilot, wireless loud speakers are being made in the form of a model of his aeroplane. The reproducer unit takes the place of the aeroplane engine and, to add to the semblance, a number of projecting corks are stuck radially around the unit to represent the cylinders of the engine. The sound is projected into the "fuselage" of the machine, which is closed in such a way as to act as a trumpet.

Comparative Shielding.

Experimental work which has been carried out with small shielded coils, and also with shielding between coils, has brought to light much interesting information. Small shielded coils were found to be preferable to large shields in receivers

employing more than two stages of tuned H.F. amplification.

There are several reasons for the choice of small shielded coils in such receivers. For one thing, economy of space is of considerable importance in a multi-valve H.F. receiver, and if large metal shields are used, much valuable space is thereby wasted. For another thing, the overall selectivity obtainable with three or four stages of tuned radio-frequency amplification employing small shielded coils is satisfactory for most purposes, even in congested areas. The increased selectivity available with large metal shields might have the effect of cutting sidebands unduly.

With regard to eliminating interaction between coils and between the various H.F. transformers, the small shielded coils function as well as those with large metal shields, in addition to permitting economy of space.

(Continued on page 932.)

EMPIRE BROADCASTING.

CAPTAIN ECKERSLEY'S EXPLANATION.

BY THE EDITOR.

WRITING to "The Times," on behalf of the B.B.C., Captain Eckersley has a good deal to say on the question of Empire broadcasting; and as the short-wave topic, in connection with the scheme for an Empire station, is very much to the fore these days, and as the B.B.C.'s attitude to this suggested scheme has, in the opinion of many critics—including ourselves—indicated a lack of real interest and appreciation of the public interest and importance of the matter, we consider Captain Eckersley's letter more or less in the light of an official reply by the B.B.C. to those who consider that steps should have been taken months ago to inaugurate a series of experimental short-wave broadcasts on the lines of those carried out by P C J J, the Dutch station at Eindhoven, and by K D K A and other well-known short-wave American stations.

Early "Experiments."

Captain Eckersley, in the course of his long letter in "The Times," says that, arising out of the B.B.C.'s rejection of certain proposals made in connection with short-wave broadcasting, the B.B.C. has been criticised on three grounds:

- (1) Indifference to Imperial considerations,
- (2) technical incapacity, and
- (3) a "dog-in-the-manger" attitude towards amateur cooperation.

The best answer to such accusations, (continues Captain Eckersley), is contained in an accurate recital of the relevant facts.

We began experiments leading to Empire broadcasting just over four years ago [*sic*—Ed.]. On the transmission side we have made considerable progress, and we have taken full advantage of the results of successful experiments elsewhere. On the reception side progress has not been so rapid, and our research is still going on. The practical result of work done during these four years—and I include the experiments in Holland, the United States, and elsewhere—is that at isolated moments it is possible in almost any part of the world to pick up somewhat distorted music and speech transmitted by a short-wave station. On only some of these rather isolated occasions reception is reasonably good. Neither the time nor the duration of these admittedly unsatisfactory moments of reception can be anticipated. Therefore every factor essential to service is absent. No promise can be given of the successful reception of any item at a given moment. This is a statement of fact, and because I, as an engineer, supported by the considered judgment of my engineering colleagues, have insisted upon the recognition of this fact, the B.B.C. is accused of a variety of crimes both against wireless and against the British Empire.

Having said this, let me add that, as a result of the work done and the experience gained by four years of research, we are now definitely more hopeful of early satisfactory results than we ever were before. By the end of this year we shall be operating a short-wave station experimentally. We shall do this in active cooperation with the Radio Corporation of America and the engineers of the Marconi Company, whose experience in short-wave work is far and away superior to that of any group of engineers in the world. Incidentally, the experts of the Marconi Company are in complete agreement with my views on this subject. These prospective experiments with our short-wave transmitter should lead us a stage further.

It will be seen from the above extract from Captain Eckersley's letter that he states that the B.B.C. began experiments leading to Empire broadcasting just over four years ago. This needs amplification.

We have followed the B.B.C.'s progress as closely as anyone, but with the exception of relay experiments at Keston, Biggin

Hill, and elsewhere, we do not remember the B.B.C. ever demonstrating, for the benefit of its patrons, that it was really engaged on short-wave work so intensively as, for example, the engineers at K D K A or P C J J.

And frankly, we do not suggest it should have been—certainly not four years ago—so concentrated on this branch of

themselves of enormous value and interest.

The B.B.C. seems to lack imagination on this point. It is dominated by the technical standard put up by the engineers, who, jealous of their reputations, do not wish to be associated with anything which does not approach technical perfection. This is not in accord with the spirit of public service: it savours personal pride and a lack of appreciation of the principle of subordinating personal ideas to widespread public demand.

The B.B.C. could—and has—covered itself by definite indications regarding the uncertainty and technical difficulty of short-wave broadcasting, but the public would at least have had an opportunity of judging for itself, and the B.B.C. would have shown that it possessed a spirit of adventure and initiative.

As it is, it prefers to sit back and keep its experiments a close secret, instead of emulating P C J J and demonstrating, not only the soundness of its contentions about the uncertainty of short-wave broadcasting, but the fact that even a few isolated successes—and the successes of P C J J may be termed more than "isolated"—make the attempts well worth while and immediate cause for intensive research, improvement, and development generally.

But it prefers to say that such proposals are "unsound" and "premature," and that it has taken a stern course at the expense of much publicity and popularity purely in the interests of—what? Not the public, not the Empire—although it may advance such reasons—but in the interests of, if anything, its own superior opinion.

If ever such a policy deserved condemnation, and if ever such weak-kneed excuses

(Continued on next page.)



Direction Finding with Portable Receivers. Members of the Golder's Green and Hendon Radio Society are shown taking wireless bearings from a hidden transmitter.

radio work. "Ordinary" broadcasting was then of paramount importance, or should have been.

Other Countries' Successes.

But what has been done since the public heard of K D K A and P C J J? People are well aware of the fact that a regular or in any way guaranteed service cannot be given; but they realise that even isolated broadcasts, if only heard with partial clarity for half an hour or so, if picked up in distant parts of the Empire, are in

GANGING SWITCHES.

An Ingenious Control-Saver.
FROM A CORRESPONDENT.

IT has often been said that necessity is the mother of invention, and this is never truer than where wireless is concerned. The number of aids to working when conducting experiments or testing receivers is legion, and the dissemination of the knowledge gained thereby is a wise policy and prompted me to pass on the little hint contained in this short note.

While arranging some components on a baseboard prior to testing out a circuit for a five-valve receiver, it became apparent that a four-way double-pole change-over switch would be necessary in order to effect the desired switching in one operation. A panel mounting type of switch was out of the question at the time, so I looked around for a baseboard type. This was not forthcoming, but the search revealed two of McMichael's six-point barrel switches, and it occurred to me that they might be "ganged" together to meet the needs of the moment.

A Simple Expedient.

To test this out I obtained a piece of 16-gauge brass wire about three inches long, and drilled a hole in the end of each of the moving spindles just large enough in diameter to accommodate the wire. The depth of each hole was $\frac{1}{8}$ ths of an inch, both being drilled concentrically with the spindle at the end remote from the controlling knob. The ends of the wire were soldered carefully, one in each hole, thus providing a more or less flexible connection between the two moving spindles. To make sure

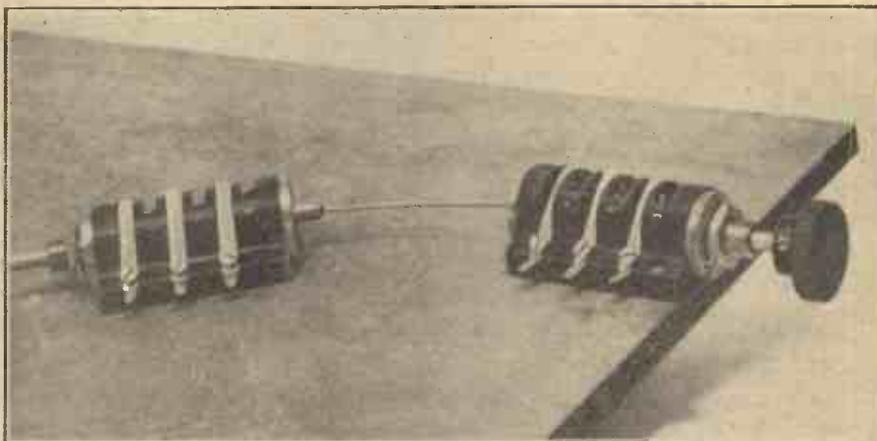
Mr. GERALD MARCUSE

Writes exclusively for
"P.W." Next Week on

"MY EMPIRE BROADCASTS"

Special and exclusive arrangements have been made with Mr. Marcuse for a series of articles dealing with the development of his Empire Broadcasting Scheme.

Watch "P.W." for the Latest
and Most Authentic News.



The flexible wire connecting the two switches acts in the same way as a Bowden brake.

EMPIRE BROADCASTING.

(Continued from previous page.)

deserved adverse criticism, surely the B.B.C.'s excuses deserve them.

Captain Eckersley, in his letter, continues as follows:

While we go forward with the technical side of the work, the cognate problems of programmes and expenditure are being considered. Ultimately we shall have to allow for occasions on which there must be transmission throughout the 24 hours of the day. There are also problems of copyright charges to be solved. Then there are arrangements to be concluded with the broadcasting authorities overseas, whose cooperation will be essential. It should not be overlooked that effective Empire broadcasting will become possible only in terms of relays through the broadcasting systems of the Dominions and Colonies. Perhaps I should add that I mean by the word "effective" the kind of broadcasting which will enable the relays to be received with reasonable clarity by the average listener throughout Greater Britain.

Now, under the proposals which we are resisting, and which are so vigorously advocated in interested quarters, even the admittedly unsatisfactory and irregular reception which may be possible can benefit only those whose technical knowledge and equipment are exceptional; in other words, a very limited number of wireless experimenters. I would add that it is common knowledge that these experimenters, while contributing to the progress of wireless science, are not so much interested in the content of what they receive as in the fact that they receive.

Hence, to the mind of the amateur wireless experimenter, the fact of occasional, even unsatisfactory, reception bulks much more largely than the intelligibility, quality, or continuity of the reception. On the other hand, for the vast majority—that is to say for the listening public—the value of reception is determined by intelligibility, continuity, and quality of the service.

Were it possible to guarantee or to demand that the listening public of Greater Britain should suddenly join the ranks of the zealous wireless amateur experimenters, even then the wisdom of premature action might well be doubted. And for this reason. That if the larger considerations of Imperial unity and understanding between the parts of the British Commonwealth are to be served by wireless broadcasting, it will not be through sporadic and largely unintelligible reception.

From the above our readers will appreciate our criticism that the B.B.C. is obsessed with the idea of a standard of technical perfection which, to put it mildly, is right up in the sky. Before such a standard can be obtained—short-wave Empire broadcasting for twenty-four hours of the day—it is more than likely that Captain Eckersley will have grown a long white beard.

The Copyright Trouble.

The question of copyright is, however, another matter. It is a relevant problem, but not incapable of solution.

Captain Eckersley states that the admittedly unsatisfactory and irregular reception which may be possible "can benefit only those whose technical knowledge and equipment are exceptional."

This statement is far too sweeping. The best answer is PCJJ and KDKA. Thousands and thousands of ordinary listeners, unskilled in technicalities, and using "straight" two or three-valve sets, have heard these short-wave stations time after time, and with little difficulty, in the most distant parts of the world.

And, apart from that, the idea of short-

that the arrangement worked satisfactorily, the two switches were mounted on a spare piece of wood, and on test the scheme proved admirable, the 16-gauge brass wire acting as a sort of Bowden brake wire between the moving portion of each switch. The accompanying photograph shows the two switches mounted on the spare baseboard, and it will be noted that with this method we have the great advantage that the switches need not be in line with each other.

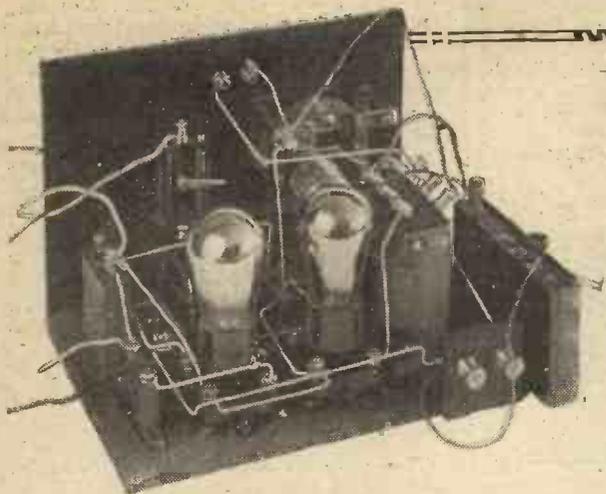
The link wire is sufficiently flexible to be bent round in the arc of a circle and yet give freedom of motion. This fact will be of undoubted assistance where a four-way double-pole change-over switch is desired with the switch points distributed in two pairs near the components whose connections are to be altered. The length and thickness of the wire may be chosen to meet the conditions existing in the receiver, or test apparatus, as the case may be.

wave broadcasts from a home station is that they should be picked up by official Dominion and Colonial stations and then relayed to listeners.

The reference to experimenters being only interested in picking up a station and not in the clarity and quality of the programme is quite irrelevant, and although the phrase "Imperial unity and understanding between parts of the British Commonwealth," etc., is very dignified, and does the writer of it much credit, from a "Times" letter writing point of view, it cannot be said to be entitled to a place in the logical sense that it constitutes a relevant argument against the proposals for short-wave broadcasting which Captain Eckersley seeks to condemn.

Little more need be written. Both sides have aired their views and given their reasons for them; both sides have much in their favour—the B.B.C., however, rather less than those whose proposals have been considered "unsound."

The epithet, we think, might well be applied to those at 2, Savoy Hill, whose policy is so conservative, whose lack of imagination and initiative so dead, and to those who, while ever ready to declaim their technical omnipotence, shy at an experiment which, from the technical point of view, at any rate, has not frightened the controllers of PCJJ, KDKA, and, in particular, that right-spirited and enthusiastic amateur, Mr. Gerald Marcuse.



One and Two-Valve Reflex Circuits

By Capt. H. J. ROUND, M.I.E.E.

SOME of the old circuits are worth reviving with modifications to suit modern conditions. I never knew a circuit which was so economical in valves and so sensitive for telephony as the old crystal reflex circuit. It was not at all difficult to handle.

The crystal reflex, as I knew it in 1914, was usually constructed like Fig. 1. Sometimes an extra L.F. stage was added, but this was not of much advantage, as we were only interested in signals in a telephone.

Carborundum was almost always used as the detector, and is even now the best detector to use if good carborundum can be obtained.

I believe the Carborundum Company issue a permanent detector made of a picked crystal, and one or two specimens I have had are very good. In these circuits, how-

The V.2 circuit is shown in Fig. 2.

Recently, in constructing reflex circuits, I have again modernised this circuit, and the altered one is, in my opinion, about the best one can get from one valve, the chief improvement being quality and tuning, the gain of sensitiveness being not very great.

A valve rectifier may be used by those who so desire, but in this article I propose to stick to crystal rectification.

I have combined the neutralising with the reaction in a way which is very simple to use, and will enable any available valve to be taken, but there are certain of the modern valves which are best for the purpose.

The circuit I finally used is shown in Fig. 3. Two H.F. chokes of the Marconi V.2 pattern were used for grid and plate feeds. The input tuning coil was tapped at one-half, one-third, one-quarter from the bottom, to suit

different conditions of wave-length and aerial, and this coil is slightly better as a Litz coil, although there is not much in the point.

The second tuning coil was a cylindrical one of solid wire, with a subsidiary winding of 14 turns of No. 36, wound at the bottom. The subsidiary winding is for neutralising purposes.

An anode and crystal tap point was arranged one-third of the way from the bottom of the coil.

The neutralising

condenser was a cheap disc condenser of 3 plates rotor and 3 plates stator, and in general was neutral half-way in.

The best valve I found was one of the new general purpose type—of about 20,000 ohms impedance and a "mu" of 14—but any valve can be used providing the anode tap is lowered, if the valve impedance is lowered, also.

The best crystal tap was in about the same position as the anode tap.

The remainder of the quantities were as shown in the diagram.

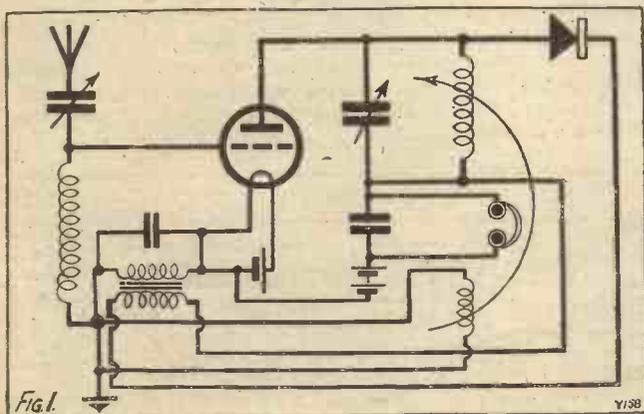
Sensitivity Good.

The neutral position in the neutralising condenser is very easy to find, and this condenser can then be used to introduce reaction up to the oscillating point.

I prefer to bring in reaction by increasing rather than by decreasing the condenser.

Sensitivity of the circuit is good. Bourne-mouth and Langenburg came in on the telephones in daylight at readable strength, with no interference from London at five miles from 2 L O, and one can go to 430 metres before 2 L O interference is serious.

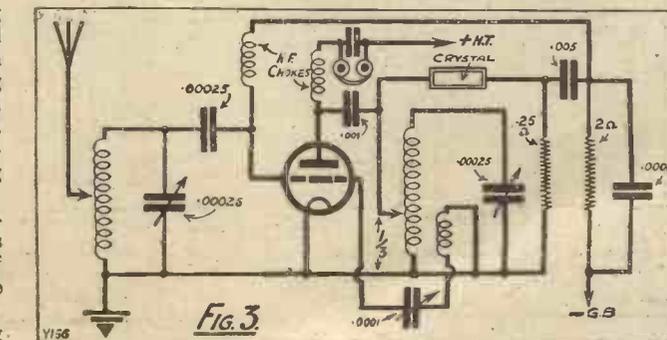
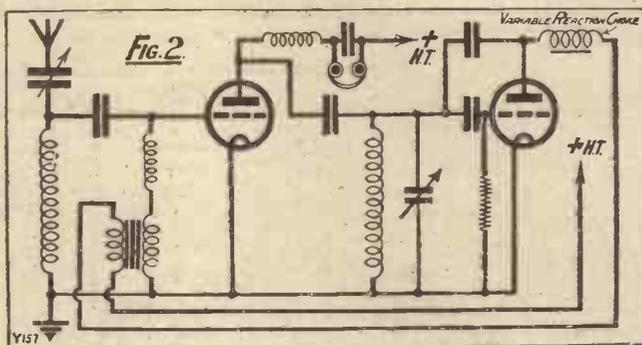
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ever, when experimenting, it is probably better to use one of the new type semi-permanent detectors, or zincite bornite combinations, owing to the fact that the occasional breaking of battery contacts, etc., will do even carborundum in, and the semi-permanent type is so easily reset, whereas sealed capsules are difficult to readjust.

Early Reflexes.

In the early stages of broadcasting I re-designed the 1914 reflex circuit and produced the Marconi V.2 circuit, using a valve rectifier instead of a crystal, the chief point in the re-design being the use of choke feeds. I think choke feed is probably the best arrangement for all reflex circuits.



ONE- AND TWO-VALVE REFLEX CIRCUITS,

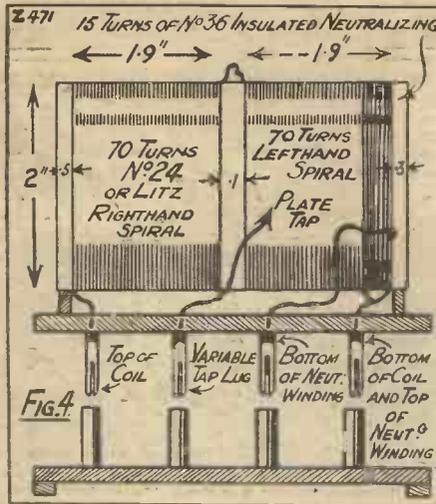
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I used a semi-permanent detector and only had trouble if I broke an H.T. battery connection, when resetting of the crystal was necessary.

A dimensioned coil is shown in Fig. 4; these coils I have standardised for my own tests. They are wound of either bare wire or Litz and have an astatic winding to minimise magnetic induction.

Adding an L.F.

In loud-speaker working, I found that a 2.7/1 or 3/1 transformer could replace the telephones and a power valve be added



stations besides London could be picked up, and only lack of tuning prevented better still being done. 2 L.O (five miles) came in at full loud-speaker strength on a 3-foot aerial.

The neutralising condenser zero position hardly shifts at all through the whole range of wave-length, but the edge of reaction point slowly moves towards a greater condenser value as the wave-length is increased. The full experimental lay-out is shown below.

I have now added a second stage of H.F. to this receiver, but although I am getting greatly increased sensitivity and very good selectivity, I am not yet quite satisfied with the practical stability, as the whole thing is quite unshielded.

I have had to lower the plate voltage on the H.F. valves to get sufficient stability for practical working.

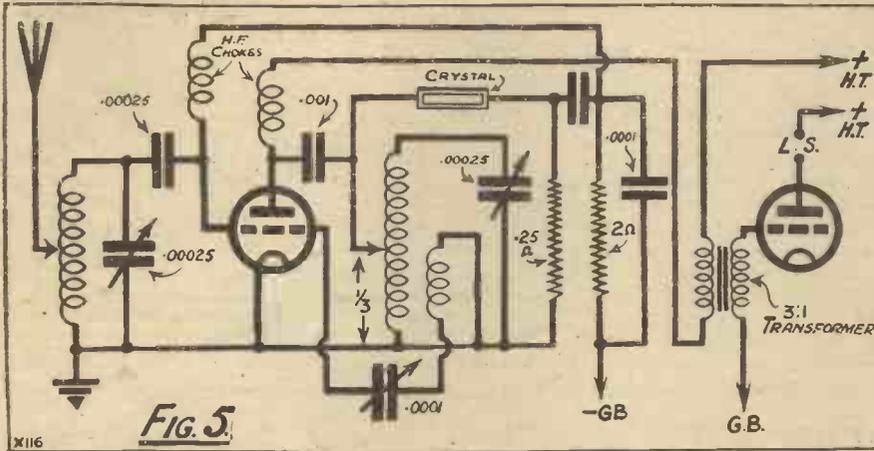
SAFEGUARDING VALVES.

ALTHOUGH present-day valves will endure a large amount of ill use, it often happens that the bulb of the valve loosens in its seating owing to the method employed in taking the valve out of the valve holder. The correct method to take a valve from its holder is to grip the base of the valve firmly and gently prise the valve upwards.

In cases where the bulb of the valve becomes loose, it is only a question of time for the valve to be considered inefficient and it will have to be repaired or replaced. To prolong the life of a valve thus affected, it is only necessary to insert a little seccotine—or light glue, if a more satisfactory repair is desired—between the base of the valve and the bulb.

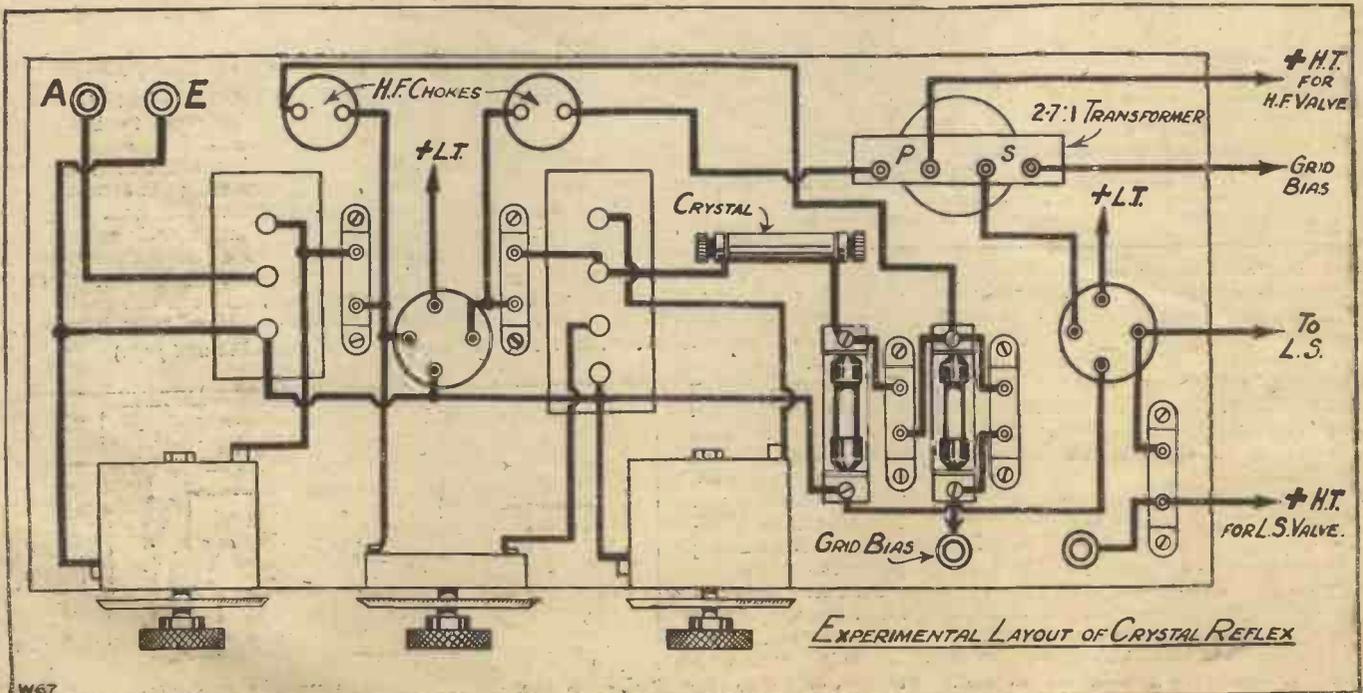
This little hint will often improve the reception on a set which is affected by microphonic noises due to faulty valves, and is almost certain to reduce the expenditure on valves.

A. C.



(Fig. 5). Without this power valve it is not easy to get strong loud-speaker stuff, chiefly because a crystal does not easily drive a valve via a resistance stage, and I was not at all anxious to go back to transformer reflex.

With a power valve connected, as in Fig. 5, the receiver was generally improved. Bournemouth and Langenburg were strong 'phone or weak loud-speaker in the day, and the local station gave excellent loud-speaker results. At night time, six or seven



EXPERIMENTAL LAYOUT OF CRYSTAL REFLEX

"A NEW" SUPER-CIRCUIT

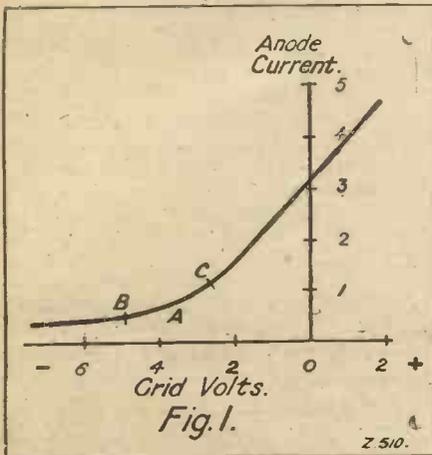
The Armstrong super-regenerative circuit is one of amazing sensitivity. An interesting development evolved and described.

By C. P. ALLINSON, A.M.I.R.E.



A CIRCUIT which has been greatly neglected of late is that employing the super-regenerative principle evolved by Major Armstrong. Certain authorities to whom I have been speaking recently are of the opinion that the super-regenerative circuit will come into its own again at some not far-off date, when some of the drawbacks attending this type of circuit are overcome.

It is certainly a wonderful circuit to work with, for the amount of amplification obtainable with one valve only, when using



trouble is, of course, that speech is badly distorted and music loses all tonal quality and even goes out of tune.

It is clear, then, that these signals can be brought up to full strength by letting the detector oscillate, and by quenching these oscillations the signal becomes readable again and recovers its original quality.

At the same time, the quenching frequency has another purpose. Consider a characteristic curve, such as that shown in Fig. 1, in which we will assume that rectification is taking place at the lower bend A. Now we know that the efficiency of rectification depends largely on the curvature at this bend, and the greater the curvature the less the efficiency of rectification. If we could make this an absolutely sharp angle, then the rectification would be perfect. If, however, we take an oscillation which we apply to the detector valve so that it sweeps over the bend part of the curve (i.e. between B and C), then for any further oscillation which is applied to the grid, and thus is super-imposed on these oscillations, we see that the effective portions of the characteristic curve on which the rectified signal is applied are actually at a sharp angle to each other, and this enables us to obtain the most efficient rectification.

Previous Difficulties.

Unfortunately, the circuit, especially when used in flivver form, had a number of drawbacks, some of which I have also found inherent to the two and three valve forms of the circuit. Firstly, it was frequently found difficult to get the quenching frequency circuit to oscillate satisfactorily. It was also found difficult in many cases to obtain sufficient reaction in both circuits to get the desired results. It is also important that the frame used be very lightly damped, and even when working properly it was found that tuning was exceedingly flat owing to the re-heterodyne effects which were obtained, so that when using a set of this description, say at six miles from the local station, great difficulty would be experienced in receiving other stations working within 100 or 150 metres of the local transmission.

A further difficulty that was found was that reaction varied from degree to degree

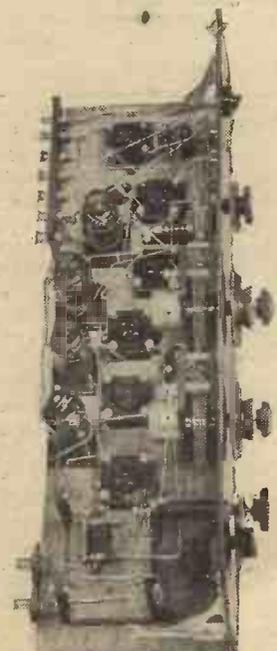
on the condenser dials, while this again reacted on the long-wave oscillations, and a set of this description was exceedingly tricky to handle and unsatisfactory in its performance. The amplification obtained was simply marvellous, but it was certainly a difficult matter to duplicate results.

A Promising Future.

I worked on these super-regenerative receivers for some time when they first came out, but none of them, to my mind, was really satisfactory in use, the chief obstacles being, apart from the annoyance caused by the quenching frequency—to which the ear, however, speedily became accustomed—due to the instability of the various adjustments and the extreme lack of selectivity.

About a year ago I took up the question again, and after doing a considerable amount of experimental work I finally evolved a circuit which should go far towards solving some of the problems associated with the usual super-regenerative reception.

Although the circuit has not been completed as yet, the work that I have done on it has given me a definite indication that it works on the super-regenerative principle and that it can give a very high degree of amplification. The basic idea of this invention,



A typical multi-stage super-heterodyne receiver.

a flivver circuit, on a frame aerial, is simply amazing. Stations hundreds of miles distant can be received at excellent strength on the loud speaker when using just the one valve.

Lower Bend Rectification.

As readers will no doubt remember, the super-regenerative principle consists in allowing the detector to oscillate strongly, and stopping it and starting it oscillating by means of a further oscillation at low frequency being super-imposed. By suitably choosing the constants of the circuit this quenching frequency, as it is called, can be made almost inaudible.

Now, everybody has noticed how a signal, inaudible in the ordinary way, comes up to quite excellent strength when heterodyne reception is employed; but the

(Continued on next page.)

A NEW "SUPER" CIRCUIT.

(Continued from previous page.)

which I have protected provisionally, is to combine two sets of high-frequency oscillations so that they will produce a beat. This beat is to provide the quenching frequency, and of course may be adjusted to have any desired frequency. The method of adjusting the receiver is approximately this. A valve which is being used both as detector and oscillator is tuned to provide a given signal and to give zero beat.

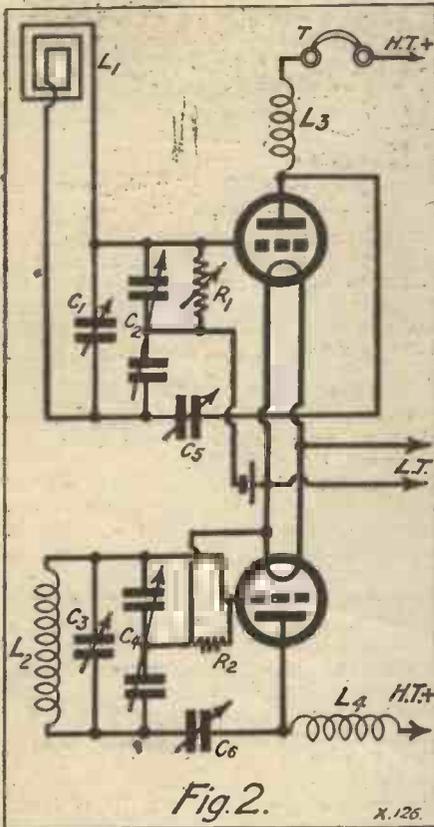


Fig. 2.

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The separate oscillator is then adjusted so as to give a beat having any desired frequency with the local oscillator, and therefore also with the transmission being received. This beat is adjusted to give a suitable quenching frequency, and by making small final adjustments on the two condenser dials the familiar super-regenerative roar is obtained.

The New Circuit.

The chief points which require consideration with this method of reception are the relative strengths of the oscillations generated by the oscillator proper and by the oscillator detector, and also the most suitable method of coupling to employ to introduce the desired amount of energy from the oscillator into the detector circuit, and nevertheless avoid any pulling into step between the two sources of high-frequency energy.

A circuit diagram showing this arrangement is given in Fig. 2. The frame aerial is shown at L₁, and this may be either centre tapped or else a capacity tap as shown at C₂ may be employed. By varying this

tapping point, by having a double variable balancing condenser for this function the strength of oscillations in the detector circuit may be adjusted, while a further control is given by the reaction condenser shown at C₅. The detector grid-leak is shown at R₁, and this may also be made variable with advantage. A choke is provided in the plate circuit shown at L₃, and in series with this the telephones T. The use of a small amount of negative bias is frequently found of advantage in this circuit, and it further assists to sharpen up the tuning.

The Heterodyne Pick-up.

A similar circuit is employed in the oscillator valve, a capacity centre tap being obtained again here, this being variable so as to allow the strength of oscillations to be adjusted as required. It is then necessary to introduce some form of coupling between the frame aerial L₁ and oscillator coil L₂, and this may either be done by means of a small pick-up coil, connected in series with the frame and coupled to the inductance L₂, or else by means of a resistance and condenser in series, coupling oscillator and detector valves grid to grid as used in certain super-heterodyne circuits. The coupling arrangements are not shown in the figure.

The use of a pick-up coil, of course, enables the coupling to be varied between the oscillator and detector circuits; but it is to be feared that unless a very small coil is used and great care taken in the assembly of the receiver, the coupling would prove to be too tight. This, however, is one of the points which needs to be determined by experiment in order that the most successful operation may be obtained by the use of this circuit. It will be seen that this method of reception lends itself to a variety of different arrangements which will, of course, be to a degree the same, though varying in their application.

A straightforward Reinartz reaction circuit may, for instance, be used for the detector, or, if preferred, a plain Hartley circuit; while the oscillator may use any of the known systems which are so frequently employed where a source of H.F. energy of any desired frequency is required.

During the experiments which I have carried out with this method of reception I have found that the tuning is exceedingly sharp, and that it is quite a simple matter to separate London and Manchester on a frame aerial at quite short distances from the transmitting station.

For the benefit of those unacquainted with "supers" I must say that a frame aerial is practically essential, as any damping in the grid circuit would render the set inoperative as regards the super-regenerative part of the business.

THE DECREASE IN LICENCES.

A READER'S VIEWS.

The Editor, POPULAR WIRELESS.

Dear Sir,—The question of programmes is rather a hackneyed one, but I notice that the number of licences renewed last month shows a considerable decrease. The reason is fairly obvious, and, what is more to the point, this drop will continue indefinitely unless something is done soon. Speaking not only from my own opinion, but also the opinion of people with whom I come into daily contact, the chief cause of complaint seems to be the Sunday programmes.

I presume more people listen on a Sunday than any other day in the week, and yet that day's music is usually the most dreary and uninteresting (to put it mildly) of the whole week. It seems to be a matter of impossibility for the B.B.C. to compile programmes on the lines of what have been proved to be the popular orchestras, viz. De Groot, J. H. Squire, and Sandler. It is not altogether a question of the orchestra, but the music, which has made them so popular. There does not seem to be any question of either of them being superior to the B.B.C.'s own. In my opinion, they are not.

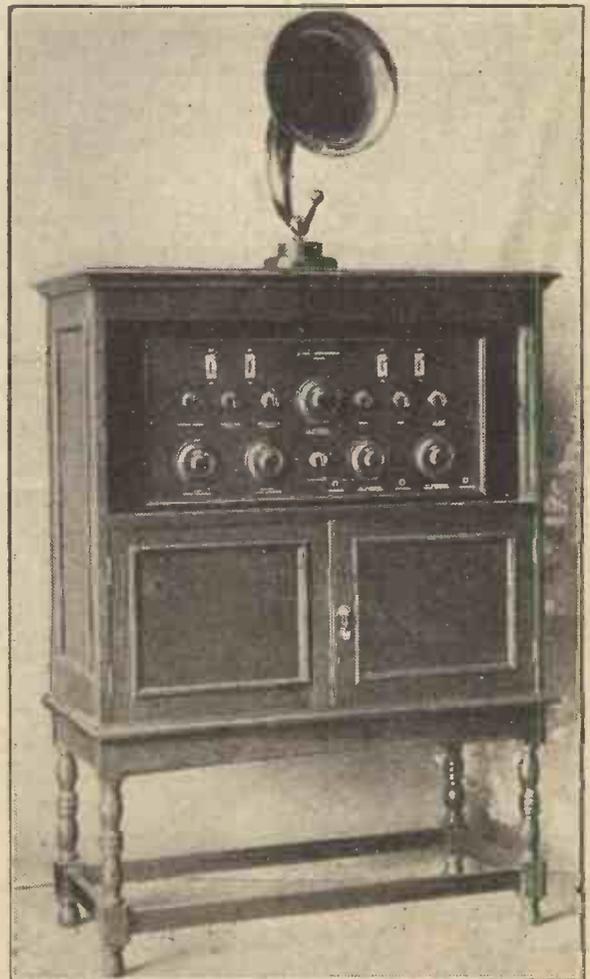
The B.B.C. give a symphony concert, shall we say, which is enthusiastically received by the audience present. They are pleased because they went there to hear that particular class of music; but that is no indication of the class of music which is wanted by the majority, and who were not present.

The policy of the B.B.C. seems to be to cater for the minority, not the majority. Any indication of the requirements of the majority, such as the recent "Daily Mail" ballot, is quite ignored. Apparently the B.B.C. wanted some actual proof. Now they are getting it with a vengeance, and will continue to do so unless they consider it worth while to take the majority into consideration instead of the minority.

Yours truly,

South Norwood, S.E.25.

J. E. BIRD.



A handsome eight-valve super-heterodyne built by one of our Darlington readers.

LET 'GOOD-NIGHT' BE AS CLEAR AS 'GOOD-EVENING'



60 VOLTS
(reads 66)

Now
13/6
10/6
7/11

If, while using a LISSEN Secret Process Battery, you measured the clearness and strength of the Evening Greeting and compared it with that of the "Good-night, Everybody," you would find the last words of the announcer clear and fresh, and the last bars of the music at midnight full of truthful tone.

An ordinary battery deteriorates if the programme is long, but the LISSEN battery keeps your loud speaker fresh voiced and natural right through. This lasting purity of tone and improved power is remarked on by everybody who uses a LISSEN Secret Process Battery. The reason for this rests with the new LISSEN Process of manufacture and the unique chemical combination which is used only by LISSEN, because it is known to nobody else.

And by dint of determination and a single-minded aim, LISSEN has brought this fine battery down in price, by distributing direct to the dealer and eliminating big wholesale profits, until now nobody need be without this fine battery.

It is obtainable at all good dealers. Ask for LISSEN Secret Process in a way that shows you will take no other.

100 volts (reads 108) 12/11

9 volts (grid bias) = 1/6

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Managing Director : Thomas N. Cole.
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TEDDY BROWN & BROADCASTING



TEDDY BROWN and his band, of the Café de Paris, have rapidly become favourites with listeners—and rightly, too, for Teddy Brown's band is undoubtedly one of the finest dance bands in the world, and people flock to the Café de Paris nightly to hear him and his merry men.

The Café de Paris is one of London's most fashionable night haunts. This small, exclusive restaurant is the rendezvous of Society—Society with a big "S." From after theatre time until the early hours of the morning one may see princes and princesses, peers and peeresses, cabinet ministers, ambassadors with their wives, leading business men, soldiers, sailors, distinguished actors and actresses. Of the latter some are distinguished, some beautiful, some occasionally both—supping and dancing.

The entrée to the restaurant, unless you are personally known to the courteous but eagle-eyed management, is difficult; the right to a table around the dancing floor, unless you are favoured, almost impossible. Nightly, between midnight and 1 a.m., the scene which greets one, from the balcony which surrounds the dancing floor, is typical of modern social conditions; royalty, the peerage, and those who "have got there," enjoying themselves in an aristocratic democratic way.

What is it which brings them there, in and out of season? What is it which makes the Café de Paris scarcely equalled by the most exclusive of restaurants and surpassed by none? They are not charged unreasonable prices; they are not provided with extravagant galas—they pass too quickly; but they are provided with the most entrancing, dance-producing band which has ever played in London, and, as an additional attraction, the world's largest and happiest leader in the person of Teddy Brown.

A Giant of Music.

Only twenty-seven years of age, and twenty-two stone in weight, this genial giant of music, who recently—owing to some slight misunderstanding with the Income Tax authorities—spent a week-end at His Majesty's expense, as a result of which it is rumoured that he is going to compose a "Brixton Blues" (the "motif" of which will be the creaking of mattress-springs, intermingling with the hollow

By "ARIEL."

groans of a hungry man), has given me some impressions of his association with the B.B.C.

Teddy Brown is an artist when playing or conducting; every ounce of his vast frame exudes rhythm. He is an expert xylophonist and saxophonist, and, in fact, plays the piano, drum, trumpet, trombone, and nearly every instrument you can think of.

Speaking personally, the writer has found that under the musical ægis of Teddy Brown he has become a Pavlova to himself, and a nuisance to his partners!

The opinion on the B.B.C. of such a factor in our lighter musical life and of one who is a regular broadcaster should be of interest to the readers of this journal; and let me say at once that that frequently maligned institution has no more fervent admirer, either as a performer or as a listener-in, than Teddy Brown.



Teddy Brown is never happier than when playing upon the xylophone.

Teddy Brown, when I asked him if he could give me some information with regard to any arrangements he had made with the B.B.C. for the broadcasting of himself and his band in the future, told me in all sincerity that as long as he is in England, and whenever he is approached, he will be only too delighted, subject to any previous engagements, to broadcast for the B.B.C. I asked him if there was any chance of his leaving England for some time. My question at first appeared to hurt him, but a placid grin of complacency gradually extended as he, very firmly and with no hesitation, replied:

"I should say not!"

Satisfied with B.B.C.

This very definite satisfaction caused me to delve rather further into Teddy's cause for appreciation of the B.B.C., and I hinted that perhaps he might have some criticism to make about the scale of payments by the Company. One had heard that some artistes were dissatisfied with the terms offered, others had refused even to consider them. His reply was illuminating:

"I can honestly say that at no time in my career have I met or come across a concern which so appreciates the value of a true artistic turn in its own sphere. I can only speak for myself and my band, but I consider I and my co-artistes are adequately paid—and I am not cheap!"

Looking at him, I believed it—implicitly!

This definite vindication of the B.B.C. by a man who is at the head of his profession, of the fair treatment of the artistes they employ, must make pleasant reading to the countless subscribers who have been overwhelmed by diverse opinions frequently uttered by those who have least right to speak. Let it be remembered that an artiste who is really satisfied will give of his or her best.

"I have always found that whenever I and my band have had to broadcast from Savoy Hill, the officials of the Company, one and all, have done their utmost to make us feel comfortable and at home," continued Teddy Brown.

"Every reasonable desire acceded to, the atmosphere made warm and appreciative, so that we could do full justice to ourselves and to the public. One can work for the B.B.C. knowing that their contracts are

(Continued on next page.)

OUR BERLIN LETTER.

By DR. ALFRED GRADENWITZ.

German High Sea Broadcasting.

AT the Fisheries Show recently held at Kiel, a new broadcasting service destined for fishing and other boats made its first public appearance. This takes the form of a high-power radio-telephone transmitter, so that at given intervals communications can be made with small craft on the open sea, particularly with fishing vessels and other boats which would have some difficulty in finding a trained operator for their wireless equipment.

Special types of receivers, which are easy to operate, have been developed in conjunction with German radio firms, and these, while complying with actual requirements on board ship, will warrant reliable communication under normal conditions, as far as Iceland and the White Sea. In addition to important nautical news, weather and wind reports, storm warnings, etc., there are given out auction and price bulletins from all fishing towns in Germany and England. Moreover, there is a possibility of transmitting individual instructions of any kind to ships on the sea.

What importance this service, in spite of its relative novelty, may claim is seen from the fact that as a consequence of orders received by this means, twenty-six boats were in the course of one month directed to other harbours. A new 10 kw. telephone transmitter now under construction for Norddeich is shortly to be set apart for this service.

Music Exhibition at Frankfurt.

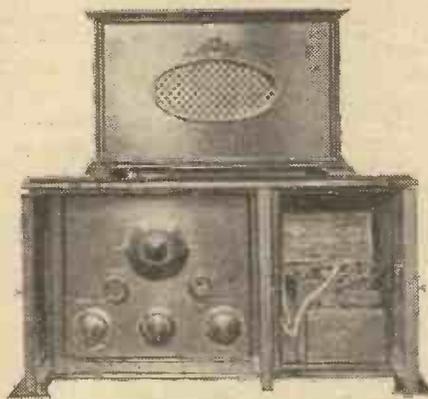
The great international exhibition, "Music in the Life of Nations," comprised an interesting radio section in the recent music show at Frankfurt, the German Postal Department, in conjunction with the local and general broadcasting companies, being among the principal exhibitors. In addition to a large-sized model of the Frankfurt transmitter, inclusive of its

antenna towers and transmitter house, there were shown two typical studios, with the heavy damping formerly in use and the present slight damping respectively.

A peasant's cottage and receiving set, as well as a hospital ward and class-room equipped with wireless receivers, were likewise on view, the special advantages of radio broadcasting for each profession being set forth in a descriptive bulletin. A number of foreign broadcasting companies supplied photographs illustrating their services.

Group Aerials for New Houses.

Individual house owners and house-building companies in Germany have, in some cases, provided a group antenna system for the use of prospective tenants. Though this in itself constitutes the beginning of the erection of a wireless receiving station, the Postal Department has refrained from taking objection to this practice, which, of course, is bound to facilitate the proper installation of individual receiving stations.



A well-designed set with batteries enclosed, constructed by one of our Greenock readers.

Radio Policy of German Postal Department.

Nine main transmitting stations and nine transmitting districts have been provided by the German Postal Department. The normal ranges of these will touch one another—or overlap, leaving only small intervals, so that about 10ths of the country is situated within the range of one of them. However, a number of "dead" districts with feeble or no reception were discovered, while some large towns within the range covered by existing transmitters would insist on having their own transmitters.

Relay stations were at first provided to comply with these wishes, and overcome the difficulties afforded by "dead" areas, but the additional expenditure thus incurred was prohibitive, and technical considerations, such as the wave-length problem, and the impossibility of providing suitable transmitting lines, also showed the necessity of a change of policy.

Since telephone cables mainly designed for a satisfactory transmission of speech fail to deal with the large range of frequencies required for the rendering of music, special accessories are being added to do this, it being hoped that this difficult task may be completed by the end of next year. The installation of any further relay stations being out of the question, the Postal Department proceeded to increase the power of main transmitters to three times the original figure, in order to ensure crystal reception within the immediate surroundings of the transmitter.

A New Station.

Experience goes to show that increasing the output of a transmitter from 0.7 kw. to 4 kw. will raise the normal crystal detector range from three miles to about six miles, which is obviously insufficient to ensure any notable increase of the number of listeners to whom a given station is accessible.

Experiments are being made to solve the problem of the simultaneous operation of one main transmitter and several relay transmitters on the same wave-length. The new large transmitter under construction at Zeesen, near Königswusterhausen, is to be Europe's most powerful station.

TEDDY BROWN AND BROADCASTING.

(Continued from previous page.)

reasonable, fair, and never fail; that one receives a courtesy and consideration which makes it a pleasure to work for them. I must say that the treatment I have experienced from the B.B.C. is much better than I have ever received from any other broadcasting company, and I have broadcasted some. And don't forget to add—it's the most important thing—there's no delay in payment."

After this eulogy I felt like buying bouquets for the whole of the directors and heads of departments at 2, Savoy Hill!

But surely there must be some snag, something in which if we did not find fault, at least we might suggest improvement? So I put it to Teddy that he should criticise the average daily programme. This he was

rather loath to do, but after a little persuasion what he said, boiled down, was this:

"The B.B.C. have an enormous audience, varied in every class, in every kind of taste, and it is a superhuman task to satisfy every one. Considering all things, the B.B.C. do their job wonderfully; but as a musician and one accustomed to broadcasting, I would suggest that the broadcasting of opera or musical comedy from the stage of a theatre is not fair either to the artiste, the orchestra, or the B.B.C.

Finest Form of Reproduction.

"Broadcasting is the finest and most perfect form of reproduction yet found—in its place; but in, for instance, the broadcasting of an opera from Covent Garden, the microphone is in a fixed position, most suitable to general reproduction of the scene or act. The artistes on the stage are singing and acting for the audience present and not into the microphone, and therefore, although possibly giving a perfect rendering in the theatre, are inadequately reproduced through the microphone. Opera is too great to be

so mishandled, and should not be so reproduced until broadcasting is more perfected.

"Again, there should be an interlude of dance music between nine and eleven p.m. I am thinking of the number of people who listen-in and who, because of their work, cannot sit up until late to hear the best dance bands in London. I receive hundreds of letters daily from all over the country, in many of which there is a request for me to broadcast my dance music earlier in the evening. Surely these workers should be considered. Instead of between the aforementioned hours having semi-highbrow and good music all the time, give a little pep to the home, say between 9.45 and 10.15. It will do good. Think of the number of houses where, perhaps, there is a slight difference of opinion, which looks like becoming a permanent depression in the home, especially when carried on to the strains of Tosti's 'Good-bye'—which could be just cleared right away by the opening bars of 'Ain't She Sweet!' I've had some—I know!"

WHAT IS DISTORTION?

The Editor, POPULAR WIRELESS.

Dear Sir,—A consignee who has occasion to complain about faulty delivery of goods will always distinguish carefully between those which have been damaged in transit and those which have never arrived at all, and would never refer to the missing articles as damaged, since, not having received them, he cannot possibly know in what condition they are.

If you look at a picture through a heavy lattice you may get a partial and incorrect impression of the original; indeed, if the lattice be heavy enough, you may miss the point of the picture altogether; yet, so long as the fragments which come through can be seen clearly, you cannot claim that your view of the picture is distorted.

One would imagine that the same general principles should apply to reception by wireless, yet we find that most listeners who have occasion to complain about faulty reception will insist on lumping together the damaged and the missing sounds under the term "distortion." Nothing is gained by this, and much is lost, for the two defects are due to different causes, and their removal demands different treatments; and now that so much attention is being focused on good reception it is to be hoped that the term "suppression" will take its rightful place alongside of "distortion."

While on the question of words, has not the time come to introduce a new one? Many years ago some forgotten genius discovered that the clumsy term "ampere meter" could conveniently be compressed into "ammeter," and though only one single little syllable was thereby saved, the new word made good. Far, far greater is the need for the tabloid word "pometer," whereby no less than three syllables are saved, and I trust that you will do your best to give it a start in life.

Logically we ought to go one step further and advocate the use of "vometer" as well; but the term would perhaps be too reminiscent of a Channel crossing.

Yours faithfully,
London. "CLEVELAND SQUARE."

A CAUSE OF DISTORTION.

The Editor, POPULAR WIRELESS.

Dear Sir,—In the letters of your various correspondents on the subject of Purity, Blasting Studios, etc., it seems that two very important and prevalent causes of distortion have been overlooked, or at least, not sufficiently emphasised.

The first cause is one that may affect the most perfect set and the most superlative transmission, that is, the man who works his set in an oscillating condition and tuned down to the silent point.

I have experienced the trouble in several districts. The transmission is coming through well, then, after a few preliminary howls, the fellow settles down on the silent point with his detector oscillating. The reception in the neighbourhood immediately deteriorates, and blasting, similar to that due to over-modulation, makes itself heard. There is, of course, no cure for this but to change to a different station or to cut down the fellow's aerial.

The other cause of distortion is found in transformer-coupled amplifiers, and is the reason, in my opinion, why some people say that transformers, however good their curves may be, can never give reproduction that sounds as well as that obtained when using R.C.C.

When two transformers are used in an amplifier with really efficient valves, it is very easy to get sufficient accidental coupling, even in a well-designed set, to cause an L.F. whistle. With a very carefully arranged set this can be eliminated, but there must always be a certain amount of feedback, and this L.F. reaction must cause peaks due to resonance which will ruin the straight line amplification which can otherwise be obtained when using good L.F. transformers. This seems to me to be the only reason against using good transformers in an L.F. amplifier, for the difference between a stage using R.C. and one using an A.F.3 is certainly not sufficient to be detected by even the most sensitive ear.

I should like to hear the opinion of other readers as to the extent and effect of L.F. reaction, most of which is, I believe, due to coupling introduced by the resistance of the H.T. battery even when this has been shunted by large value condensers.

Yours faithfully,
BERNARD R. BETTRIDGE.

Birchington, Kent.

ANOTHER NOVEL AERIAL.

The Editor, POPULAR WIRELESS.

Dear Sir,—I read the article by R. V. Hulbert in your issue for August 6th regarding his experiences with a piano and a spring-mattress as aerials.

I am a young experimenter, and am used to a great deal of cycling; but whenever I used to take my "One-valve Chitos" on the carrier with me, I could never fix up a satisfactory aerial. However, I had the idea of using the bicycle as an aerial; I fixed a few inches of flex under the saddle-nut, and a few more feet along the ground for an earth. At fifty miles from London this station was overpowering, while, in full daylight, several Continentals were tuned in. The bicycle can be left in a shed in the yard with quite a long lead-in, or brought into the "radio den," with a lead-in of a few inches, but the results are the same

CORRESPONDENCE.

WHAT IS DISTORTION?

ANOTHER NOVEL AERIAL—SHORT-WAVE RECEPTION, ETC.

Owing to readers' complaints that undesirable touting and similar queries have followed the publication of letters addressed to "Popular Wireless," we have decided to discontinue giving the full postal addresses of our correspondents. Relevant queries arising from such correspondence are always welcomed for publication on this page.

We cannot accept any responsibility for the views expressed by readers in their letters.—The Editor.

Further, if a station can only be received faintly with the bicycle in one direction, the direction can be altered until the signals improve. I am looking out for more readers' experiences with "Novel Aerials." Wishing POPULAR WIRELESS every success; and hoping that many more one-valves such as the "Chitos" and the "Filadync" will appear in the near future.

Yours faithfully,
WILLIAM ROBERTS.

London.

METHODS OF L.F. COUPLING.

The Editor, POPULAR WIRELESS.

Dear Sir,—May I crave the hospitality of your columns once more in order to answer Mr. Bonavia-Hunt's interesting letter?

Violins and all string instruments are excellent, and a big orchestra of strings is a real pleasure to listen to.

I have taken the trouble of using the amplifier and loud speaker in conjunction with a good microphone in the same room as a piano and violin, and have stood between loud speaker and instruments, and it was very hard to detect the loud speaker.

Mr. Hunt's question, "Does an organ sound like an organ?" is harder to answer.

It does in so far as you could not mistake it for any other instrument, but there are one or two imperfections which I am trying to eliminate. After all, it is rather optimistic to expect a cone of paper 10 inches in diameter to reproduce the organ in all its majesty and grandeur, and the fact that it can attain such a close similarity is surprising.

I agree with Mr. Hunt that there is a lag in a crescendo movement, but think that he rather exaggerates the effect.

By careful design and calculation of the condensers and grid leaks the effect can only be noticed if one knows the piece of music intimately. Also one must bear in mind that the B.B.C. use R.C.C. and there must be a certain lag in transmission.

With regard to choke coupling I agree, and have since my previous letter substituted a 450-henry choke in place of the last grid leak.

Battery coupling suffers from several disadvantages. With the high anode voltages I am using the coupling battery would have to be very large, particularly on the last stage. As the battery is at L.F. potential to earth, some very unpleasant effects can be obtained, as I have experienced.

I trust Mr. Hunt will find this letter as interesting as I found his.

Yours faithfully,
A. S. BROWN.

S.E.16.

RADIO AND TELEPATHY.

The Editor, POPULAR WIRELESS.

Dear Sir,—The letter on "Radio and Telepathy" which you published in this week's issue of POPULAR WIRELESS is very interesting—especially as the writer, Mr. B. A. Starley, M.A., says that he is willing to give more detailed information if desired.

Some years ago I had frequent opportunities of practising telepathy with a Burmese boy, and came to almost the same conclusions as Mr. Starley. The only difference was that I found it best, after glimpsing at the article, to have the impression in the mind to this extent only—that when the guess was made I knew whether it was right or wrong. There was no conscious thought or "picture" in my mind. The guesses were correct about four times out of five.

But I have never been so successful in transmitting thoughts to anyone else—nor could the Burmese boy transmit to me. This leads me to believe that the state of mind of the "receiver" is an important factor, and I have been unable to find out how to acquire this state. So if Mr. Starley has some information to give on this point, I should be very glad to have it.

Yours faithfully,
W. LL. LAWRENCE.

Rhyl.

THE "STATFACE" FOUR.

The Editor, POPULAR WIRELESS.

Sir,—Please accept my thanks for the description of the "Spanspan" Four. I think it the best four-valver yet, having tried every one published. I have been able to get ten stations on loud speaker, eleven on 'phones, in place of the Standard Screen; I have fitted screening box with H.F. valve in same.

Yours faithfully,
W. H. STOWERS.

Torquay.

SHORT-WAVE RECEPTION.

The Editor, POPULAR WIRELESS.

Dear Sir,—Short-wave readers may be interested to know that A G A and A G C, of Nauen, Germany, are now transmitting speech and music. A G A uses 14.9 m., and A G C 17.3 m., both sending at the same time. A G C comes in R 5-6, while A G A only reaches R 24-3. On July 29th these stations were transmitting from 8.30 to 8.55 approximately. The announcements were made by a woman, several languages being used. They asked for reports. A G A faded badly, but A G C was quite steady and the quality was very good.

With reference to Mr. Riley's letter in "P.W." July 30th, I also received this transmission very clearly. Fading was only noticeable during the speeches. The strength was R 3½. I wonder how many amateurs heard the tests from the same station on Sunday, June 28th, when they were working Bodmin from 7 p.m. onwards. The strength reached R 5 during a record by John McCormack, at 9 p.m. The station was announced as the Drummondville Station of the Marconi Company. Drummondville is a town 80 miles south of Quebec.

The "mystery" station is probably 2 X T, the R.C. of A. station at Rocky Point, on a wave of 16.1 m. This station sends 25 word tests at various times in the evening, and uses a humming noise before and after speech.

P C J J is received best R 5-6. No fading with the other stations in the following order:

- | | |
|-----------------------|----------------|
| A G C, R 44-6. | No fading. |
| Drummondville, R B 1. | Slight fading. |
| 2 X A D, R 3. | Slight fading. |
| 2 X A F, R 3. | Fading bad. |
| 2 X T, R 2½. | No fading. |
| A G A, B 2½. | Slight fading. |

All the above receptions are on a one-valve modern Reinartz.

I hope you will continue to publish short-wave notes and short-wave constructional articles.

Yours faithfully,
D. S. COE.

Plymouth.

STANDARD TWO-VALVER.

The Editor, POPULAR WIRELESS.

Dear Sir,—Re the "Standard Two-Valver." I took the set down with me to the south-east coast, and the results were great. Selectivity and range were extraordinary. The performance quite equals the five-valve neutrodyne I have here, as regards range and selectivity, and with another extra magnifier it will be great. I have had rather considerable experience in construction, and "P.W." sets have all been good, but this one beats the lot.

Yours faithfully,
E. WALPOLE.

Ealing, W.5.

A GRID-BIAS H.T. DANGER.

The Editor, POPULAR WIRELESS.

Dear Sir,—If grid bias is taken from an H.T. battery, it is most important that the negative H.T. lead and positive grid-bias lead are connected to the same cell or battery socket. If this is not done the cells between grid-bias positive tapping and H.T. negative will be short-circuited through the receiver, and result in permanent damage to the intervening cells. This, in the case of a dry battery, may spread through the whole of the cells and ruin the battery.

The best plan, when using wet sac Leclanché cells, is to have the cells used for grid bias disconnected from the H.T. battery; in fact, used as a small additional battery with sufficient cells (allowing 1.5 volts per cell) to give the necessary grid-bias voltage. The two sets can, however, be placed in the same tray or cabinet. The No. 1 sac is all that is necessary, due to the fact that no current is taken. The two sets can, however, be placed in the same tray or cabinet.

An examination of the grid-bias circuit in any receiver will show that a short circuit occurs unless the connecting up is made as we have indicated above, and it is possible that many users of grid bias have inadvertently caused such a short circuit, with the consequent lowering in the quality of their reception.

Yours faithfully,
M. E. WATES.

London, W.C.1.

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Traders and manufacturers are invited to submit wireless sets and components to the "P.W." Technical Department for test. All tests are carried out with strict impartiality in the "P.W." test-room, under the supervision of the Technical Editor, and the general reader is asked to note that this weekly article is also intended to provide a reliable and unbiased guide as to what to buy and what to avoid.—EDITOR.

A TAPPED H.F. CHOKE.

DETEX, Distributors, Ltd., 125-129, Rosebery Avenue, London, E.C.1, recently sent us one of their tapped H.F. chokes. It is a compact component, suitable for either baseboard or panel mounting. It is provided with three connecting points, and connections can be made between any two of these, thus providing three alternative values. The three available inductances are 27,800, 84,400 and 112,200 mhs. The windings are contained in a slotted former, and the device has a low self-capacity.

We tested it in several positions in a receiver, and found it to be perfectly satisfactory on short, normal broadcast, and long wave-lengths. Using terminals 1 and 3 (the whole of the winding) it operated without "peak" up to 2,500 metres, while, when terminals 2 and 3 were employed, we found it O.K. down to 100 metres. Terminals 1 and 2 proved capable of covering the

normal broadcast band and 5 XX quite comfortably. The price of this Detex Tapped H.F. Choke is 4s. 9d. and, being both well made and efficient, it appears to be quite cheap.

TWO GOLTONE ITEMS.

Messrs. Ward & Goldstone recently sent us a small sample of their "Negrolac" aerial wire. This consists of 49 strands of enamelled wire covered with a coated fabric covering. It should have excellent "pick up" qualities, and should also be able to resist the action of corrosive agents successfully for very long periods. It is a rather expensive material, costing 15s. per 80 ft. length and 18s. per 100 ft.

The experimenter should be particularly interested in the Goltone "Quickgrip Connector." This device is rather like a spring tie clip, so designed that it can easily be fixed on the end of a lead. Its jaws can

then be sprung on to any point to which it is desired to connect the lead. It will hold firmly on to practically anything—even a single strand of wire. The clip sells at 2d., and an article which can so facilitate experimental work should be present in moderate numbers in every amateur's workshop. Messrs. Ward & Goldstone also sent us, as a matter of interest, specimens of their 5 amp. and 10 amp. sizes of "Quickgrip Connectors," which retail at 5½d. and 7½d. each respectively. These are much larger, and being lead covered are suitable for use as accumulator connectors. People who have to do a fair amount of accumulator charging should find them invaluable.

THE "LIONTRON."

From Mr. S. Lyons we have received a "Liontron" detector. Mr. Lyons is producing some excellent crystal detectors of the semi-permanent "Perikon" type these days, and this latest product is no exception. Suitable for single-hole panel mounting, it is provided with a safety cap which screws over the small knob provided for adjustment purposes. But the detector seldom requires attention, and remains in a sensitive condition for very long periods.

A feature of this component is that the two crystals employed are visible through a glass-covered aperture, while, additionally, either or both are readily replaceable should the necessity arise. It is from every point of view a well-designed and produced article, and at the low price of 2s. 9d. appears to us as being as attractive as anything in the way of modern detectors there is on the market.

(Continued on next page.)

New Osram Valves

An Important Announcement

The introduction of the new Osram Filament has enabled the General Electric Co. Ltd. to produce a new and improved range of Osram Valves for Broadcast Reception

The outstanding merits are:—

Extremely low current consumption.
Entire absence of microphonics. Great Robustness

These Valves have been adopted and are recommended after trial for clearer and better reception by:—

MISS EDITH DAY M^r DE GROOT
Improved Results Cheaper Prices

APPARATUS TESTED.

(Continued from previous page.)

DUBILIER "R.C." UNIT.

One of the advantages of the resistance-capacity method of low-frequency amplifier coupling is that it makes for compactness in receiver design, and this is especially so when the resistance, leak and condenser required for each stage is obtainable in the form of one unit.

Messrs. Dubilier recently placed such a unit on the market. The condenser is contained in an ebonite moulding which forms the base of the device, while on the top of this are mounted the two pairs of Dumetohm clips. In these latter are fitted two "Dumetohms." In the sample sent us these have resistances of 1 and 3 megohms, but as Messrs. Dubilier point out, any values can be employed as desired by individual constructors. "Dumetohm" grid leaks, or resistances as we should call them, are particularly suitable for R.C. work, for as our experience has shown they are quite impervious to atmospheric variations and retain their resistances at constant values even when subjected to fairly high voltages.

Naturally, when such a unit having resistances of pretty high values is used, it is necessary to employ one of the high amplification factor valves, and we are not particularly keen on more than one of these in any one set. But where two stages of L.F. are used a very excellent combination is one of these Dubilier units, together with a transformer coupled stage, this taking

the final position. We tested the sample sent us in such a circuit and it gave very satisfactory results indeed. Dubilier components are always reliable and dependable and we should imagine that this R.C. unit is as good as anything else bearing its name in these respects. It is certainly well made and at the price of 7s. is an attractive proposition.

"EASY LESSONS IN WIRELESS."

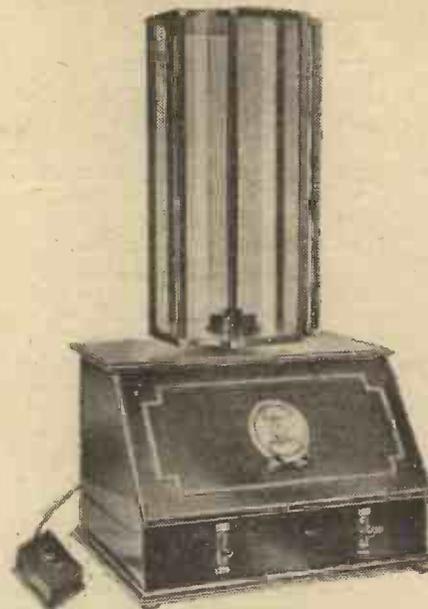
A very useful little work of the above title has just been published by the University Tutorial Press, Ltd., at 1s. 3d. It is by R. W. Hutchinson, M.Sc., A.M.I.E.E., and is intended for the absolute beginner. It is well written, and the constructor who wants to learn a little about the theory of radio could not do better than secure a copy of it.

LAMPLUGH VARIO-FIX RHEOSTAT.

Messrs. S. A. Lamplugh, Ltd., of Birmingham, have produced an improved version of their popular vario-fix rheostat. The "Vario-Fix" is a small filament resistor for baseboard mounting which can be adjusted to any value from zero up to its maximum resistance. The new model has a removable resistance element so that its range can be easily changed after it has been fixed in a set. All that one has to do is to unscrew the two little terminal screws and lift the resistance strip out and another one can be placed in position just as easily. The soldering tags are fixed to the resistance element. The "Vario-Fix" sells at the low price of 1s. 2d. for any maximum value of 6, 15 or 30 ohms.

The resistance strips can be obtained separately at 6d. each. This latter is well worth remembering for it frequently happens that low ohmic resistances are required for other purposes than that of direct filament control.

The "Vario-Fix" is a well produced little article and should continue to meet with a considerable demand at the competitive figure at which it is sold.



The new Marconiphone "Super-Eight" Super-Heterodyne Receiver. The list price of this, complete with valves and batteries, is £78 - 7 - 0.

The right place for a poor H.T. battery; — the ultimate home of even the best!

Why pay good money to fill ashcans? If it's H.T. you want, invest in a



CLARKE'S "ATLAS"

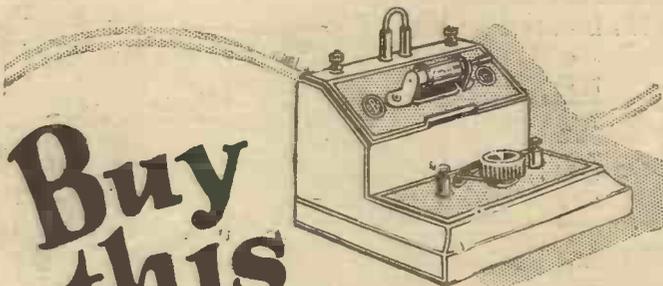
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The one thing needed to make wireless "all pleasure." At practically no cost, this Eliminator gives a smooth, constant H.T. supply whenever required. Simply plug in to the nearest lamp socket; there is nothing to burn or go wrong. Variable voltages and grid bias tappings on most models.

PRICES:

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Buy this as a "stand-by"

"No listening-in to-night—the batteries are down!"

"Oh, dear, and only last week a valve went phut in the middle of the news."

10'6

How many times have you wanted a BROWNIE as a "stand-by" when your valve set failed?
BROWNIE Crystal Set costs less than one valve!

Ask any good radio dealer.
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RADIOTORIAL

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Editor:
NORMAN EDWARDS, M.Inst.R.E., M.R.S.L., F.R.G.S.

Technical Editor:
G. V. DOWDING, Grad.I.E.E.

Assistant Technical Editors:
K. D. ROGERS, P. R. BIRD, G. P. KENDALL, B.Sc., A. JOHNSON RANDALL.

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As much of the information given in the columns of this paper concerns the most recent developments in the Radio world, some of the arrangements and specialities described may be the subject of Letters Patent, and the amateur and the trader would be well advised to obtain permission of the patentees to use the patents before doing so.

Questions and Answers

DISTORTION DUE TO H.F. FEEDBACK.

J. E. P. (Northampton).—"I have been troubled by a kind of blurring distortion on my four-valve set (H.F., Det., and two resistance L.F.'s), and, having tried all sorts of remedies, I have come to the conclusion that it is caused by stray H.F. currents. Is it likely that they would give rise to effects of this

kind, bearing in mind that the aerial and earth leads are necessarily rather long ones, and there may be some interaction with one or both of them and the long loud-speaker lead which goes to two different rooms? If you agree that H.F. may be the cause of this form of distortion, please say how it may be cured?"

We think it is quite likely.—In fact, probable—that the distortion that you are experiencing is due to an H.F. feed-back reaching the grid of the last valve, or the last valve but one.

A very easily applied remedy which is generally effective in such cases is the insertion of a resistance (100,000 to 250,000 ohms) between the grid itself and the lead or leads which connect to it. This resistance may be of the small carbon type (i.e. a point-one or a quarter-megohm grid leak), and should be tried first in one grid lead and then in the other. If neither position completely cures the trouble, try a leak in both, which should prove an effective remedy.

THE FILADYNE ONE-VALVER.

K. C. S. (West Ealing, London, W.13).—"I have constructed the 'Filadyne' one-valve circuit, and my notes may be of interest to others.

"On my set, better results are obtained when the leads of the grid coil are reversed! Other connections are O.K., and when the set is correctly connected there are few carriers; while, when wrongly joined, there is, as you say, 'almost one for each degree.'

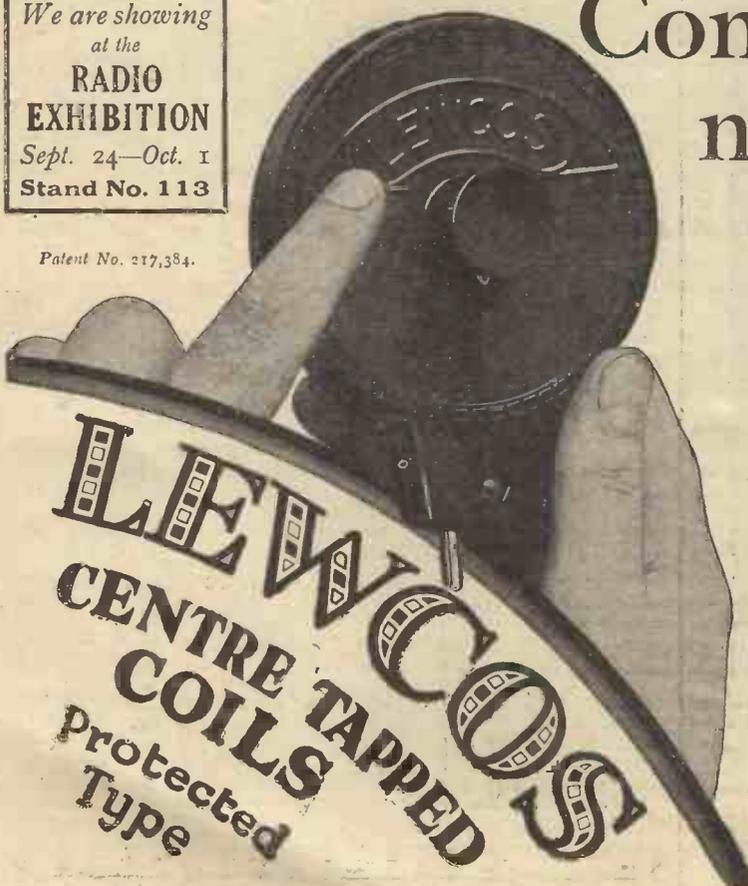
"In this fashion I have received many Continental stations, while Newcastle is the only home station, excluding the local one, 2 L.O. I do not know why I cannot get oscillation, as everything is as specified, except (1) I used a Lissenstat minor as rheostat; and (2) a 2 v. 1 amp. valve, which has an impedance only 3,000 ohms higher than the one you specify, and an amplification factor only half higher. This is, I think, near enough.

"On raising the H.T. (72-80 v.) there is an increase in signals, which has the effect of

(Continued on page 928.)

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 at the
RADIO EXHIBITION
 Sept. 24—Oct. 1
 Stand No. 113

Patent No. 217,384.



Complete range now available!

The recent introduction of LEWCOS Litz-wound centre-tapped coils Nos. 60 and 200 has proved so successful that we have now decided to supply these more selective coils in eleven numbers, covering the complete waveband. Try one of these new coils in your aerial circuit. Obtainable through all radio dealers. Full particulars gladly sent on request.

Wave-length Range in metres with Anode Condenser in parallel.

Coil No.	'00003 mfd.	'00025 mfd.	'0005 mfd.	Price each.
25	73	160	225	3/6
35	90	225	300	
40	126	283	386	
50	151	316	432	
60	188	391	555	
75	231	500	680	5/3
100	297	652	885	
125	498	995	1330	
150	565	1180	1625	
200	595	1410	1960	
300	942	2005	2755	
LEWCOS "X" COILS (Double Tapped).				
X 60	188	391	555	4/9
X 200	595	1410	1960	7/-

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THEIR steady voltage, low resistance and big reserve of power are a revelation to users of dry batteries. "HART" 'RAO' Type High Tension Accumulators are much more economical to operate over prolonged periods, and they also ensure that complete freedom from distortion of reception so welcome to critical listeners.

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Write to-day to Dept. "P.W." for particulars of "HART" Batteries for all wireless circuits, and for FREE BOOKLET of interest to all wireless users.

HART ACCUMULATOR CO., LTD.,
 STRATFORD, LONDON, E.15.



The PHONOVOX

The Igranic - Pacent Phonovox makes a gramophone record speak through the loud speaker of a wireless set with remarkable clarity and volume.

It comprises three pieces :

1. The Phonovox, which takes the place of the sound box of the gramophone and can easily be fitted by anyone in a few seconds, without the use of any tools.
2. A Plug Adaptor, which is inserted into the radio set in place of the "detector" valve.
3. A volume control, by means of which the volume of sound can be varied at will.

No other alteration is necessary to either the Gramophone or the Radio Receiving Set. The latter is always available for radio reception by merely removing the adaptor and replacing the "detector" valve. The Gramophone may always be used in the ordinary way by removing the Phonovox and replacing the sound box.

But the result, when the gramophone speaks through the Phonovox and loud speaker is SURPRISING and DELIGHTFUL.

The volume is increased, the tone is improved over the whole range, from the highest to the lowest notes, and needle scratch is abolished.

PRICES :

	£	s.	d.
Phonovox	1	17	6
Volume Control		7	6
Plug Adaptor		5	0

The Phonovox works equally well if connected to an Igranic three-valve amplifier (instead of a wireless receiving set) and a loud speaker.

We are exhibiting at the National Radio Exhibition, Olympia, Sept. 24th to Oct. 15th 1927.

STANDS Nos.
148 & 149

Write for Publication No. 6295/R. 55.

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 Works : BEDFORD.

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A BALANCING CONDENSER VERNIER CONDENSER CAPACITY REACTION CONTROL

The Gambrell Neutrovernia

has established itself as the finest neutrodyne condenser obtainable. It can be used for any of the three purposes mentioned above. Capacity approx. 2/38 m/mids. Will not short. A uniform increase or decrease in capacity is given by each turn of the knob.

Can be mounted three ways—on base-board, on panel, or through panel. Ask for the "Gambrell Neutrovernia" and Refuse Substitutes.

GAMBRELL BROS., LTD.
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PRICE

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Assured with our new Insulating Liner, Jars, 1/3 doz. plain; 1/8 doz. waxed; Special Zincs, 1/- doz.; High-Capacity Sacs, 1/8 doz.; Perforated Liners, 4d. doz. Post Free on three dozen and over, including special dielectric carton suitable as a container. Send for sample complete unit, particulars and instructions. We Stock Seamless Moulded Cone Parts, also the Wonderful Rolls Portable Set.

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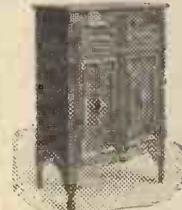
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are DUSTPROOF and house the whole apparatus, leaving no parts to be interfered with. All you do is UNLOCK & TUNE IN. Made on mass production lines, hence the low price. Provision is made to take panel, from 16 by 7 up to 30 by 18 in.

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SILENT H.T.

"TROMBA" Units give a pure and steady H.T. supply. Work on Leclanché principle. Made in all capacities, in single cells, or complete batteries. Also a few batteries of odd sizes at reduced prices. Send id. stamp for list, or 1/- for complete samples of all capacities. Recommended by "P.W." 21/5/27.

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RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 926.)

making the rheostat less critical, but has no effect whatsoever on oscillation. Also, to try to oscillate, I put a .0001 fixed condenser in the aerial, and could, at times, just oscillate, but then I lost signal strength! This is a very interesting set, without doubt!

"Although I cannot oscillate, the one valve works a Brown H.2 loud speaker, so that speech is just audible at about 6 ft. away. With an L.F. amplifier (one valve), the volume is too great for a room 11 ft. square. (I am six miles from 2 L.O.)"

The modification of the grid-coil wiring and the use of a different rheostat are variations of a comparatively unimportant type. The results from the use of a different valve, however, are particularly interesting, especially as it has been found that the valves which work best in the Filadyne circuit are not necessarily valves all having the same—or approximately the same—characteristics.

We do not quite follow your statement that you cannot oscillate, as this is contradictory to the statement that you receive plenty of carrier waves. It

THE TECHNICAL QUERY DEPARTMENT

Is Your Set "Going Good"?

Perhaps some mysterious noise has appeared and is spoiling your radio reception?—Or one of the batteries seems to run down much faster than formerly?—Or you want a Blue Print?

Whatever your radio problem may be, remember that the Technical Query Department is thoroughly equipped to assist our readers, and offers an unrivalled service.

Full details, including a revised scale of charges, can be obtained direct from the Technical Query Dept., "Popular Wireless," Fleetway House, Farringdon Street, London, E.C.4.

A postcard will do: On receipt of this an Application Form will be sent to you, free and post free, immediately. This application will place you under no obligation whatever, but having the form you will know exactly what information we require to have before us in order to solve your problems.

is impossible to hear anything of distant carrier waves with a non-oscillating set. They can only be heard if they are picked up by a receiver which is feebly oscillating on a wave-length very near to that of the station being picked up.

THE BEST AERIAL.

A. P. (Pontypridd, Glamorganshire).—"Which would you think the most suitable aerial for picking up stations and for selectivity—100 ft. and 30 ft. high, or 80 ft. and 30 ft. high?"

This will depend partly upon the type of aerial tuning which is employed, and partly upon the coupling between the aerial circuit and the tuned grid circuit. For most receivers at present in use the 80 ft. aerial which is 30 ft. high would give results superior to those obtainable with the 100 ft. aerial 30 ft. high.

VALVES FOR THE FILADYNE.

C. W. L. (Bury St. Edmunds).—"I am contemplating building the 'New Filadyne One-Valver' described in 'P.W.' No. 256, and am wondering if either of my valves (mentioned by name) will be suitable for the set, as both are almost new and I do not want to buy another?"

"Also, is it possible to receive the long-wave stations like Daventry, etc? If so, what alterations are necessary with regard to coils, etc.?"

Neither of the valves named by you are recommended as being suitable for the Filadyne circuit, though of course they are excellent valves when used in a conventional circuit.

It is possible to tune in long-wave stations by using larger tuning coils, the number of turns for the latter being the same for the Filadyne as for any other type of circuit. But there is this important difference. In the Filadyne circuit the filament current has to pass through the tuned coils, which act as filament chokes. Large coils of more than 100 turns will have a considerable D.C. resistance (unless they are constructed of thick wire), so that there will be a voltage drop between the accumulator and the filament, and the latter may then easily have insufficient voltage applied to it.

This difficulty, of course, can be overcome by using a four-volt or six-volt accumulator and allowing for the additional resistance in the filament circuit which is due to the tuned coils.

The easiest way to ensure that the coils being tried have not too much resistance for the particular accumulator in use is to connect a voltmeter across the filament pins of the valve. Then adjust the filament rheostat until the voltmeter registers the correct voltage for the particular valve in question. If the voltage registered when the filament rheostat is tuned on full is not high enough, the D.C. resistance of the tuned circuits must be reduced by the use of coils made of thicker wire.

THE "REGIONAL" THREE.

S. R. D. (Northamptonshire).—"The 'Regional Three' appears to be just the set for listeners in the big city centres which will be covered by regional transmitters placed several miles away. But how about if one lives within sight of the regional stations' masts? Won't the selectivity be a little lacking in such a case?"

As a matter of fact, the degree of selectivity provided in the "Regional" Three's high-frequency transformers is based on the supposition that the new regional stations are to be placed well away from the centres of population. For those who are placed within a few miles of the transmitter, it may be advisable to increase the selectivity by reducing the number of turns on the primary and stabilising windings. Trial should therefore be made before finally soldering the connections to the pins, and if the degree of selectivity is found to be inadequate, two or even three turns of wire may be removed from both primary and stabilising windings on the lower range transformer, and 10 or 15 turns from the high range transformer. These turns should be removed at the outside ends of the windings which connect to plate and N.C. respectively, leaving the central plus H.T. connection intact.

H.F. INSULATION.

W. B. (Dewsbury, Yorkshire).—"If a fixed condenser will by-pass high-frequency currents, the insulation between the metal foil is no insulation so far as high-frequency currents are concerned. Why, then, is the small ebonite bush—which is the only insulation between the fixed and the moving plates in some makes of variable condenser—considered sufficient? Why doesn't a short occur across the ebonite?"

Certainly this appears to be very puzzling at first glance. But a little reflection will show that the two instances quoted—the plates of a properly-made fixed condenser, and the bush of a variable condenser—have not so much in common as they would appear to have at first sight.

It is true that, in both instances, you have some form of insulation between metal plates, these plates being alternately charged and discharged by the high-frequency currents. But notice how vastly different is the "active area" of these plates, across which the high-frequency currents must act.

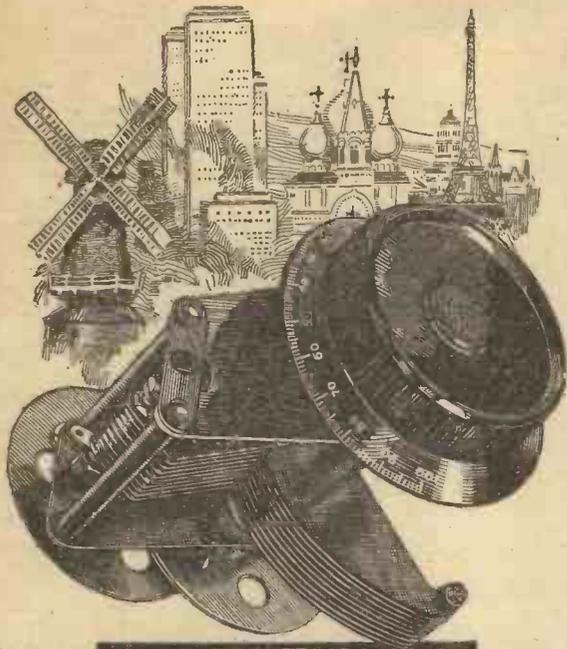
Looking first at the fixed condenser, it will be noticed that the high-frequency current entering it is led to the alternate flat plates of metal foil. Pressed close against these "input" plates, and separated only by the very thinnest of thin insulation, is the opposite set of plates, by which the high-frequency currents can leave the condenser.

If spread out into one plate, the area of the metal on the "input" side of the condenser would be several square inches, at least, even for a small condenser. Opposite to this is the equally large area of metal plate, connected to the opposite or "output" side of the fixed condenser. And nowhere between those two sets of plates is there any thick insulation. Probably these plates are all less than 1-50th of an inch apart, whilst the active area of plate facing plate is several square inches.

Such a condenser would have a comparatively large capacity—say, .001 mfd.—and it would offer very little opposition to high-frequency currents.

Now look at the other side of the picture and consider what kind of a "condenser" is formed by the ebonite bush of a variable condenser. True it is an insulator, with metal plates each side of it when the variable condenser is set at its minimum. But instead of then having a large area of plate

(Continued on page 930.)



**GECOPHONE
CONDENSERS**

for **RANGE**

because their scientific design introduces no additional losses into the tuned circuits, and the unique integral slow motion device enables precise adjustments to be made with dead accuracy

Easily the finest engineering job in the wireless industry.

Reduced Prices

Square Law Type		Straight Line Frequency Type	
.0001 - 17/6	.0003 - 17/6	.0003 - 19/-	.0005 - 22/-
.0002 - 17/6	.0005 - 19/6		
.00025 - 17/6	.001 - 27/6		

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**LOW LOSS SLOW MOTION
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Nos. 140 and 15
NATIONAL RADIO EXHIBITION.



*They
make the music clearer*

Their unique construction enables "Cosmos" Short-Path Valves to reproduce the entire gamut of musical sounds with clarity and fidelity. Users of "Cosmos" Valves agree that they provide a Short-Path to better reception. It is hoped that these very favourable prices will enable ALL valve set users to enjoy the remarkable production of Broadcast music which has been so highly commented upon by musicians and critics.

Note the New prices

	Old price	New price
<i>For 2-volt accumulator</i>		
S.P.16/R 0.09 Amp	14/-	10/6
S.P.18/G 0.3 Amp	14/-	10/6
S.P.18/B 0.09 Amp (Resistance Capacity)	14/-	10/6
S.P.18/RR 0.3 Amp (Power)	18/6	12/6
<i>For 6-volt accumulator</i>		
D.E.50 0.09 Amp	14/-	10/6
S.P.50/B 0.09 Amp (Resistance Capacity)	14/-	10/6
S.P.55/R 0.25 Amp (Power)	22/6	20/-
A.45 0.65 Amp (Bright Filament)	8/-	5/-
<i>For series running in Multi Valve sets</i>		
D.E.11 0.25 Amp (1.1 Volt)	14/-	10/6



**Cosmos
VALVES**



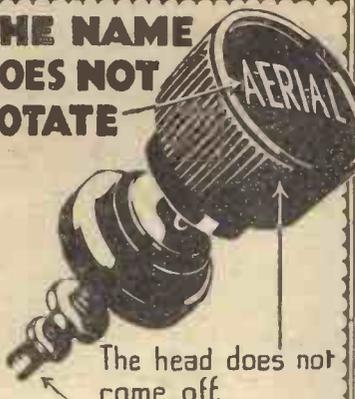
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(Proprietors: Metropolitan-Vickers Elec. Co., Ltd.)

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R
V71

THE NAME DOES NOT ROTATE



The head does not come off.
The slot and nut eliminate soldering.

THE FINISH IS PERFECT THROUGHOUT

Made with 30 different engravings, and used by the manufacturers of all the best battery eliminators.
Standard large insulated model (Polished black Bakelite) Type B, 9d. each.
Popular Model (non-insulated) Type M, 6d. each.
Illustrated Catalogue free on request.
Obtainable from all Dealers, but in case of difficulty send your order to us, enclosing your dealer's name and address.
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PLEASE MENTION "POPULAR WIRELESS" WHEN REPLYING TO ADVERTISEMENTS

RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 928.)

facing an equally large area of metal on the other side, the active surfaces at the bush have a very small area.

And even this very small area is at a great disadvantage because the insulation there is quite thick. (Not 1-50th of an inch as before, but more like 1/4 or 1/2 in.)

Consequently, the condenser so formed has a very low capacity—probably somewhere between 1-100th and 1-1,000th of the properly made fixed condenser.

Its ability to pass high-frequency currents would be correspondingly low, and thus it does not allow a short to occur.

But your question was well worth asking, W. B., for it is a fact that some high-frequency loss does occur at such a condenser-bush, though in a really good condenser this loss is so small as to be negligible.

In a badly-made condenser it is still small, and would not "short" the condenser, but it might easily be large enough in many instances to affect results adversely.

MAKING AN H.F. CHOKE.

G. H. (Bedford).—"I have a quantity of No. 44 D.S.C. wire, which I should like to make into a high-frequency choke, for a condenser-controlled reaction set. It will not be used for very short waves, so can I wind it more or less 'anyhow,' on a home-made ebonite bobbin, and if so, what are suitable dimensions for the latter?"

The wire will be quite O.K. for your purpose. You can make the bobbin from two 1 1/2 in. discs of thin ebonite, separated by a centre-washer of 1-16 in. in thickness, about 1/4 in. in diameter. Into the groove so formed wind about 500 turns of wire.

A SELECTIVE "TRAP" CIRCUIT.

H. M. C. (Newcastle-on-Tyne).—"I have just secured a job that is going to take me to Niton, in the Isle of Wight, next October. I should like to take a set down there, to listen in, but I understand that the powerful Niton coast station is working to ships all day and night long, and the interference will be terrible.

"My present set is old-fashioned, but pretty good for selectivity—it's an high-frequency, detector, and low-frequency (diagram enclosed)—but I wonder if I could add a "trap" circuit to it, so as to cut out this coast station? I have plenty of condensers and coils, or could make the latter specially if I knew the connections for a likely circuit. What kind of trap circuit shall I try?"

We recommend you to try the following arrangement, which will require two additional variable condensers, a fixed condenser, and two coils.

Disconnect aerial and earth leads from the set, and connect them instead to another similar coil and condenser—0005 and 40 turns, the same as used at present. Now join the new "earth" to the old earth terminal. All that then remains is to connect the top—aerial side—of the new coil and condenser, to the old aerial terminal through a trap circuit.

This trap circuit is to consist of a small variable condenser, say .0001 or .00005, connected in series with a fixed condenser—of about .001 mfd.—across which is joined a low-loss tuning coil.

(It will be seen that the whole arrangement is superficially like the famous "N" circuit.)

The only difficulty is to decide how many turns are required by the low-loss coil. This will depend upon the interfering wave-length, and you may find it necessary to wind two or three of these coils to suit changes of wave-length by G N I (the Niton station), before you are able to completely tune it out.

The easiest plan would be to choose an ordinary plug-in coil, which reduces the interference quite considerably when used as a trap coil. Then make a low-loss coil having, say, 25 turns more than this. Arrange tapings on this coil so that the exact best position for tuning can be selected under working conditions. Once this has been found the "trap" will prove an effectual and easily operated selector circuit.

VALVE FOR THE FILADYNE.

"EXPERIMENTER" (Chester-le-Street, Durham).—"I have become very interested in the various Filadyne circuits, and should like to try out this hook-up. I notice that a very great deal depends on the valve. Which is the one to buy for best results?"

Amongst all the types tried three have given really outstanding results, these being the Marconi or the Osram D.E. 2L.F., and the Ediswan D.R.2.

Invaluable to EVERY Amateur and Constructor.

The "POPULAR WIRELESS"

BLUE PRINTS OF TESTED CIRCUITS

The following is a complete list of the "P.W." 6d. Blue Prints for Constructors, showing the different circuits available:

P.W. BLUE PRINT Number

1. DETECTOR VALVE WITH REACTION.
2. UNIDYNE DETECTOR VALVE WITH REACTION.
3. 1-VALVE L.F. AMPLIFIER.
4. CRYSTAL DETECTOR WITH L.F. AMPLIFIER.
5. H.F. (Tuned Anode) AND CRYSTAL, WITH REACTION.
6. H.F. AND CRYSTAL. (Transformer Coupled, without Reaction).
7. 1-VALVE REFLEX WITH CRYSTAL DETECTOR (Tuned Anode).
8. 1-VALVE REFLEX AND CRYSTAL DETECTOR (Employing H.F. Transformer, without Reaction).
9. H.F. AND DETECTOR (Tuned Anode Coupling, with Reaction on Anode).
10. H.F. AND DETECTOR. (Transformer Coupled, with Reaction).
11. DETECTOR AND L.F. (with Switch to Cut Out L.F. Valve).
12. DETECTOR AND L.F. UNIDYNE (with Switch to Cut Out L.F. Valve).
13. 2-VALVE REFLEX (Employing Valve Detector).
14. 2-VALVE L.F. AMPLIFIER (Transformer Coupled, with Switch to Cut Out Last Valve).
15. 2-VALVE L.F. AMPLIFIER (Transformer-Resistance Coupled, with Switch for Cutting Out Last Valve).
16. H.F. (Tuned Anode), CRYSTAL DETECTOR AND L.F. (with Switch for Last Valve).
17. CRYSTAL DETECTOR WITH TWO L.F. AMPLIFIERS (with Switching).
18. 1-VALVE REFLEX AND CRYSTAL DETECTOR, with 1-VALVE L.F. AMPLIFIER, Controlled by Switch.
19. H.F. DETECTOR AND L.F. (with Switch to Cut out the last Valve).
20. DETECTOR AND 2 L.F. AMPLIFIERS (with Switches for 1, 2, or 3 Valves).
21. THE 2-VALVE LODGE "N."
22. "THE GUARANTEED REFLEX."
23. THE 1-VALVE "CHITOS."
24. THE "SPANSACE THREE." Three-Valve Receiver employing 1 Neutralised H.F. Valve, Detector with Non-Radiating Reaction Control and 1 L.F. Valve.
25. 2-VALVE REINARTZ (Det. and L.F.).
26. A "STRAIGHT" 4-VALVER (H.F., Det. and 2 L.F. with Switching).
27. A "MODERN WIRELESS" 4-VALVER (2 H.F., Det., and L.F.).
28. A "MODERN WIRELESS" 5-VALVER (H.F., Det., and 3 L.F.).

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All Orders for these Blue Prints should be sent direct to the "Popular Wireless" Queries Department, Fleetway House, Farringdon Street, London, E.C.4, enclosing a stamped addressed envelope and a postal order for 6d. for each Blue Print Ordered.

Be sure you use Keystone guaranteed components

Copex Popular Model Screen and Base



This screen and base is made from high-grade copper—the best metal for screening coils. Terminals are arranged in such a manner that it is impossible to “short” them when replacing screen. Perfect electrical and self-cleaning contact. Screen and interchangeable 6-pin base **9/6** (Patent No. 259,459)

Copex “O.C.” Coils for use with above—superior to all others.

By reason of a special patented feature embodied, Copex “O.C.” Coils are far superior to all other types of screened coils. For no other will give you all these advantages:

- 1.—Oscillation rendered perfectly under control.
- 2.—Higher amplification.
- 3.—Coils and transformers that are matched within one metre. This accuracy is obtained by testing against a Quartz-Oscillator.

Type	250/550m.	1000/2000m.
Split Primary H.F. Transformer	10/6	10/6
Split Secondary H.F. Transformer	10/6	14/6
Aerial Coil	6/-	6/-

All Copex Coils are guaranteed matched within one meter.

Special Six-pin Base

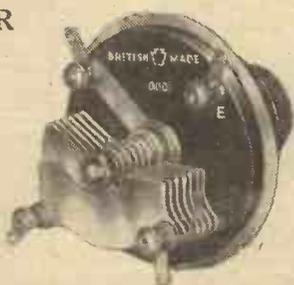
To replace the more expensive standard screened coil base in sets where the actual screen is not required. Standard spacing with terminals arranged for easy accessibility

2/9



KEYSTONE MIDGET CONDENSER

Here is the Keystone “Midget” Panel Mounting Condenser. It is designed with extraordinary care and eye for detail, and utilises square law method of tuning. Delightfully smooth movement. The hand capacity shield is an effective guard against injurious capacity effects from the hand. Price **5/6**



Keystone Neutralising Condenser

Designed by experts and are suitable for neutralising the electrode capacities of all types of valves. Very low minimum capacity. Wide spacing of the vanes renders accidental “shorting” impossible.

Board mounting **5/-** Panel mounting **6/3**

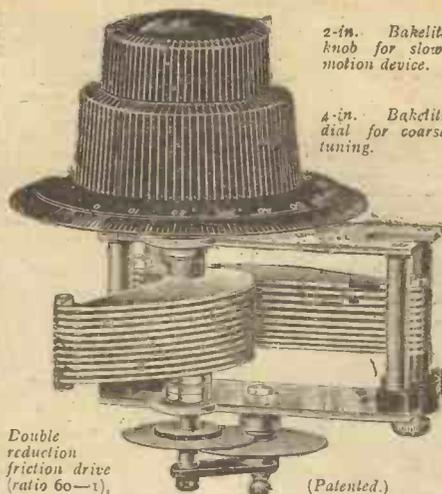
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Screening box only, 12/6

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2-in. Bakelite knob for slow-motion device.

4-in. Bakelite dial for coarse tuning.

Double reduction friction drive (ratio 60-1), (Patented.)

THE “J.B.” TRUE TUNING S.L.F.

Prices: ‘0005 mfd. 18/8; ‘00035 mfd. 15/8; ‘00025 mfd. 15/-; for Short Wave Receivers ‘00015 mfd. 15/-.

Prices: “J.B.” S.L.F., complete with 4-in. Bakelite Dial, ‘0005 mfd. 11/8; ‘00035 mfd. 10/8; ‘00025 mfd. 10/-; for Short Wave Receivers ‘00015 mfd. 10/-.

“J.B.” NEUTRALISING CONDENSER 3/6

Finished in polished nickel plate for baseboard mounting. Absolutely reliable and cannot short circuit. Requires a minimum space. Self-locking. Dustproof. Smooth ultra-fine adjustment. Maximum capacity approximately 20 mmf. Maximum capacity negligible.

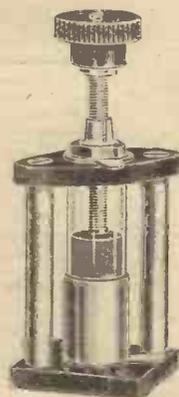
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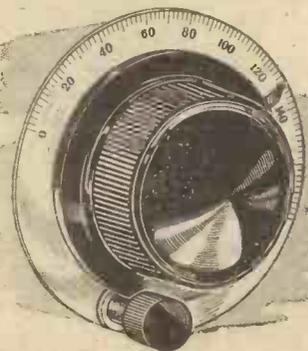
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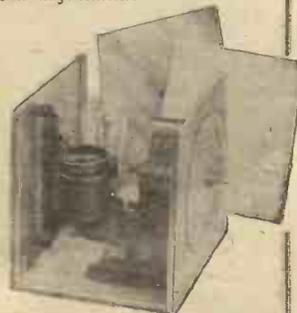
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TECHNICAL NOTES.

(Continued from page 912.)

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Wet H.T. Batteries—Jars, Zincs and Sacs complete.
3/6 per doz. (18 volts). Post 3d. extra. Sample 6d.
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HEADPHONES REPAIRED

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NO POLES, PULLEYS, OR WIRES REQUIRED. FIXED IN FEW MINUTES. CANT BLOW DOWN OR SWAY AND CAUSE FADING SIGNALS. SAVES HOURS OF WORK. GUARANTEED TO IMPROVE RECEPTION. TESTED BY MANY INFLUENTIAL JOURNALS: REPORTS; "PERFECT".

SEND FOR ONE NOW. GARR. PAID 27/6 FROM

"NOMAST" PLATE AERIAL Co.
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BIRKENHEAD.
—PATENT NO 260089—

A Super Super-Heterodyne.

A new circuit, which is claimed to be an advance on the super-heterodyne, has been invented by M. Lucien Chretien, of Paris, and is given the name of "Strobodyne." The receiver derives its name from the stroboscopic effect, which is well known in optics. The stroboscopic effect may best be explained as follows: Imagine a reed is vibrating at 30 vibrations per second, and we look at this reed through narrow slots in a rotating metal disc, these slots being equally spaced around the disc and the disc rotating exactly once per second and having 29 slots.

In this way we obtain 29 views per second of an occurrence which is taking place completely in $\frac{1}{30}$ of a second. The result is that the occurrence at which we are looking has completed one cycle and $\frac{1}{30}$ of the next, and in this way it appears to be performing its evolutions at a frequency of one per second instead of 30 per second. We are thus able optically to "slow it down" so that we can observe its details.

No Grid Leak.

In the case of the "Strobodyne" a somewhat analogous electrical principle is used. The circuit operates not by the use of different frequencies heating as in the case of the super-heterodyne, but by furnishing a conductive path for the signal at suitable intervals only. These intervals are provided in an oscillatory circuit.

It is claimed that with the "Strobodyne" the valve used in the circuit functions as an oscillator control, and also as an amplifier, with an increase in sensitiveness. No grid leak is employed, and with an aerial only a few feet in length considerable volume of signals is obtainable. In the circuit at present constructed eight valves are used.

Dry Rectifier.

Westinghouse (U.S.A.) engineers announce a new rectifier suitable for use for L.T., H.T., and grid bias, which consists of units of copper and copper-oxide, between which some mysterious electrolytic action seems to take place. A preliminary description of this type of dry rectifier was given in these Notes some months ago.

By the assembly of a number of units, electric currents of sufficient amperage for use in wireless receiving sets may be obtained. This new device, however, is not properly out of the laboratory stage, but it appears to have great promise, since the life of the elements, so far as can be ascertained, is practically infinite.

In Cartridge Form.

In this connection the Thordarson Company, of Chicago, have now put on the market a charger in which the L.T. rectifying element is a dry cartridge which

can be replaced as readily as the usual cartridge fuse. This type of rectifier has the advantages that it is entirely silent, since there are no vibrating parts and no electrolytic hissing; it does not introduce any of the risks attendant upon the use of acids or other liquids, and the rectifying element (which is guaranteed for 1000 hours full load operation at 2 amperes, or approximately one year's normal service) can be replaced in 30 seconds.

Loop Aerial Condensers.

The recent reference which I made to frame aeriels has brought a number of inquiries as to the tuning capacities which should be used in conjunction with frame aeriels of different size.

The following figures may be of use to experimenters who are desirous of constructing loop aeriels for their receivers. In order to cover the broadcast band of, say, 200 to 500 metres, the spacing between turns, being about $\frac{1}{2}$ in., the following dimensions and tuning condenser capacities will be found useful. For a loop of about 2 ft. square and taking tuning capacities of 0.00025, 0.00035, and 0.0005, the number of turns will be respectively 20 turns, 14 turns, and 10 turns. For a loop of about 3 ft. square and using tuning condensers of the same three capacities, the turns will be respectively 16, 12, and 8. For a loop of about 4 ft. square the turns for the condensers mentioned will be respectively 12, 8, and 6.

These figures are given on the assumption that the loop is of the flat or pancake type, or of the box type. In the latter the windings are all of the same area, whilst in the former type the area of the windings becomes smaller towards the centre. In using the foregoing figures with the flat or pancake type, take the area as being the average area of the loop.

It may be mentioned that the box type for a given area will be more sensitive as a pick-up of signal energy, but the flat or pancake type will be superior in directional properties. Again the flat loop is to be preferred with unshielded frame aerial receivers because of minimised coupling between the loop and the coils in the receiver.

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Complete Sets, Loud Speakers (all makes), Sets of Parts, etc.

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THE BATTERY SUPREME!

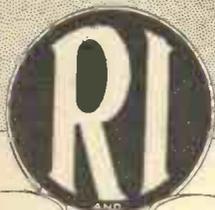
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Trays for above 7/-

Free advice given as to best battery for your set on hearing number and type of valves.
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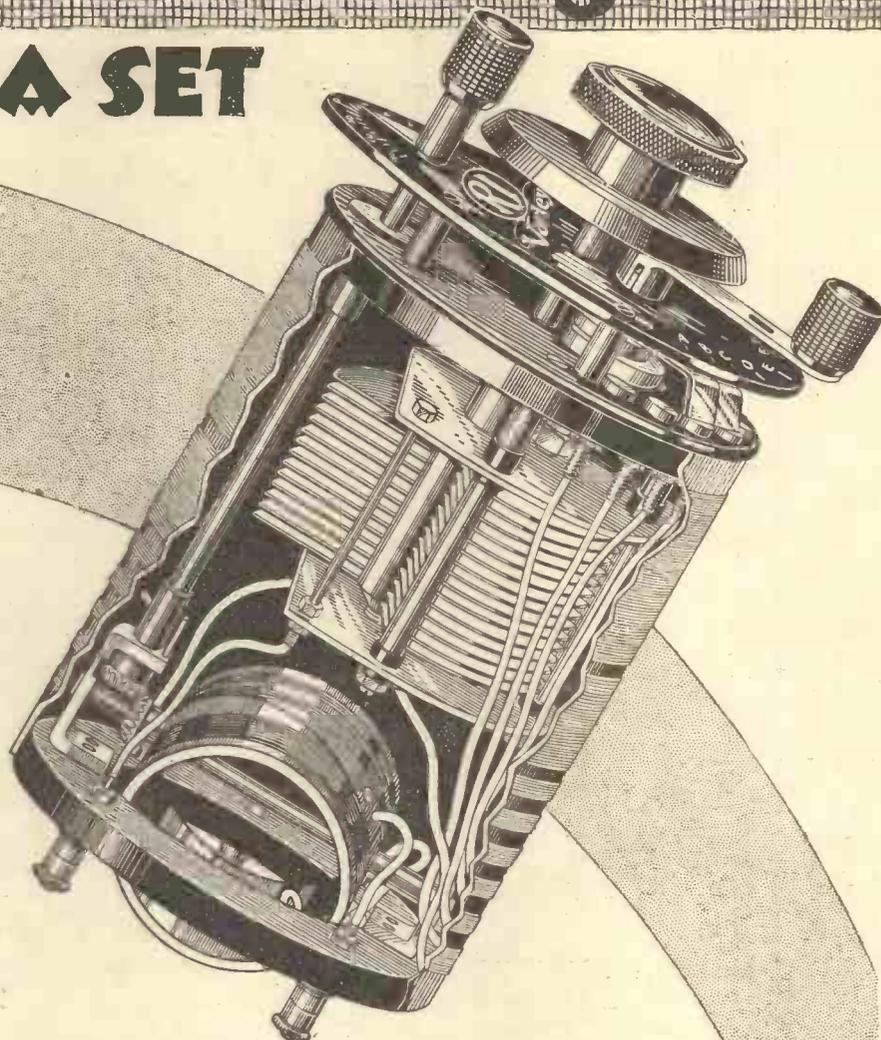
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**RETROACTIVE
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Think of all the advantages of the famous R.I. Retroactive Tuner—the saving in trouble and money by eliminating plug-in coils, the real degree of tuning efficiency over a frequency band up to 4,000 metres—and then think of the added advantages of a continuously variable air condenser—all incorporated in one unit—and you get an idea of what we have achieved in our latest component.

For the first time in the history of wireless you have now a complete, self-contained tuner covering the whole of the broadcast waveband up to 3,000 metres—a unit which can be used as a complete receiving set by the simple addition of a valve holder, grid leak, and condenser for rectifying.

The space taken by this unit is practically the same as the standard tuner, whilst the disposition of the parts enables aerial reaction and tuning of the inductance, for all wave-lengths, to be carried out with the utmost simplicity.

An additional terminal is provided for tapping, on the reaction coil, for more efficient tuning with the large number of valves now in use.

PRICE COMPLETE . . . £2-7-6

Watch for the announcements of a still further development of our Retroactive Tuner—a new Model "B" especially designed for Neutrodyne Work.

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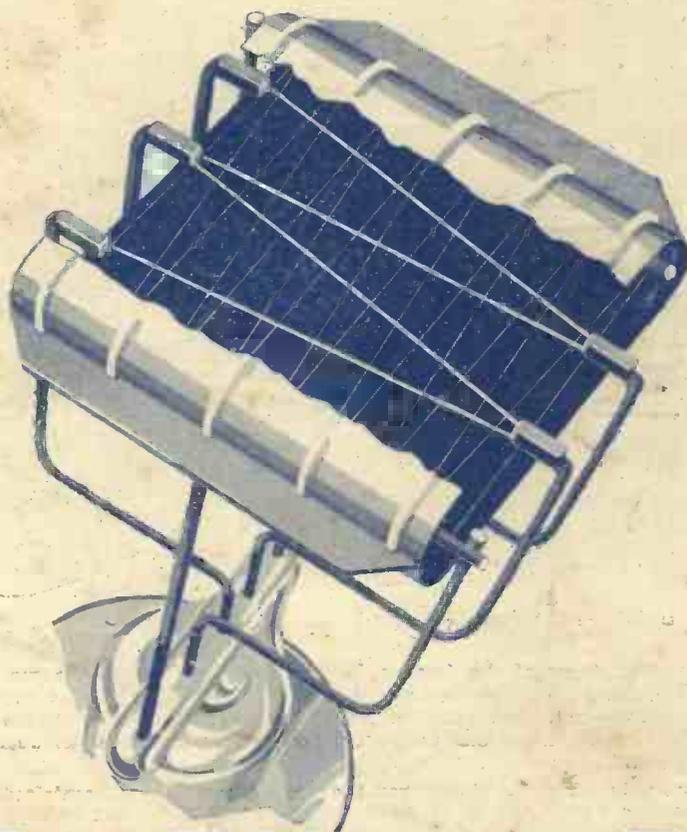
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P.M. 251 (4 volts, 0'25 amp.) 20/-
P.M. 256 (6 volts, 0'25 amps.) 20/-

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