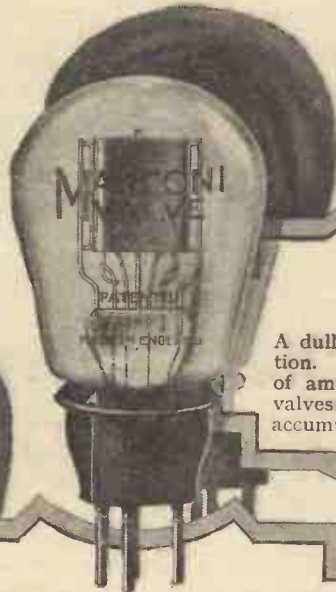


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P.1213

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RADIO NOTES AND NEWS.

Blue Prints for Nothing—A Surprising Feat—Croyland Abbey Bells—Two Weeks in a Wireless Camp—Radio Geneva—Another Record for 2 N M.

Blue Prints for Nothing!

WHAT do you think of the four blue prints that are given away with this issue of POPULAR WIRELESS? I think you will have to agree that they represent a good two-shillingsworth of extra value, all for the usual threepence.

Whilst I am sure that you believe in the old saying about the impropriety of critically examining the dental cavity of a presentation gee-gee, yet you may have a hankering after some other circuit which is *not* amongst those given away this week. If so, don't despair, but read on.

More to Follow.

NEXT week another batch is to be given away. Another four of the best, each complete in itself, theoretical, pictorial, practical, self-explanatory, non-curling, flat-backed, large-size, buckshee blue prints—guaranteed and gratis!

And, what's more, this is *not* the end—as the boy said when his foot slipped and he started to slide down the roof!

A Surprising Feat.

MY recent references to working with ordinary valves and very little H.T. have brought to light some curious instances. One Warminster reader tells me that using two Louden dull emitters he can tune in Daventry, Berlin, and Radio-Paris with no H.T. at all. This is easy enough upon an orthodox Unidyne H.T.-less receiver, but it is certainly a surprising feat upon the ordinary circuit, intended for use with a high-tension battery.

Romance of a Singer.

MISS MAVIS BENNETT, the popular soprano, who is so well known to listeners, was not always famous. As a matter of fact, it's not so very long ago since she came to London with only £10 in her pocket, and for weeks

NEXT WEEK!

Another 2/- Gift Next Week!

Four More Blue Prints given away with every copy of "P.W.," on sale Next Thursday.

Order Your Copy Now and Don't Miss this Magnificent Gift.

she could not find an engagement. Then her luck turned, for De Groot gave her a chance at the Piccadilly Hotel, where she scored an instantaneous success.

Croyland Abbey Bells.

THE famous old bells of Croyland Abbey will be broadcast again upon Sunday next, in response to many requests by listeners. I am glad to hear that the B.B.C. has decided to install permanent lines to the famous abbey, so that in future they will easily be able to broadcast the bells whenever required.

Radio Society's New Headquarters.

THE Leyton Radio Association has taken up new headquarters at 683, High Road, Leytonstone, E.11. In future the society will be known as the Leyton and Leytonstone Radio Association, and all in the locality who are interested in wireless will be welcomed as new members. Inquiries should be



The new Bridgewater Beam Station. On the left are the five masts for receiving from Montreal. The other five masts (to the right) will support the aerial that listens for South Africa.

addressed to the secretary at the new headquarters, as indicated above.

Two Weeks in a Wireless Camp.

LIEUT. W. H. LLOYD (5 T V) informs me that he is trying to raise recruits to complete the establishment of a Royal Corps of Signals unit, Territorial Army. Here is his letter:

"How many POPULAR WIRELESS readers would like to enlist in the Royal Corps of Signals (T.A.) for wireless duties? Excellent training is combined with our hobby, and two weeks' camp on wireless is both interesting and healthy. 40 and 120 watt transmitters are ready to operate, and the more who come along to do it, the larger the schemes we can arrange.

Where to Apply.

"FOR those who are interested in that kind of thing there are other duties, employing all means of signal communication. Technical knowledge is *not* essential on enlistment, so come along, 'hams,' and let me hear from you." The headquarters of the unit is at Putney Bridge, where some jolly dances and socials are held; but all letters of inquiry should be addressed to Lieut. W. H. Lloyd, 27, Copt-hall Gardens, Twickenham, Middlesex.

The Broadcasting Ambassador.

TALKING about the Army reminds me of the letter recently received by the B.B.C. from a German woman in the Ruhr (who enclosed two beautifully worked d'oyleys for a British artiste whom she had heard by radio). Translated it reads: "On Sunday evening we were absolutely gripped by the beauty of the glorious concert. There are indescribable feelings of the heart which seem to throw a bridge from us to you.

Unconsciously one's thoughts hark back to past years. However was it possible that we confronted each other as enemies? No more war. Broadcasting will be an ambassador between the nations."

(Continued on next page.)

NOTES AND NEWS.

(Continued from previous page.)

What's in a Name?

"WHAT is the Irish name for the new Dublin station, 2 R N?" asks a reader who apparently didn't quite catch the announcement. I understand that the really correct name is "Stasiun Craoibhscaoileachain Ath Cliath." So now you know!

Concerts from Finland.

HAVE you heard Finland? A reader in Helsingfors informs me that there are two stations there, one of which is experimental (wave-length 522 metres) and carries out irregular transmissions. The other works regularly from 5 till 7 p.m., G.M.T., upon 318 metres.

On Tuesdays, Thursdays, and Saturdays a programme is S.B. from both stations, and also from a half-kilowatt station at Tammerfors. So far, I do not remember hearing from any reader who has picked up any of these stations.

6 T G

THE call sign 6 T G has been allotted to R. Harris, Esq., The Rectory, Long Crichel, Dorset. Transmissions will be upon 23, 45, 150, 200, and 400 metres, and reports will be welcomed.

Big Ben in the Transvaal.

WRITING from Krugersdorp, Transvaal, a "P.W." reader says: "Every night after 10 o'clock (8 o'clock in England), I am able to get from ten to fifteen carrier waves from your English stations. You are about 6,000 miles away, but this does not prevent the reception. Music and speech is heard, but I have not been fortunate enough to catch any call sign yet. I have heard Big Ben striking 12, and at the same time 2 struck here." The circuit is a straight 4-valver, H.F., Det., and 2 L.F."

Killed by Wireless.

THERE was a sad fatality at the Horsea Island wireless station (Portsmouth) recently, when H. C. Taylor, aged 20, was found dead beside his apparatus. Part of his duty was to read the transmitting voltage, and apparently he had been electrocuted by a 20,000-volt discharge.

Telephony Record to the Philippines.

ALTHOUGH the fact was rather lost sight of in the rush of International Radio Week tests, some very good results were obtained about that time, quite apart from B.B.C. stations. For instance, on Sunday, January 24th, 2 O D (Mr. E. J. Simmonds, Gerrard's Cross) carried out 2-way communication with a station in Manila, Philippine Islands.

2 O-D Again!

THE British experimenter was in this instance using telephony, and this was clearly received by the U.S. warship "Black Hawk," who replied with C.W., on 25 metres. 2 O D was using a wave-length of 45 metres, and signals were steadily maintained for a long talk, between the hours of 6 and 7 p.m.

Mr. Simmonds tells me that conditions seem to be good to the Cape now, and he often has a few words with the South Africans.

Radio-Genève.

IN our issue of December 29th last it was stated (under "Foreign Notes and News") that Radio-Genève was in financial difficulties, and would relay the Zurich programmes in future. The Geneva station director informs me that this is inaccurate. Radio-Genève has experienced no such financial difficulty, and has not the slightest intention of becoming a relay station, neither for Zurich nor for any other station. On the contrary, the present regular programmes are to be extended and improved shortly, and they will in future include theatre broadcasts and dance music.

SHORT WAVES.

"We have five children and four pairs of head-phones; and we take turns to listen to the wirks."—A Child-listener, in a letter to the B.B.C.

"When there is a decrease in the Sunday evening congregation and not a corresponding increase in the Sunday morning congregation, then wireless is a great threatening danger. It is impossible for anyone to worship 'listening in.'"—The Vicar of Spalding (Reported in the "Yorkshire Observer").

"Nor is it necessary to celebrate every festival that arises or the birthdays of the more or less obscure deceased. Sometimes such events provide a peg on which a really first-rate entertainment may be hung. . . but a student of the programme must feel that there are times when there is a danger of reaching the standard of the very inefficient army in which everybody was an officer."—A writer in "The Times."

Francis Mistress: "Jane, Jane! Come quickly and take the parrot away—the master's just dropped his valve set."—"News of the World."

Another Record for 2 N M.

I SEE that our old friend, 2 N M (Mr. Gerald Marcuse, of Caterham), has been at it again. To his long list of first-across successes must be added the distinction of being the first experimenter to speak with St. John's, Newfoundland. He got clear speech across to 8 A R of St. John's at 6 p.m. one evening, and the latter replied in Morse, both stations using a wave-length of approximately 45 metres.

Captain Eckersley's Assistant.

AN interesting B.B.C. staff appointment is that of Mr. N. Ashbridge, B.Sc., A.M.I.C.E., to be assistant chief engineer of the company. Mr. Ashbridge was the man who took over the Writtle station from Captain Eckersley when the latter joined the B.B.C. in 1923.

Wonderful Crystal Results.

CRYSTAL-SETS don't generally beat the results obtainable with a valve-set, but an Anglesea reader tells me that he has a crystal-set in use which will make many a one-valve owner break the Tenth Commandment. He says: "I am on the banks of the Menai Straits, with an aerial 40 ft. long and 60 ft. high. My nearest station is Liverpool (60 miles), and I use Tungstallite (Blue Label), but have had good results with several other crystals." His letter continues:

Foreign Stations Galore.

"THE following are the stations I have received: Aberdeen, Glasgow, Newcastle, Bournemouth, Manchester, London, Liverpool, Dublin, and Daventry. Also the following foreign stations: Hilversum, Radio-Paris, Hamburg, and Petit Parisien.

"All the foregoing have been identified for certain, but there are also two weak Germans, another Frenchman (thought to be Radio-Toulouse), another upon about 260 metres which is no doubt Brussels, and a Spanish station with lady announcer which is almost certain to prove to be San Sebastian."

Hamburg "On Tap."

THE amazing feature of this reception is its reliability. "London," my informant says, "I can receive almost any time (215 miles). Strength varies, but it is often louder than Daventry." Dublin (85 miles) is "best of the lot, loud and distinct speech," whilst even Hamburg can be picked up "almost any time, and at times quite distinct speech." Moreover, there is plenty of punch behind the signals, as the following shows:

An Old Friend.

ON New Year's Eve, five pairs of 'phones were worked upon Daventry, and all could hear distinctly." And a P.S. adds: "Number of 'phones up to five does not seem to make any appreciable difference. I have not tried more than five."

You will be wondering from whence the set itself came—well, it was taken straight from the pages of "P.W." (where it exclusively appeared), and it is called the "P.W." Ultra Crystal Set.

Wireless Control.

MAJOR RAYMOND PHILLIPS—the expert on Wireless Control—tells me that he has been in communication with the Postmaster-General upon the subject of a licence for wireless control experiments. (I referred to one aspect of the matter in these Notes recently.) He has now been informed as follows: "The Postmaster-General will raise no objection to the installation and use of short-range wireless apparatus for the purpose of experiments in the control of machinery by wireless, but the radiotelegraphic apparatus must on no account be used for the purpose of sending or receiving messages without a specific licence."

New Prague Station.

THE new Prague station seems to be coming over very well indeed, and I have to thank a number of readers who have notified me of the reception. The gist of them all is contained in this report from a New Seaham reader. "Prague came in strong on L. S. (using 1-V-1) and he was also very clear. Besides announcing in his own language he spoke in French and English, and states the station will transmit from 7 till 9 p.m. G.M.T., on 368 metres."

The International Tests.

THE opening stages of International Radio Week were rather disappointing. Ten minutes after the American stations started to send to Europe, they were obliged to cease transmitting by an S O S. The British stations, on the contrary, were uninterrupted, but reception was poor, though Daventry, London, and Bournemouth got over successfully. An Ottawa amateur picked up Aberdeen and Newcastle, but no startling improvement upon last year has been reported.

ARIEL

An Interview with Edison



A recent portrait of Thomas Alva Edison.

IF the question "Who are the six most important radio men in the world?" were put up to all the wireless "fans" in England—and the many other countries in which POPULAR WIRELESS circulates—few lists would be turned in without the name of Thomas Alva Edison pretty near the top. Yet few people really know just what Edison contributed to radio science. Nevertheless, had it not been for one of his early inventions, which dates back as far as the year 1883, it is doubtful whether we should have such perfect wireless communication as we now have.

To whom do you give credit for the invention of the valve? "To Fleming," most amateurs will reply. And they would be perfectly justified.

Early Patents.

In 1904, on November 16th, to be exact, Professor J. A. Fleming, of London, was granted patent No. 24,850/04 (No. 803,684 in U.S.A.), for the use of the two-electrode valve in connection with wireless. "If two conductors are enclosed in a vessel in which a good vacuum is made, one being heated to a high temperature, the space between the hot and cold conductors possesses a unilateral electric conductivity," his specification reads. Fleming's valve was admittedly not much of a conductor, but it was the forerunner of the present valve which owes its perfection to De Forest.

Now, back in 1883, Edison discovered that if a plate be introduced into an incandescent lamp-bulb, and kept at a positive potential with respect to the filament, a current would flow between these two electrodes. Edison took out U.S. patent No. 307,031 on this invention, but his discovery does not seem to have had much practical application, and appears to have been put aside and temporarily forgotten. In later years, however, it came to the fore, and the Edison effect, as it was termed, was used by Fleming when he developed his first Diode. If we trace radio history right back then, we see that to Edison is due a lot of the credit for the invention of the valve.

For a long time I have been trying to find out for "P.W." readers just how the great inventor spent his day, and so recently I again called up his private laboratory at

Orange, New Jersey, and spoke to his confidential assistant, Mr. Meadowcroft.

Although it was a very busy time of the year, Mr. Meadowcroft kindly arranged for me to journey to Orange, the only stipulation on his part being that I should come early in the morning. Edison, I found out, hated to stay in bed, and was up at the crack of dawn every morning, and to work.

A Boy Experimenter.

"When he was twelve years old he rarely slept for more than five or six hours at night," Mr. Meadowcroft told me.

In those days Edison had obtained a job as newspaper seller on a train. That was in 1859. Edison's family was by no means poor, rather the contrary being the case; but he prevailed upon his mother to allow him to undertake this work so that he would be able to have money to spend on his experiments.

Even at that age he was extremely interested in chemistry, and, in fact, actually had a section in one of the vans of the train rigged up as a sort of laboratory, in which

THOMAS ALVA EDISON.

Thomas Alva Edison, one of the greatest inventors the world has ever known, is undoubtedly a Radio Pioneer whose early researches posterity will never forget. Every amateur has heard of the "Edison Effect"—a discovery which gave Fleming the clue to the Two-Electrode Valve. Of Edison's other contributions to Radio, his early experiments with inductive systems for telegraphy and telephony, every reader has heard; and of his dislike of being interviewed on Radio subjects, every Editor is well aware!

But after a year's patient endeavour, our New York Correspondent was granted a short interview with the inventor of the gramophone, electric light, and—but space will not permit a detailed list of Edison's many wonderful inventions.

The point is that, for the first time, a British Radio journal, through the initiative of its New York Correspondent, Mr. L. W. Corbett, is able to publish a description of Edison's laboratory as it is to-day, and a pen portrait of the greatest inventor of the age.

And so "P.W." once more provides its readers with an exclusive feature of world-wide interest.—THE EDITOR.

he worked while the train was running. It was on this train that Edison had his first real drawback, for one day, as the train was negotiating a particularly badly laid piece of track, a stick of phosphorus was shaken from its position in a jar on a shelf, falling to the floor and bursting into flames.

The Edison Laboratories.

While he was trying to put out the blazing conductor, a fiery-headed Scotchman, rushed in to see what was the matter. The flames were soon put out, but that did not cool the temper of the conductor, who, at the next station, threw out all Edison's apparatus and soundly boxed his ears. It is through this slapping that the inventor acquired his lifelong deafness.

When I arrived at Orange I was immediately shown into the waiting-room, and soon Mr. Meadowcroft appeared, not, however, before I had read the framed inscription on the wall:

There Is No Expedient To Which a Man Will Not

Resort to Avoid the Real Labour of Thinking. Sir Joshua Reynolds.

Some hours later, as I left the laboratories, that quotation ran through my head, or rather, this interpretation of it:

There is no expedient to which Edison has not gone

To avoid for others the necessity for thinking.

Mr. Meadowcroft led me through a dark, narrow passage and up a flight of stairs to one of the laboratories, a long, well-lighted room. Here were all manner of benches and large models of various contrivances, too numerous for me to describe here even if I remembered them all. One or two I do remember. As I entered the laboratory to my left was what to me looked something like a model—a very large model, standing perhaps ten feet in height—of a harvesting-machine. I haven't the slightest idea whether it was a scale model of such a machine or not. Anyhow, it demonstrated to me how thoroughly Edison went about anything he undertook.

"Mr. Edison always makes everything in a large scale model first," said Mr. Meadowcroft.

Scale Models of Inventions.

"Take, for example, that framework of a house over there. Mr. Edison is experimenting on an idea he has for a concrete house, which, if he is successful, is to be his contribution to the working man. The idea of the house is that the frame is erected and then the concrete is poured in. It will only take six hours to fill! Next we came to a large scale model of a quarry.

"This is a model of the cement quarry that Mr. Edison has at New Village, N.J.," said Mr. Meadowcroft. "One inch on the model is equivalent to ten feet. It is being altered constantly, so that it is always possible to tell at a glance just how the quarry is." Another example of Edison's thoroughness, I thought. After passing through this room, we entered the phonograph laboratory. Here were gramophones in all stages of construction, and records, too.

"Many of the gramophone motors are run on a destructive test," said Mr. Meadowcroft, and we know exactly what parts have to be built to withstand the most wear. Records, too, are tried until they wear out." Mr. Edison was, of course, the inventor of the first talking-machine.

It is interesting to note at this time that none of Edison's many inventions have been made by chance. In almost every case they have been thought out to the minutest detail, and often many years of experiment have been necessary. Whatever he has tackled and solved has been the result of hard, logical thinking. When he thinks he is on the right track, time and money seem to be no object. For example, when he was experimenting with the incandescent electric lamp, he sent men as far as China and Japan to search for bamboo, which would be suitable to carbonise. Men were sent to Cuba, Florida and South America.

(Continued on next page.)

AN INTERVIEW WITH EDISON.

(Continued from previous page.)

So eager was Edison to find the best filament material, that he even borrowed a few hairs from the beard of Mr. Mackenzie, one of his friends, who taught him telegraphy. The hairs, which were plucked from the bushy red beard, were quite as successful as other carbonised materials, and the boys—Mr. Edison's assistants—had a fine time, for they told Mr. Mackenzie that the brightness of the lamps was due entirely to the rich colour of the beard.

Primitive Aeronautics!

After passing through the phonograph room we reached the music studio where all the records are tested and where occasionally auditions are given to singers. Mr. Edison himself can often be seen personally attending to the auditions and many of the numbers recorded are chosen by himself, in spite of his deafness. He has a wonderfully acute inner ear and is able to detect many of the imperfections imperceptible to the ordinary ear. In a room adjoining the music room is stored all the music which has been considered for reproduction, some 250,000 pieces in all. This is one of the largest private collections of music in the world.

We passed through several large machine shops, finally arriving in the large chemistry laboratory which is separated from the main building. Here Edison spends a great deal of his time, for he has been deeply interested in this branch of science since he was twelve, ever since he persuaded one of the boys employed by his family to swallow a quantity of Seidlitz powders in the belief that he would thus be enabled to fly.

This experiment resulted in an application of the switch, but what did Edison care. It was all in the name of Science!

Edison's First Patent.

There was not time for more than a cursory glance around the chemistry laboratory, but a whole day there would not have been too long to go into the numerous experiments that were being conducted under Edison's supervision. I don't think that I am wrong in stating that half of his time is spent in this laboratory alone. As we left this laboratory, Mr. Meadowcroft informed me that all the many laboratories that I had passed through were devoted solely to experimental work and that the works were absolutely distinct. This came as quite a surprise to me for the many workshops, etc., that we had visited were, in some cases, fully as large as those in medium sized factories.

As we walked towards the library where I was to meet Mr. Edison, I asked Mr. Meadowcroft what was Edison's first patent.

"A vote recorder," was the reply. "Application was signed during October, 1868, and Edison took the recorder to Washington and exhibited it before a committee. It was turned down as it was too quick and perfect. The chairman of the committee told him that one of the greatest weapons in the hand of a minority was filibustering on votes, and this new

device would prevent this," said Mr. Meadowcroft.

Mr. Meadowcroft told me that he had written a book (which I have since had the opportunity to read) detailing the life of Edison. It is full of interesting stories and many laughs. I can thoroughly recommend it to "P.W." readers. It is published in England by Harper & Brothers.

Early Radio.

Mr. Meadowcroft relates in his book that Edison once took up wireless and perfected a system of train telegraphy between stations and trains while the latter were in motion. This system was used for a considerable period of time on the construction trains of the Lehigh Valley Railroad, and is said to be the forerunner of modern wireless telegraphy.

We now entered the library and Mr. Meadowcroft introduced me to Mr. Edison. "Another bloomin' Englishman," said he, with a twinkle in his eye.

The joke was on Edison, however, for I knew that a number of his closest associates,



Mr. Edison carrying out chemical experiments in his laboratory.

including Mr. Meadowcroft, were from England. Mr. Meadowcroft has been with Edison for over forty years. The above adjective, then, I naturally accepted as a compliment.

Thomas Alva Edison is now an old man—in years—but what immediately struck me when I shook hands with him was his expression of alertness. His personality is strong, and I should say that the years that have passed have made no adverse encroachments on his intellectual powers.

Communication With The Beyond.

Indeed, his conversation was amazingly brisk and to the point. Edison does not believe in wasting time. What he had to say to me he said rapidly, yet clearly. He still works a more than full day and, like our own great doyen of scientists, Sir Oliver Lodge, is never so happy as when he is really hard at work on some problem.

Let me say at once that I could not persuade Mr. Edison to discuss modern wireless developments. The fact is, he is not enamoured of radio, and I was careful to keep away from the subject.

"How are you progressing with your experiments in communication with per-

sonalities who have passed from this existence?" I asked the great inventor.

"I have not had much success yet," he replied. "I have not been able to spare all the time I would like on this subject."

Mr. Edison went to great pains to explain that it was not necessarily his opinion that our personalities do pass on to another sphere. In fact, he said that it is more than likely that personalities do not survive after death. Edison has advanced a theory that all living beings are built up of countless entities and that these entities live for ever. Upon death, the majority of these entities go off and find new work to do. Possibly the master entities, those existing in that part of the brain known as the Broca, where is the seat of our personality, keep together after our death, and thus there is a chance of the survival of our personalities.

A Rare Honour.

"Bearing this possibility in mind," said Edison, "I have been thinking of a device—an apparatus—which would be so delicate that if it is at all possible for personalities to exist in an after world, it will at least give them a better chance of getting in touch with us than by means of tilting tables and Ouija boards, etc."

Thus it is Edison's idea to put physical research on a purely scientific basis, and he is of opinion that this is the only possible manner in which such communication, if at all feasible, may be obtained.

After chatting with Mr. Edison for a few more moments, I took my leave, having previously promised not to overburden him with questions.

"Mr. Edison was very worried over the grossly exaggerated reports the Press gave on the psychic researches he made," said Mr. Meadowcroft. "Some papers even went so far as to publish cartoons of the new 'spiritist' telephoning directly, and apparently without effort, to the after-world. Nothing was farther from Mr. Edison's conception.

"His idea was to devise a form of apparatus which could be used by 'trained' investigators to give a more scientific aspect to their work."

I then left, thanking him for his kindness in letting me take up so much of his time for the benefit of POPULAR WIRELESS readers.

Thus ends my account of my visit to Edison. It has taken me over a year to achieve this, for Edison refuses to be interviewed. No interview with Edison has appeared in a British periodical for several years—to my knowledge, at any rate—and it was only by great good fortune that I eventually persuaded him to see me, and then on the stipulation that I did not discuss Radio.

But a few facts about the great men of the world are always interesting, and I hope "P.W." readers have read this article with interest.

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Another Fine Gift To Our Readers

Order your copy of "P.W." now and do not miss the next four Blue Prints given away with every copy of next week's issue.

A Detector Valve Set with Reaction



The Set Described, Designed and Constructed by the "P.W." Technical Staff.

The Diagrams for this article will be found on the Blue Print given away with this issue.

DESPITE the introduction of all sorts of "stunt" and other circuits, the "straight" 1-valve with reaction, to this very day, still more than holds its own. The reasons for this are not far to seek. It is efficient, easily constructed, and, what is more important, easily handled.

Extraordinary feats of DX have been accomplished with simple 1-valve sets

on such a set in almost any part of the country.

As the "P.W." method of providing series or parallel aerial tuning is introduced, the receiver will cover any range of wave-lengths (according to the coils used, of which more anon), and is therefore suitable for the reception of both relay and main stations, and, of course, 5 X X. The set is as selective as a 1-valve broadcast receiver should be; greater selectivity can be obtained, but only at the expense of ease of manipulation or by sacrificing side-band qualities. At the same time, it is a set that many experimenters go back to for standard working after having passed through the "stunt" circuit phase.

Polar Junior 2-way coil holder (R.C.C.), a Peto-Scott .0005 mfd. variable condenser, a Precision rheostat, and a Dubilier grid leak and condenser. Other makes can be



The finished receiver ready for use.

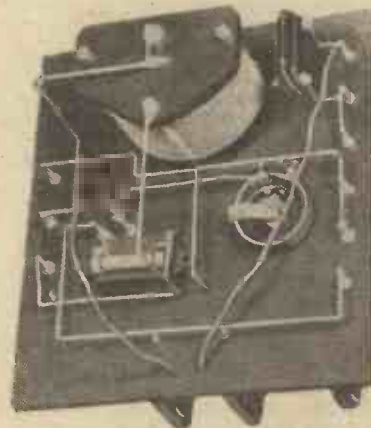
The Components Used.

The constructor who has previously confined his wireless activities to crystal work, but wishes to "reach out," cannot do better than make the "Detector Valve with Reaction" his first valve set. If eventually he becomes more ambitious, and desires to operate a loud speaker, he will find it very easy to construct a suitable L.F. amplifier which will couple up to it readily and use the same batteries. One such amplifier is described in this very issue of "P.W."

H.F. amplifiers for increasing range of reception are not so easy to add to a set, but thousands of keen amateurs get along quite nicely without ever finding a need of H.F. amplification.

The blue print concerning this set gives further details about it, and, with the further assistance of the photographs, constructors should meet with no difficulties.

The particular components used in the original model included the following: A



A view of the wiring beneath the panel.

exactly of the nature of the one to be described in this article. Of course, such ranges of reception cannot be duplicated by all possessors of 1-valvers, because much depends upon local conditions, aerial and earth efficiency, individual operating skill, and, perhaps, individual powers of patience—the last factor being more a personal virtue than a recognised degree of skill!

However, let us briefly tabulate those things that, under average conditions, this little 1-valve set ought to do. First of all, it requires a fairly good aerial and earth—outdoors for preference, as a very good indoor aerial is never equal to a moderately bad outdoor one. It will not operate on a frame aerial satisfactorily.

What the Set Will Do.

It is purely a receiver for use with 'phones; even when employed very close to a broadcasting station it will not provide sufficient volume for comfortable loud-speaker work.

Clear, loud 'phone signals should, however, be obtainable up to a hundred miles or more from a broadcasting station. Two or three stations should be available

used, but it must be ascertained that they will fit in—positions of panel-drilling holes can be altered, but the panel itself should not be larger than the one specified or the receiver will lose its neat compactness and tend towards unwieldiness.

Drilling the Panel.

The "P.W." blue prints give panel-wiring lay-outs in which the component positions are but approximate. A diagram in which actual measurements are given is provided, and this must, of course, be used in conjunction with the specified components. If, as stated above, alternative components are employed, it may be necessary to rearrange the lay-out slightly. In none of our blue print receivers do we bind constructors down to definitely specified makes of components. Ample clearance is allowed.

Panel-drilling is the first task subsequent to the assembly of all the necessary components and materials. This is quite a simple task, as ebonite is an easy material to work. Care must be taken, and the metal-working drills handled fairly gently, for it tends to brittleness and chips if handled carelessly. It is hoped that constructors are keeping note of the information given in our new weekly feature, "For the Constructor," as it will prove invaluable during the construction of sets. Note particularly the drilling guide given a week or two ago.

(Continued on next page.)



Note the flexible connections to the coil holder.

A DETECTOR VALVE SET.

(Continued from previous page.)

After the drilling comes the mounting of the components, and then finally the wiring. This last can be carried out with that admirable material "Glazite" or round or square section tinned copper wire.

Soldering throughout is advisable if an efficient, permanent job-of-work is to be made of the set. The soldering must itself be carried out efficiently, for imperfectly soldered joints can be worse than no soldering at all. Clean wire, clean contact, hot, clean iron and a good flux are the main factors that require consideration.

The Coils to Use.

The wiring to the moving coil holder may in some makes—in most, in fact—necessitate the employment of two short pieces of

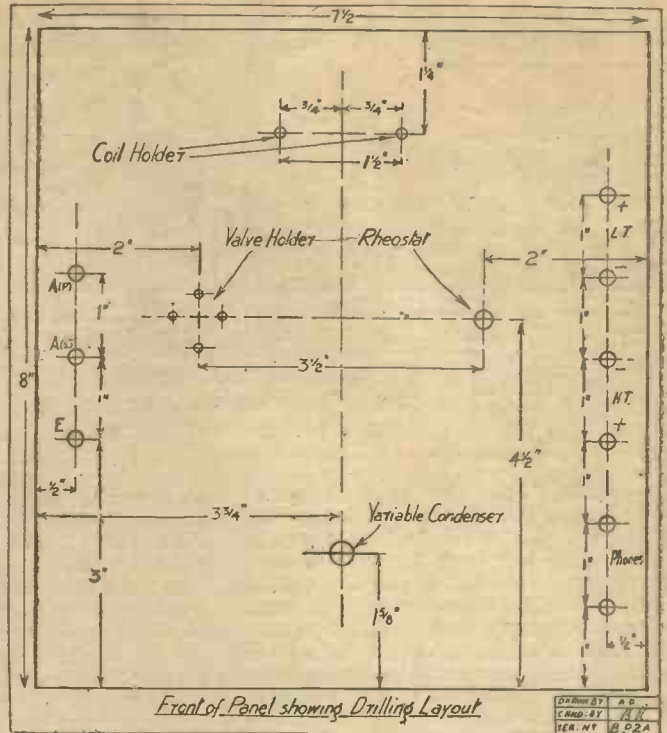
reaction coil, which seldom requires changing when an alteration from series to parallel or vice versa is made.

It will probably be found that reaction is more easily obtainable when on "series," and that a slightly smaller reaction coil can be used. Also it is generally the case that tuning is slightly sharper, and signals louder on at least the main station wave-length band.

On 5 X X's range little advantage appears to obtain in the use of series tuning, and as this would necessitate a 300-turn coil, it is economical to employ parallel tuning for that purpose.

The dimensions of the aerial and earth systems affect tuning, and as these vary in individual cases, hard and fast rules for coil sizes cannot be given.

It may be found that, in the case of relay stations on low wave-lengths, a 50-turn aerial coil and series tuning is needed, but having a 75 and a 50 on hand, the 75 can be used for reaction in such cases. Therefore the four sizes



POINT-TO-POINT CONNECTIONS.

Aerial parallel terminal to fixed plates of variable condenser, socket of fixed coil holder, and one side of grid leak and condenser.

Aerial series terminal to moving plates of variable condenser, earth terminal to plug of fixed coil holder and L.T. negative.

L.T. negative is also connected to H.T. negative, and to one side of the rheostat, the other side of which is connected to one filament socket of the valve holder.

The other filament socket is taken to L.T. positive.

Other side of grid leak and condenser to grid socket of valve holder, plate socket of valve holder to socket of moving coil holder.

Plug of moving coil holder to bottom 'phone terminal, other 'phone terminal to H.T. positive.

A .002 fixed condenser is connected across the 'phone terminals.

flexible wire, as shown doubly dotted in the wiring diagram.

Having completed the wiring, the receiver can be cleaned up and transfers affixed to the panel in accordance with the

... case can be used. The top... 4 in. Suitable cabinets can be... made, but the simple box type is... to make and does not necessitate the use of any great carpentry skill. Any sort of wood can be used, according to the personal taste of individual constructors.

Notes regarding the accessories to use with this set, and how the series parallel aerial terminals are employed, appear on the blue print. It should be noted that the coils are used as follows: The 75-in. aerial and 50 for reaction for main stations with series tuning, and the 200 in. aerial and 150 in reaction for 5 X X with parallel tuning.

Either series or parallel tuning can be used for any or all of the stations, but different sizes of coils are required. Large coils are necessary in the case of series tuning—for instance, a 75-turn coil is, as mentioned above, required in the aerial for main stations when the aerial variable condenser is arranged to give series tuning, but, in the parallel position, a 35-turn coil will cover most of the main stations.

This, of course, does not refer to the

mentioned on the blue print should cover all the constructors' general requirements.

Constructors are advised to scan the other constructional articles in this issue, as we have endeavoured to avoid duplication of more general remarks concerning the accessories.

THE DETECTOR VALVE.

FROM A CORRESPONDENT.

THE detector valve of the set acts in a different way from any of the other valves, whether H.F. or L.F. amplifiers. The detector has associated with it the grid leak, which, although one of the smallest components in the circuit, is one of the most important. It acts as a... the detector valve, and maintains its... over voltage with respect to the other... circuit.

The grid leak consists of a high resistance element, of a value between 500,000 ohms (half a megohm) and five million ohms (five megohms). An average value for the grid leak for all-round purposes is 2 megohms.

Variable Grid Leaks.

The actual value of the grid leak, however, depends upon the type of valve, and upon whether distant or near reception is being dealt with. It is generally better to use a variable grid leak, so that the best value can be found by adjustment whilst the set is actually in operation, for the influence of the value of the grid leak is most important—far more important than many amateurs are inclined to think.

If the grid leak were not connected to the grid, the latter would rapidly store up electric charge... voltage rose so

high that it would become paralysed or choked, and the detector valve would cease to function. The grid leak prevents this storing up of static charge, and so keeps the valve in operation.

Accidental Leaks.

Sometimes you may find that the set seems to work better without a grid leak than with one. If this is so, it means that the necessary leak is being provided in some other way. For example, sometimes the grid condenser may be leaky, owing to insufficient insulation of the plates from one another, and so it acts not only as a condenser but also as a grid leak. If a grid leak proper be superimposed upon it, the total amount of the leak is too great, that is to say, the net resultant resistance is too low, and the set thus works better when the proper leak is removed.

Again, sometimes the valve holder may be of bad insulating material, and so a leak may occur there, which acts in the same way as a regular grid leak.

But it is better to avoid these accidental leaks altogether, as you know much better what you are doing if you have all the leakage effect concentrated in the grid leak proper.



The Set designed, described and constructed by the "P.W." Technical Staff. The diagrams, etc., for this Set will be found on the Blue Print given away with this issue.

FOR those who do not wish to be confined to the reception of their local station, but want to be able to pick and choose their programmes as far as possible, there can be no more suitable set than the one described in this article. Suitable, that is, from the point of view of results compared with ease of control and economy of upkeep.

The receiver employs two valves, one used as an H.F. amplifier in order to enable weak signals to be picked up, and the other to detect or rectify those amplified signals and, further, to provide a little more amplification by means of reaction. Two tuning controls only are necessary, consisting of variable condensers, while reaction is obtained in the usual manner by variably coupling a coil in the plate circuit of the detector valve to the anode coil of the H.F. valve.



A photograph of the complete set, showing the convenient lay-out of the controls.

When correctly wired up, and with suitable valves under moderate conditions, this set will give extremely satisfactory results, and it is difficult to give any definite range which it will cover.

Under favourable conditions it is quite capable of picking up American broad-

casting, while the reception of most of the British, including 5XX, and many Continental stations should not prove a difficult matter. Its wave-length range is practically unlimited, because plug-in coils are used and these can be changed, when desired, to suit the requirements of the listener.

Signal Strength and Selectivity.

As the set stands it will, of course, be suitable only for use with telephones, the receiver having been designed with a view to enabling DX results to be obtained rather than to limit it to local reception and more signal strength. It is an easy matter, however, to add either one or two L.F. valves for loud-speaker reception. If, however, the amplifier's H.T. — is connected to its L.T. — internally, this connection should be broken before using the amplifier. If still further selectivity or range is required, it will not be a difficult matter to adapt an H.F. amplifier to suit this set.

As regards selectivity the set can be thoroughly recommended, and, under average conditions, will enable the local station to be cut out and most of the other B.B.C. stations received without much trouble. It will depend, of course, upon the proximity to the local station, the skill of the operator, and the difference in wave-length between that of the local and the required station as to how completely the former can be eliminated; but, under test, it has been found possible completely to get rid of 2 L O at a distance of less than 12 miles, and to pick up Bournemouth, over 100 miles away, at good strength.

Components Used.

The construction of the set is extremely simple, and if the blue print provided is carefully followed and good components are used, there is no reason why success should not be attained the first time the set is tried out.

For the guidance of those who wish to follow the panel drilling diagram absolutely, we may state that the following components were used in the set whose photographs

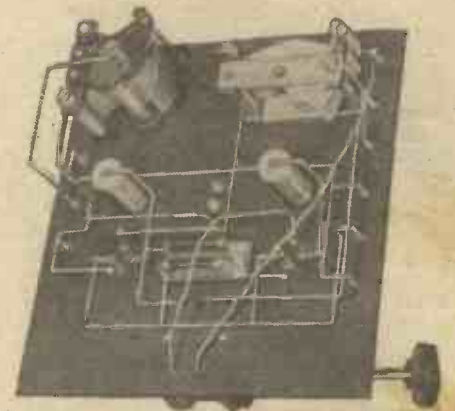
appear here: Lotus 2-way coil holder, with long handle; Lamplough low-loss '0005 variable condenser; Bowyer-Lowe "Popular" '0003 variable condenser; Lissenstat Major rheostats; Yesly combined grid leak and condenser; Security valve holders, and Peto-Scott plug-in single coil holder.

The grid condenser can be of the flat type if desired, though the one shown here is cylindrical. There are no difficulties likely to crop up in the mounting or wiring of the set, though the latter should be followed as closely as possible from the photographs and blue print so as to ensure that it is well spaced, an important point when dealing with this type of receiver. A final check of the wiring is given in the form of the point-to-point connections.

Outdoor Aerial Advised.

When the set has been built, and the panel and wiring cleaned up to ensure that no traces of flux or loose beads of solder remain, the set can be connected up and tested. It will be seen that the usual series-parallel three-terminal method has been employed for the aerial condenser tuning, and the connections for this are given on the blue print.

As good an aerial and earth as possible should be used for this set, though



This view of the reverse of panel should be used in conjunction with the blue print when wiring up the set.

an indoor aerial can be employed with a subsequent reduction in the range of reception. The use of a frame aerial is not advisable, for this kind of aerial necessarily decreases the range by about 80 per cent, so that, apart from the local station and perhaps one other, probably very little will be picked up.

Concerning the Valves.

The photographs show Atlas coils and 6-volt valves, though this does not mean that other types of coils or valves cannot be used. Almost any type of plug-in coil will be found suitable, providing it is efficient, but in the choice of valves the constructor will have to be a little more careful. In the first place, the first valve, which has to amplify at H.F., must be one designed for that purpose, while the second valve, which has to do the detecting, can be either a general purpose valve or one specially recommended by the makers for rectification purposes. The L.T. battery must be suitable for the type of valve employed and vice versa, while an H.T. battery having a voltage up to about 60 or

(Continued on next page.)

AN H.F. AND DETECTOR RECEIVER.

(Continued from previous page.)

72 volts should be available (60 volts is a good average value to use for the first test).

It is advisable for accumulators to be used for the L.T. battery whatever type of valve is employed, and, as the former are provided in three different voltages, namely 2, 4, and 6, it may be useful if we give a list of some of the suitable valves for those various voltages.

Suitable Makes of Valves.

Taking the H.F. valve first, either of the following can be used with success:

2-volt type: Cossor W.2, Ediswan A.R.D.E. red line, Mullard D.3 (H.F.).

4-volt type: Mullard D.06, Ediswan A.R.06 red line, Marconi D.E.3 (H.F.). (These require 3 volts though, of course, a 4-volt accumulator must be used. Their filament consumption is .06 amp.). All these are dull emitters. The following take the full 4 volts, and are not dull emitters: Cossor P.2, Mullard red ring, and any other general purpose 4-volt valve.

6-volt type: The above bright emitters

POINT-TO-POINT CONNECTIONS.

Aerial parallel terminal to fixed plates of .0005 variable condenser, socket of aerial coil holder and grid socket of first valve holder.

Aerial series terminal to moving plates of .0005 variable condenser, earth terminal to plug of aerial coil holder, and L.T. positive, which is also connected to H.T. negative, and to one side of each rheostat. The other side of each rheostat is connected to one filament socket of its corresponding valve holder.

The remaining filament sockets are connected together and to L.T. negative.

Plate socket of the first valve holder is connected to fixed plates of the .0003 variable condenser, socket of anode coil holder and one side of grid condenser.

Moving plates of .0003 variable condenser joined to plug of anode coil holder and to H.T. positive. Other side of grid condenser to grid of second valve and to one side of grid leak, the other side of which joins L.T. positive. Plate socket of second valve holder to plug of reaction coil holder, socket of same being taken to the bottom 'phone terminal. Other 'phone terminal is connected to H.T. positive.

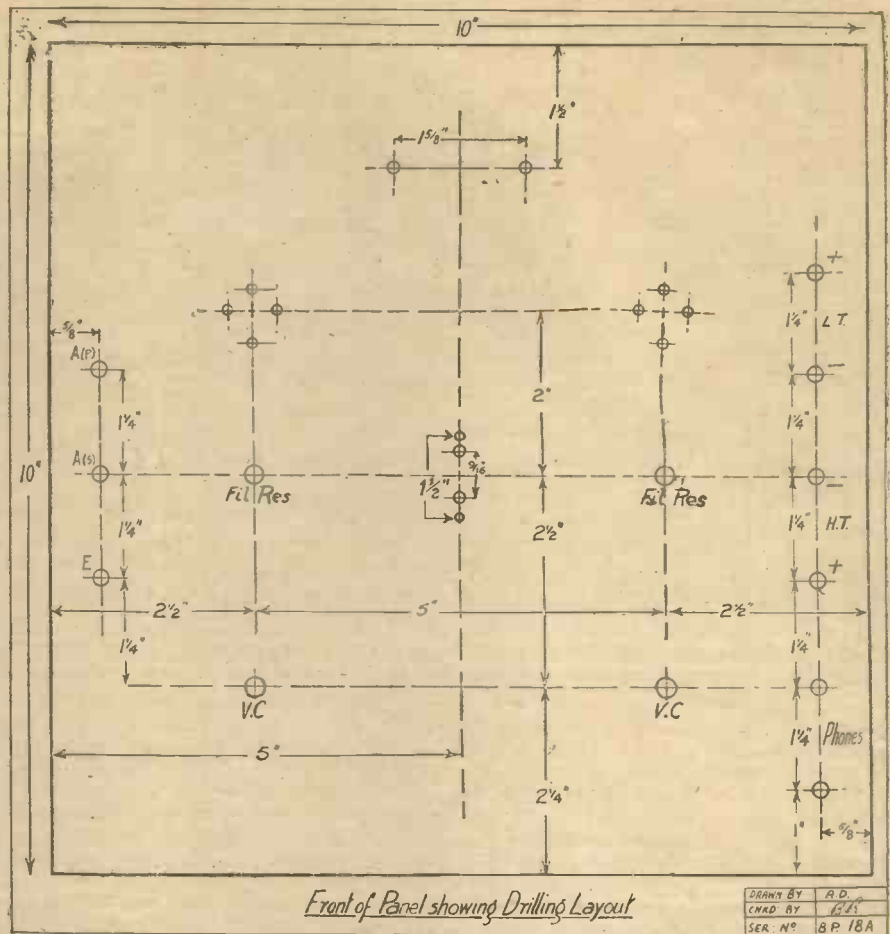
A .002 fixed condenser is connected across the 'phone terminals.

and any of the 6-volt power valves, such as the B.4, P.V.5 D.E., etc. These power valves are usually sold for L.F. amplification, but are quite suitable for H.F. work, if required, and give excellent results.

Handling the Set.

For the detector stage any general purpose type of valve of suitable voltage can be used, the special white ring valves sold by the Mullard Co., or any of the 6-volt power valves such as the B.4, D.F.A.1, P.V.5 D.E., etc.

Tuning is carried out by means of the two variable condensers, which should be operated simultaneously, while the reaction



Front of Panel showing Drilling Layout

coil should be gradually brought up towards the anode coil until the set is just off the oscillation point.

The Necessary Coils.

It is now in its most sensitive condition, and careful tuning of the two condensers, with occasional adjustment of the reaction coil, should enable the listener to pick up one station after another.

Practice will be necessary before the handling of the set becomes simple, but it will not be long before some really good DX results are obtained. The coil chart at the end of article on the Reflex receiver in this issue will hold good as regards aerial and anode coils for the H.F. and Det. receiver, while the reaction coil can be either the same size as the anode or one size smaller—whichever gives best results.

FOREIGN RADIO NEWS.

FROM OUR OWN CORRESPONDENTS

A French Broadcasting Combine.

THOSE French broadcasting stations that are not state-owned have, under the leadership of Senator Dupuy, the chairman of the Petit Parisien, formed a combine under the name of Fédération Française des Postes Privés d'Émissions Radiophoniques.

The stations in this new organisation are Radio-Paris, Radio-Toulouse, Radio-Lyons, Radio-Agen, Radio-Mont-de-Marsan, Radio-Normandie, Radio-Montpellier, Radio-Anjou, Radio-Bretagne, and Petit Parisien.

These stations have been drawn together by the tendency shown in many instances recently, especially in the broadcasting of a French statesman's speech at Geneva which excited universal curiosity, to starve them out to the benefit of the state stations, whose methods are in general inferior to those of the private stations.

The first motion passed by the council of the new federation states its belief that, though by the inventive genius of her scientists, France should take a leading place in radio matters, the state of affairs in France so far as radio is concerned is very backward, and the country has remained stationary whereas several other nations have made very notable advances.

The association is for mutual support and defence, and to apply, when necessary, pressure on the authorities in the interests of radio "fans."

Swedish Station Starts Work.

It is announced that the radio station at Landsort, on the east coast of Sweden, call number S A O, has started work. Its task is to broadcast scientific observations, and its messages are heard distinctly over a radius of 100 miles.

(Continued on page 1328.)

OURSELVES—AND THE

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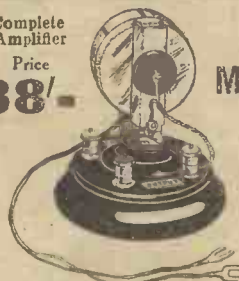
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THAT television, the dream of all radio experimenters and inventors, is practically an accomplished fact, and will probably be such a fact before the end of 1926, is the startling statement that the famous French radio engineer, Edouard Belin, made to me the other day, when I interviewed him specially for POPULAR WIRELESS. M. Belin has been making exhaustive studies of this subject for the last year, and has just given a demonstration at the Sorbonne (writes Mr. Delano).

"The apparatus which I demonstrated, Monsieur," he pointed out, "is merely one used in a study of such work. I cannot, with this machine, transmit pictures, or scenes from a distance; but I have actually in existence such an apparatus, which lacks only at the moment a proper method of amplification to make it capable of transmitting pictures or images over long distances by wireless. This amplification difficulty will be overcome in a short time I hope. I cannot say just when—perhaps it is only a matter of weeks. But when I have met that, I will start tests which I believe will prove of the greatest interest to the world."

System of Mirrors Used.

M. Belin pointed out the apparatus he had used at the Sorbonne in his demonstrations, calling attention to the fact that the entire machine had been built merely for the purpose of studying television, and not with any idea that this was to be the final solution. The theory he already had worked out—"but," he shrugged, "you know what it is, the difference between a theory and a finished commercial article."

The apparatus he has on exhibition is interesting in the extreme. Mounted on a wooden table, with a driving motor coupled to a vertical shaft below, it consists of a regular slide projection machine, with carbon arcs; a peculiar revolving drum with a series of flat mirrors, which is at an angle with and before the lens of the projector, and other mirrors, etc.

"We place a picture slide in the projector, which, of course, casts light and shadow as usual. The mirror drum is made to revolve at a very high speed, taking the reflection of this picture upon it and throwing it in a series of vibrations (due to the flatness of the mirrors) over to a mirror placed behind this slotted screen. The drum is not only revolving at high speed, but, by a special worm gearing, is made to swing back and forth laterally at a speed commensurate with that at which it turns.

Clear "Reception" Obtained.

"The picture image being cast back upon the small mirror behind the slotted screen," indicated the French inventor, "is reduced to a spot of light; and as the drum mirrors take only a part at a time, you get only parts of the photo reflected in this small mirror at once. Now the light beam passes through the large lens at the side of the mirror drum, thus concentrating it into a regular spot. It is reflected from this lens back against the reverse side of the drum, by the second small stationary mirror which you see here. And the revolving and swinging drum takes this little spot and throws it in a series of vibrations against the semi-transparent screen which you see to the extreme left."

PROGRESS WITH TELEVISION.

THE BAIRD and BELIN CLAIMS.

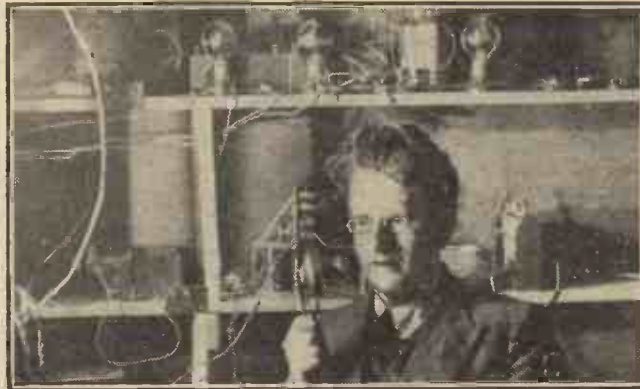
By F. M. DELANO.
(Our Paris Correspondent)

and

K. D. ROGERS.
(Assistant Technical Editor).

As the lights are turned on, a small spot the size of a pea appears on the glass screen. The machinery is set in motion, and the spot becomes rather a streak of light, swinging up and down and back and forth. As the apparatus attains full speed, this light spot produces a square of light upon the screen, somewhat vibratory, but nevertheless clear.

"Obviously," points out M. Belin, "when you place a photo-slide between your light source and the first mirror, you get a series of modulations of the pure



Mr. J. L. Baird carrying out tests in his laboratory.

light according to the shadows cast. And these are carried through until they appear as the same picture in the final reflection—as you can see."

He pushed the lantern slide into place, and immediately the light square took on the aspect of the photo—a prominent French senator with full beard.

"Now, in place of the first small reflecting mirror," remarked M. Belin, "a photo-electric cell (potassium, of course, for selenium would not be fast enough) would react to those light modifications. Or I may place it elsewhere—I am not ready to give the details of the smaller apparatus yet. Perhaps I will fail, after all, and have to wait still other weary years before I have achieved my dream. But, as it stands now, Monsieur—I am impatiently waiting for the weeks to pass when I may know whether I have or have not solved the television problem."

* * *

Another enthusiast who is on the track of television is Mr. J. L. Baird, who has been working for more than three years on the problem, and whom I saw recently in his two-room laboratory in Frith Street, Soho (writes Mr. K. D. Rogers).

The rooms were literally smothered with

apparatus, mainly H.T. batteries, valves and amplifiers; while in the transmitting-room a huge 5 or 6 ft. disc with 30 lenses arranged round its circumference, arrested the attention of the observer.

I will not go into the details of the means by which Mr. Baird hopes to accomplish television, as they were discussed in the article published in "P.W." of May 23rd, 1925, and have not been altered by any great extent since then.

Mr. Baird explained that his main trouble was financial, and he had so far had to use crude uncorrected lenses which caused a considerable amount of aberration.

An Interesting Demonstration.

"Let me show you how it works," went on the inventor. He moved about a dozen switches, and four or five knobs, and then the great disc began to revolve. Faster and faster it went, until a constant speed of between 200 and 300 revolutions per minute was reached.

"I'll put 'Jimmy' up in place," said Mr. Baird, and he placed the well-worn head of a ventriloquist doll in position in front of the transmitter.

We adjourned to the next room, where he opened a receiving set—about the size of a large suit-case, but made of wood—and began to twiddle a few little knobs. A small motor started up, driving a disc similar to, but smaller, than the one in the transmitting-room.

A lamp flickered away merrily among the "works" of the set, and Mr. Baird explained that this flicker denoted that the two discs were not yet in resonance. "The lamp will go out when the transmitter and receiver are in step," he added.

Eventually the flickering slowed down, and the lamp went out. I was invited to look in the camera obscura-like attachment on the side of the case.

"Jimmy" Vanishes.

There, sure enough, was Jimmy, flickering away at me and moving his eyes and mouth in realistic fashion. Then, all of a sudden, he began to look a little off colour, and the horizontal lines in the picture tilted upwards, eventually becoming vertical—Jimmy had disappeared.

"It's gone out of adjustment," said the inventor. "I shall have to re-synchronise it."

This was done, and Jimmy reappeared as before. It was undoubtedly a step forward from the results achieved last year, but whether the final solution will come by this method is still a matter of speculation. We shall, I fear, have to wait for some time yet before seeing by wireless, or even land-line, is finally accomplished.

Mr. Baird is making a plucky effort to solve an extremely difficult problem, and whether his method is the one finally adopted or not he deserves the highest commendation for his ingenuity, and I, personally, would like to wish him the best of luck.



Technical Notes

Conducted by our Staff Consultant, J. H. T. ROBERTS, D.Sc., F.Inst.P.

THE question of the binder or varnish to be used on a coil is one upon which there have always been considerable differences of opinion. It has generally been the aim of the constructor to make up his coils in such a way as to be self-supporting without the aid of any varnish or binder, and various types of coils have appeared on the market which are made on this principle.

The objections which are usually urged against the varnish are that it introduces losses in connection with the coil, and furthermore, that it frequently absorbs moisture. There is little doubt that an unsuitable binder may cause considerable trouble in this way, and it is therefore interesting to note the results of some extensive tests which have been carried out by the laboratory department of the "Radio World" (New York) on the relative advantages and disadvantages of different kinds of varnishes.

The substances considered were collodion, sodium silicate, and collodion-amyl-acetate solution; the last-mentioned solution is compounded from $\frac{1}{2}$ ounce of collodion and $\frac{1}{2}$ ounce of amyl-acetate. In the tests a wave-metre was used and an oscillating circuit, set to certain wave-lengths. The test circuit was tuned to resonance with the oscillator until the current on a special galvanometer showed a maximum deflection.

In this general way the effective resistance of the circuit for the given frequency was obtained, and different coils were introduced, identical as far as possible in their inductance value and general design, differing only in the nature of the binder which was used in their construction. Hourly tests were made to show the change in the effect as the binder dried out.

The Result of Tests.

The results were as follows: The coil coated with sodium had the highest losses, the losses being 33 per cent greater at 200 metres than with the coil which was untreated. At 550 metres the sodium-silicate-treated coil had losses which were 25 per cent greater than those with the untreated coil. The collodion-coated coil did not introduce losses so great as those with the silicate-coated coil. Calling the coils No. 1, 2, 3 and 4, number one being the untreated coil, number two sodium silicate, number three collodion and number four collodion-amyl-acetate, the coil resistances in ohms at the various wave-lengths were found to be as follows:

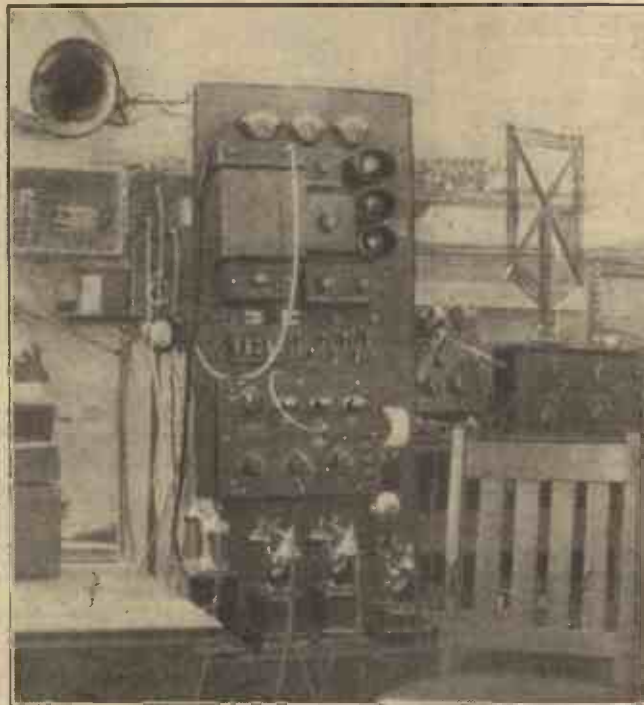
Wave-lengths	No. 1	No. 2	No. 3	No. 4
200 metres	14.7	20.0	17.0	15.3
250 "	10.1	14.0	11.0	10.3
300 "	7.8	10.7	8.3	7.9
350 "	7.0	8.3	7.5	7.0
400 "	6.1	7.5	6.6	6.1
450 "	5.6	7.0	6.2	5.6
500 "	5.2	6.5	5.7	5.2
550 "	5.0	6.25	5.2	5.0

From this it appears that the sodium silicate as a binder is unsuitable. Furthermore, the selection of the binder appears to have a great influence on the selectivity and the volume obtainable with the coil, and from the results obtained it seems that the collodion-amyl-acetate solution is the most advantageous to use.

Furthermore, it has the additional advantage that it renders the coil practically moisture-proof.

The Edison Accumulator.

I notice that the alkaline type of high-tension accumulator is now finding its way on to the market, more particularly in the United States. This type of cell is claimed to have a great advantage over the lead type in that it has a longer life, is cheaper and more efficient, does not suffer from



The amplifiers and relay line controls at the Darban Broadcasting Station.

sulphation of the plates or corrosion of the terminals, is not liable to buckling of the plates, and suffers no injury from standing idle or from short-circuiting or overcharging. This type of battery is undoubtedly one which will be likely to meet with considerable approval, although, like many other things, it has been slow in gaining recognition with the British public.

Tracing Battery Leads.

Every valve user knows the little inconveniences of tracing out the various high-tension leads to the different valves, and distinguishing these from one another and

from the low-tension leads. It is a great nuisance continually having to retrace the wires. This, however, is very readily overcome by the simple expedient of taking two pieces of cardboard, or preferably of celluloid or such-like material, and making in each a number of holes through which the different wires are passed.

Each of these two pieces of celluloid acts as a label, and one piece is slipped over the wires at the end close to the batteries, an identification mark being made against each of the holes through which the wires are passed, whilst the other is slipped up towards the ends of the wires which go to the terminals of the set, the second label being marked to register with the first one. In this way the two ends of any of the wires are very easily identified.

I notice that in "Radio" (Berlin) a little device of this kind is advertised for sale.

Some Aerial Experiments.

Some interesting information on different types of aerial are given in "Radio" (South Africa) by a correspondent who has made a number of experiments on aerials of various dimensions and consisting of various types of wire. He challenges the theory that the horizontal length should never be more than half the vertical height, the belief not being borne out in practice,

according to his experiments. A 150-foot aerial, he states, is no better than a 100-foot for B.C.L. work. The conclusion reached as a result of the experiment referred to is that for maximum efficiency one should keep to the natural wave-length of the aerial, except in cases where allowance has to be made for screening.

Amongst the different types of wire which were tried were the following: 7/22, both enamelled and bare, 42 S.W.G., and 15/32 enamelled. The 42 S.W.G. was by far the best, but soon lost against the 15/32, owing to corrosion.

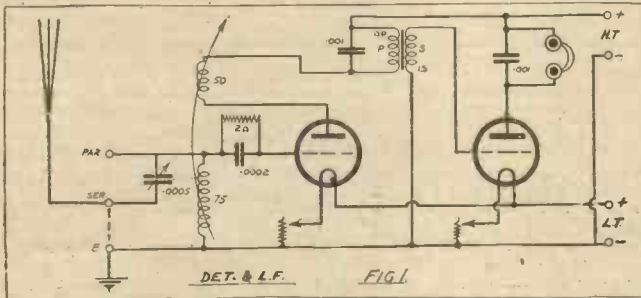
A Dial Tip.

Many amateurs experience difficulty owing to the rotor of a variable condenser being so loose that it will not stay in any given position, the slightest jar causing it to rotate slightly, which, in the case of a very selective set, may be the cause of losing a station altogether. This difficulty may readily be overcome by the simple expedient of introducing, between the back of the dial and the surface of the panel, a disc either of felt or thin sheet cork. This little trick not only ensures the rotor remaining in a fixed position when set, but also gives a smoothness to the operation of the condenser which is very desirable. Of the two, probably the felt is preferable, as it has more resiliency than the cork and is not liable to squeak.



SO many people have written to me asking my opinion of various receiving circuits that I feel that if I devote this article to a brief discussion of a few popular circuits, it may be of interest to at least some of my readers.

Perhaps the most popular of all valve circuits for the purpose of general reception is the one given in Fig. 1, consisting, as will be seen, of an ordinary detector valve with reaction on the aerial followed by an ordinary L.F. amplifier. This is an all-round circuit of the greatest utility, both for the

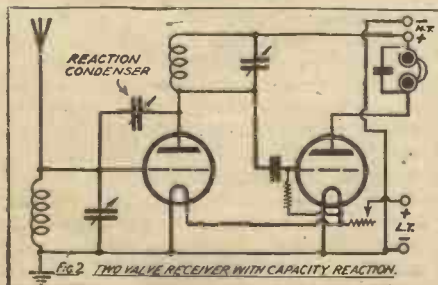


reception on the ultra H.F., for broadcasting, and the picking up of signals on the longer ranges.

Useful Broadcast Receiver.

Carefully handled, it is capable of working a loud speaker with a fair volume up to a distance of twelve miles or so from a main broadcasting station, while its headphone range under favourable conditions is remarkable. Many are the times when DX telephony reception from America has been carried out successfully using this circuit, while in the early days of short-wave reception it was the most popular circuit known.

From a quality point of view it is better to abolish the grid leak and condenser method of rectification, and to use the first valve as a rectifier on the anode bend principle, a suitable valve in this case being a D.E.5B or D.E.5 for broadcast reception, or a D.E.Q. for the ultra H.F.



 An Exclusive Article by the famous
 British Experimenter and Owner
 of 2 O D,
 E. J. SIMMONDS, M.I.R.E., F.R.S.A.

It is of the utmost importance that a reliable and well designed L.F. transformer should be used with an impedance suitable for the particular valve with which it is to

be employed. For instance, with this type of circuit I am using as a detector a D.E.5 with 60 volts H.T., coupled by means of a 6 to 1 ratio Marconi Ideal transformer to an L.F. amplifier, consisting of an L.S.5 valve with 120 on the plate and 8 volts grid bias. This combination gives really excellent results,

though any other makes of valves and transformer could be used, provided they are suited to each other. It is a question of the valve and the transformer to be used in any particular set that matters, not merely any valve and any transformer, however good each may be. In this respect, I think it is a great pity that all makers of L.F. transformers do not issue curves showing the amplification for the range of musical frequencies, at the same time giving the makes of the valves and the types used when the curves were obtained.

Capacity Reaction.

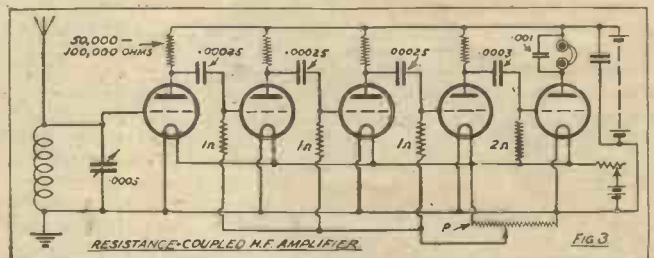
In the receiver just discussed it will be noted that magnetic reaction was employed, but in Fig. 2 we have another form of reaction which is not so generally used, but which, nevertheless, is quite efficient. In this circuit an H.F. valve is employed, followed by a detector, reaction being carried out between the plate and grid of the first valve by means of a small variable condenser. I have found this circuit excellent for the reception of weak signals, provided care is taken in the choice of the H.F. valve. Reaction is quite smooth, but on the whole, for general purpose use

I am rather inclined to favour magnetic reaction between the plate circuit of the detector valve and the tuned anode of the H.F. valve or the aerial, preferably the former, because this tends to reduce the radiation when the set is oscillating.

In the majority of cases, though capacity reaction may be easy to handle, I think that the magnetic type gives better control, and, of course, on receivers where self-oscillation is a fault, it can be reversed so as to control the set—a very valuable feature in some cases.

A DX Receiver.

The circuit shown in Fig. 2 is suitable for all wave-lengths down to about 100 metres, below which, owing to the inter-electrode capacities of the valves, the H.F. valve gives practically no increase in signal strength, while the additional tuned circuits make handling very complicated and the set inclined to be unstable. On broadcast wave-lengths, however, especially where magnetic reaction is employed, the circuit can be very valuable, and is capable of telephony reception over very long distances, the H.F. stage amplifying the incoming weak signals, and so bringing them up to an intensity suitable for efficient detection, while the extra tuned circuit incorporated in the anode of the H.F. valve greatly increases the selectivity



of this set. This receiver, of course, will not work a loud speaker, and is useful only for 'phone reception.

While discussing H.F. amplification, I should like to include the circuit shown in Fig. 3, where four stages of H.F. are employed, followed by a detector valve. Owing to the likelihood of instability the resistance coupling has been employed, thus making the H.F. stages aperiodic, leaving only one tuning control.

For the reception of low wave-lengths this circuit is not particularly efficient, its greatest efficiency being obtained on wave-lengths above 1,500 metres, where it has the great advantage that the amplification is constant on all wave-lengths.

(Continued on next page.)

SOME INTERESTING CIRCUITS.

(Continued from previous page.)

For general use on broadcast waves, however, the circuit is rather an uneconomical one, because the full advantages of the 4 H.F. valves are not obtained, and the circuit is not particularly selective. It has been in use, however, for a considerable time for the reception of long-wave telegraphic signals and for reception where frame aeriels have to be used. For the reception of C.W. on long waves it is usually an advantage to improve the selectivity by the use of a separate heterodyne for producing the local "beats," otherwise the detuning necessary to give "beats" with the incoming signals causes a serious loss of signal strength.

Capacity reaction should be applied from the last valve (the detector), and by a tapped switch should be available to any of the foregoing grid circuits, this arrangement giving a valuable control of reaction both negative and positive.

In this particular it is of importance to note that the potential signs at any moment of adjacent stages of each valve are exactly opposite. For instance, when the grid of the first valve is positive the grid of the second valve is negative, and so on, a point which should be remembered when such a receiver is to be constructed.

Resistance L.F. Amplifiers.

This receiver also has the disadvantage of requiring a high plate voltage, 100 volts at least being necessary, while, to obtain really quiet operation, the anode resistances should be wire wound. In my opinion it is preferable to use the resistance in the last anode circuit, and to place the 'phones in shunt with a condenser, to avoid the steady plate current which might otherwise render the 'phones less sensitive.

Valves of high amplification factors should be employed, though good results have been obtained with valves having ordinary characteristics, but, in this event, the amplification rapidly decreases as the wave-length decreases below 1,500 metres.

Resistance coupling may not be particularly efficient when applied to H.F. circuits with the reception of signals on wave-lengths below 1,000 metres, but it is a decided advantage when used on the L.F. side of the set, especially where telephony is to be received.

It is of its greatest value when even amplification of musical frequencies are concerned, for it will give practically even amplification throughout the whole scale. It certainly has the disadvantage of not giving such a high amplification per stage as the L.F. iron-core method of coupling, but for purity of results it is unsurpassed.

The circuit shown in Fig. 4 denotes a detector valve followed by three resistance-coupled L.F. amplifiers, and this circuit can be recommended for the reception of local broadcasting, and is capable of giving good volume on a loud speaker with a high degree of purity. Reaction has been omitted, because this always tends to decrease the purity of reception, owing to its sharpening up the tuning, thereby losing some of the side bands of the modulated carrier wave.

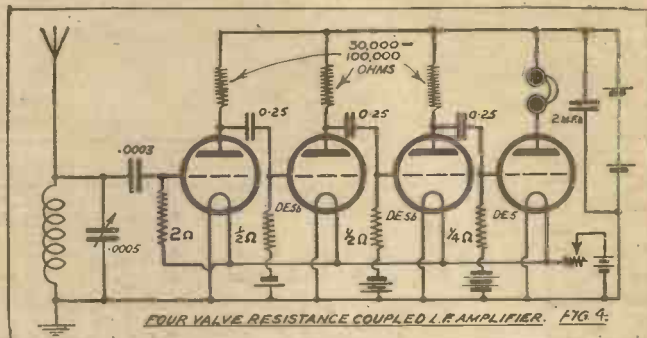
An improvement on the circuit shown would be to omit the grid leak and condenser on the first valve, and to make that rectify on its anode bend.

Avoiding Distortion.

With regard to the low order of amplification accompanying the use of resistance-coupled amplifiers, this may be improved by using special valves now available for such circuits. These valves have a high amplification factor and high impedance, and this must increase the magnification per stage obtained from the set. For quiet reception it is essential that the resistances should be wire wound, while the grid leaks should be of the fixed value type of good quality. The last valve should have a separate H.T. tapping provided, and it is of the utmost importance that the correct values of grid bias for each valve should be arranged, for an incorrectly adjusted

L.F. resistance-coupled amplifier will give bad distortion. Grid current and overloading of the valves must be avoided.

In order to avoid setting up self-oscillation at audio frequencies, it is often an advantage to use shock-absorbing valve holders when dull emitter valves are being used. For those who desire the finest of



reproduction, capable of withstanding really critical musical examination, there is no doubt that this type of circuit is the only really satisfactory method of amplifying broadcast telephony and doing justice to the transmissions from the B.B.C. stations.

UNTRUSTWORTHY ACCUMULATOR TESTS.

MOST listeners know that there are two testing instruments in general use for showing the condition of an accumulator—the voltmeter and the hydrometer. It is not so well realised that either of these instruments can give misleading readings, but that such really is the case a little consideration will show.

Taking the former case—that of the voltmeter—first, it can easily be appreciated that a single reading upon this instrument may prove very misleading. All that the voltmeter tells is the "pressure" between the two sets of plates (negative and positive). We know that for a fully-charged cell this pressure should read about 2.6 directly the cell is taken off charge, but after standing awhile the voltage drops to about 2.1.

Misleading Readings.

It is possible for an old and unserviceable accumulator to be overcharged for a time, and after such treatment its voltage may rise to 2.1, but as soon as current is taken from such a battery, the voltage drops very rapidly, and it would be quite unsuitable for lighting valves, all of which require a steady voltage.

If, therefore, an accumulator is to be judged by voltage alone, it must be tested when actually delivering current, preferably to the valves which it will normally have to supply. Only when the voltage of each cell remains steadily at 2 volts (or thereabouts) for several hours, is the voltage test a reliable one.

After use for a week or so, the voltage of the cell drops; when it gets as low as

1.85 the battery needs re-charging, and further use will tend to spoil it.

The hydrometer does not measure the voltage at all, but depends for its usefulness upon its measurement of the density, or "strength" of the accumulator's acid. This alters according to the condition of the accumulator, in very much the same way as the voltage does, and is, if anything, a more reliable test than that of the voltage.

Density Tests.

When a cell which is in good condition has been re-charged, the "density," or to give it its right name, the specific gravity, of the acid, is 1.2. When the battery has been in use and is run-down (with its voltage down to 1.85), the specific gravity will be down to 1.17. The change in specific gravity is a gradual one, keeping pace with the condition of the accumulator.

From this it will be seen that the hydrometer test merely indicates how much higher or lower than normal is the density of the liquid in the cell. If a cell were in bad condition it would be a simple matter to fake its specific gravity by adding stronger acid to the cell. Such a trick would easily be detected in use, but it shows that neither the hydrometer nor the voltmeter is infallible, unless several tests are carried out whilst the cell is on load. The ideal method of checking the condition of accumulators is frequently to use both a voltmeter and a hydrometer. This is the method obtaining at most power stations, and it is—or should be—the method by which your own accumulator is tested.

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THROUGHOUT

CURRENT TOPICS.

By the EDITOR.

The "N.A.R.M.A.T." Evidence—Some Sensible Recommendations—
The Radio Association's Evidence—Fantastic Suggestions.

THE labours of the Broadcasting Inquiry Committee appointed by the Prime Minister are very nearly at an end. The other day some interesting evidence was given before the committee by Mr. W. W. Burnham, managing director of Messrs. Burndept, Ltd. Mr. Burnham gave his evidence on behalf of the National Association of Radio Manufacturers and Traders, and he stated that the radio industry, which really came into its own in this country about four years ago, had grown to a very large extent, and to-day it was estimated that something like 40,000 people were directly employed in it. The turnover in wireless goods last year was from 10 to 12½ million pounds. Furthermore, Mr. Burnham pointed out that ancillary or subsidiary trades had been greatly benefited, indirectly, by the progress and expansion of the wireless industry.

Broadcasting Zones.

Mr. Burnham made some other very interesting statements in his evidence. He said that his Association believed the present system of low power main stations and trifling low power relay stations, to be absolutely wrong. Even with a very expensive receiving set it was not possible to get many alternative programmes with any degree of satisfaction, or free from interference, owing to the weak power employed by the majority of the transmitting stations.

Mr. Burnham said that the N.A.R.M.A.T. considered the present arrangement of British broadcasting financially extravagant. For the services it gave it obviously cost too much in plant, upkeep and personnel, and he advanced the suggestion, on behalf of the Association, that competent wireless engineers should divide the country up into six or seven zones, so that in each zone a high-power station, say, 25 kw., could be erected.

These stations, suitably linked to a central studio with connections to local studios, should be able to furnish suitable alternative programmes, and the user of a moderately priced receiving set would thus in all probability be able to select the programme of any of these stations at will. He added that his Association also recommended the erection of a super-power transmitting apparatus for national and long distance broadcasting, as the international aspects of broadcasting must be regarded as very important.

Fewer Stations.

Mr. Burnham's views are exceedingly interesting. Readers will remember that we have all along advocated the re-organisation of British broadcasting on similar lines to those advocated by Mr. Burnham and his Association. We would go further, however, and suggest that even fewer stations could be satisfactorily employed, providing the power was linked in each case to, say, 50 kw.

Objections have been raised on the ground that 50 kw. stations would have to employ wave-lengths of between 1,000/2,000 metres if the stations' transmissions were to prove efficacious. We do not consider this an insuperable objection. That the present system is expensive and that it does require a large staff to maintain it is an undisputed fact, but British broadcasting must be simplified and everything possible done to minimise the great bugbear of interference.

The Board of Control.

Another interesting point in Mr. Burnham's evidence was that a 98 per cent. expression of opinion of the Association's members was in favour of broadcasting remaining in the hands of one independent authority and not passing under Government control.

It was considered that the capital needed by that authority could be easily found by the issue of guaranteed 75 per cent. debentures or bonds, and the income for rendering services obtained from licences, as at present. The authority should have a representative board of control, constituted on broad lines, something like as follows: British radio manufacturers, musical interests, theatrical interests, news interests, religious interests, educational interests, Wireless League and Associations, and Government representatives. So far, Mr. Burnham's evidence has proved the most practical and the most businesslike evidence as yet offered to the Committee.

* * *

In striking contrast to Mr. Burnham's evidence was the evidence given by the representatives of the Radio Association. The hon. secretary of the Radio Association stated that insufficient knowledge was responsible for the numerous complaints of bad reception. Thousands of sets were out of use simply through the lack of elementary knowledge. With this we completely disagree, and we would like to know on what evidence the honorary secretary of the Radio Association bases this extravagant assumption.

A further fantastic plan was put to the Committee by the honorary secretary of the Radio Association. He stated that the country should be divided into districts, and in each district one or two radio engineers with a motor van should call on people who desire elementary radio instruction!

The honorary secretary of the Radio Association may not be aware of the fact that over a million people in this country purchase wireless journals for the purpose of obtaining that instruction. People are not in the habit of making appointments for wandering gramophone experts or wandering electric light experts to give them "instruction," and it is absurd to suppose that wandering radio engineers, such as the honorary secretary of the Radio Association has in mind, would be able to do much good.

Wireless clubs exist for the purpose of those enthusiasts who wish to get together and discuss the intricacies of their hobby. But the suggestion that public lectures and classes should also be held in various towns is, to our mind, quite unnecessary.

There exist in this country many thousands of people with wireless sets who have not the slightest inclination to probe into the mysteries of their receivers. In cases like this it is up to the radio manufacturers to supply a straightforward and thoroughly simple receiver which can be operated with as little trouble as one operates a gramophone. The ordinary listener who is not interested in the technicalities of wireless will simply not be bothered by learning wireless theory and technique generally; all he wants is some sort of a set which, by pressing a button, will fill his room with music.

Subsidised Radio Instructors?

The gentleman who made this proposal further suggests that an organisation of listeners would be appropriate, and it was considered by the Radio Association that a good beginning could be made with an expenditure of from £10,000 to £20,000 per annum, the money to be found by devoting to this purpose a share of the licence fees which at present goes to the B.B.C.!

This suggestion shows a distressing lack of knowledge of the present broadcasting situation. We have already pointed out that the B.B.C. are not drawing a penny from any new licence money paid in by new listeners, as their revenue is limited to £500,000 per year. And, also, it would be grossly unfair if licence money was to be appropriated for the purpose of instructing people who did not want to be instructed, and, furthermore, for the instruction of those listeners who, because they did not study their subject, must be spoon fed at the expense of the thousands of amateurs in this country who, besides paying their licence money, study wireless technique.

In conclusion, it was suggested that certain profits accruing from broadcasting could be made to provide the means of finding funds for a first-rate national theatre and opera house. In other words, evidence offered by the Radio Association to the Broadcasting Committee contains a suggestion that certain moneys obtained by the B.B.C., in particular from the profits of the "Radio Times," should be diverted into a fund for the building of a national theatre or opera house!

A Pinch of Salt.

This strikes us as being even more fantastic and more calculated to arouse disapproval than Mr. Churchill's "Raiding the Road Fund" to meet Government expenses, and we can only express the hope that the Broadcasting Committee will take a very large pinch of salt with such "evidence" offered by the Radio Association.

We have already expressed the view, in recent issues of POPULAR WIRELESS, that the Radio Association is taking itself far too seriously. We do not consider that its organisers have the experience or the knowledge wherewith to presume to make suggestions such as they have made to the Broadcasting Committee of Inquiry, and we sincerely trust that the fantastic nature of these suggestions will be widely realised by serious students of broadcasting in this country.

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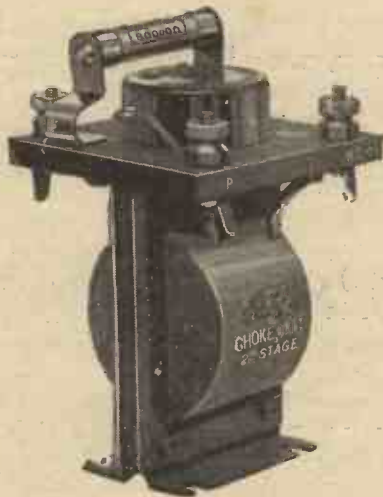
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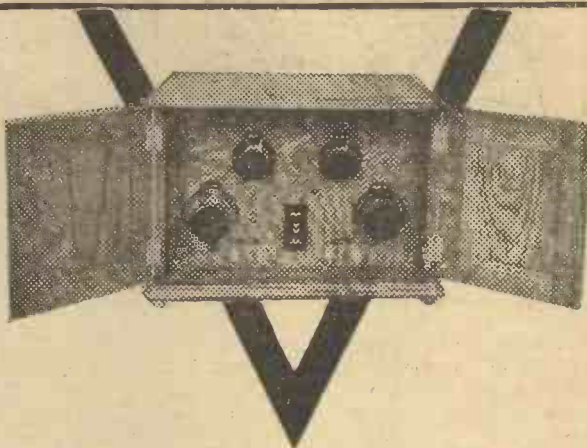
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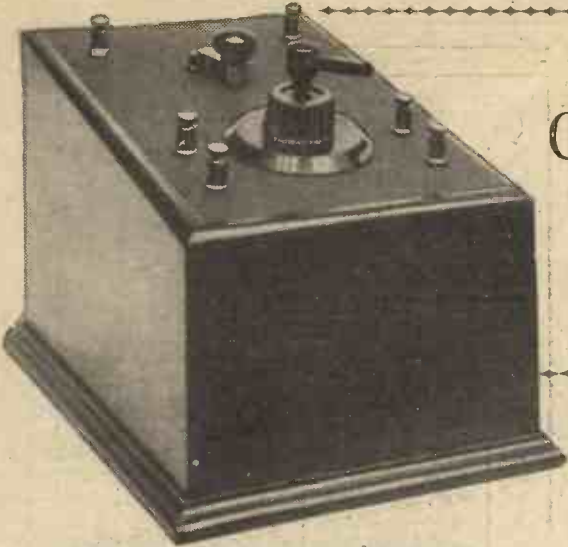
Ericsson
 FAMILY
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 RECEIVER SET

THE COMPLETE ELIMINATOR.

An "H.F." Drainage System.

By LAURENCE MANNING, A.M.I.R.E.

This practical article should be welcomed by many of the thousands of "P.W." readers who are troubled by "interference."



The completed instrument has a neat straightforward appearance.

model, which will undoubtedly give every satisfaction.

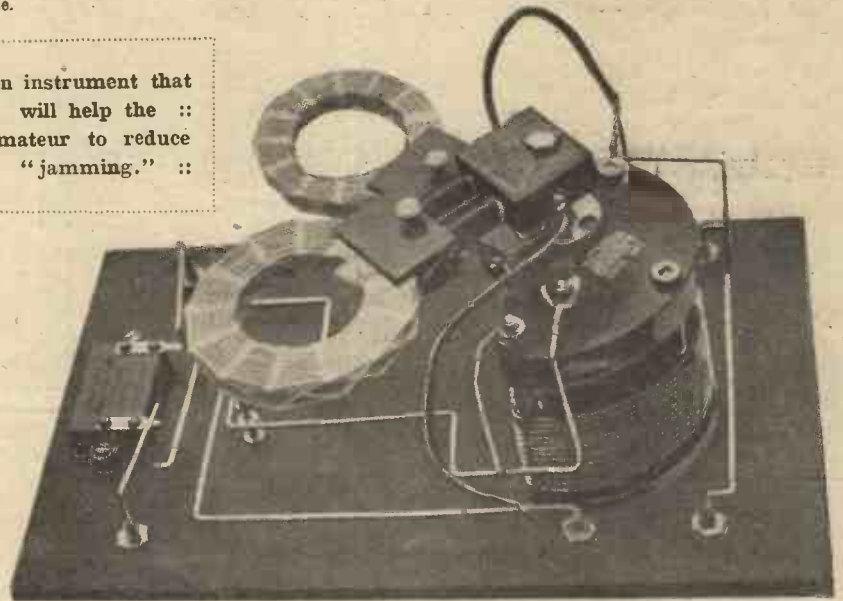
In practice the following operation can be carried out by the wave-trap:

earth should be joined to terminal marked E. On the other side, for all interference except that on waves longer than the desired wave, the terminal marked G1 should be connected to the aerial terminal on the existing

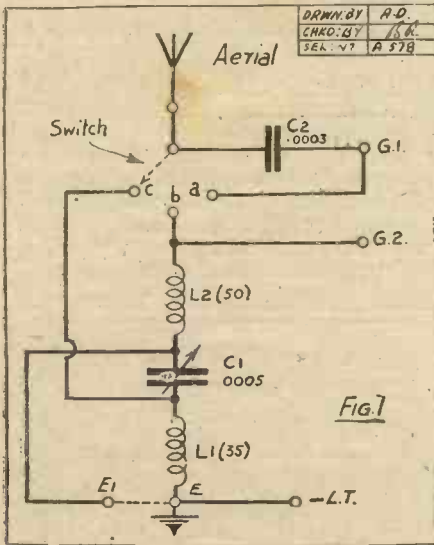
THERE is no doubt that strong interference from a local station—either broadcasting or spark—can be completely eliminated if a suitable circuit is employed. The most successful method may be termed "the H.F. drain."

Practical experience points to the fact that loose-couplers are not satisfactory in assisting in the elimination of very loud signals. Indeed, it can be truthfully said

An instrument that
:: will help the ::
amateur to reduce
:: "jamming." ::



The wiring, as this photograph shows, is by no means intricate.



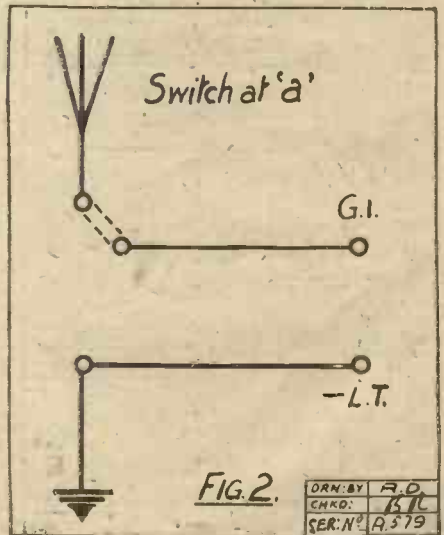
- (1) Cut out local station.
- (2) Cut out Daventry and receive Radio-Paris.
- (3) Cut out or reduce 300-metre ship jamming.
- (4) Cut out or reduce 600-metre ship jamming by connecting up as in Fig. 4.

tuning arrangements, while the terminal marked L.T. should be joined to the existing earth terminal on the set.

(Continued on next page.)

The Components Required.

- 1 panel 6 x 10 in. approximately.
- 1 small switch arm.
- 3 contact studs.
- 2 contact stops.
- 1 Seamark Connode.
- 2 coil plugs with pin.
- 1 35 Reactone coil. For cutting out short waves.
- 1 50 Reactone coil.
- 1 Dubilier .0003 fixed condenser.
- 2 lengths of 16 gauge square tinned copper wire.
- 6 large telephone terminals.
- If it is desired to cut out long waves (Daventry) 2 Reactone 150 coils will be required.



that, unless in the hands of an expert, they give nothing but disappointment.

The writer has had considerable experience in eliminating interference, both at the Admiralty and at his private research station in Sheffield. Regarding the latter, models of a successful "trap" circuit have been supplied to the War Office for eliminating extremely loud signals.

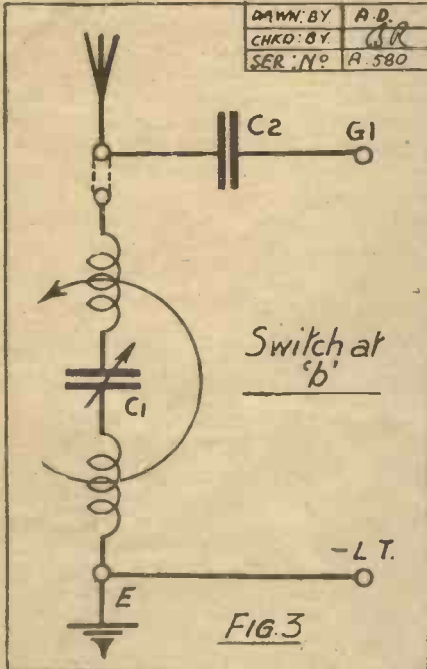
It will be of interest to the reader to learn that the first attempts were made necessary on account of the writer's experimental signals on short waves causing slight interference to neighbours who wished to listen to broadcasting. It was then decided to discover a real method of completely cutting out these interfering signals at the receiving end, and the Complete Eliminator described here is a modified and improved

Consulting the wiring diagram, the aerial should be joined to terminal marked A. The

THE COMPLETE ELIMINATOR

(Continued from previous page.)

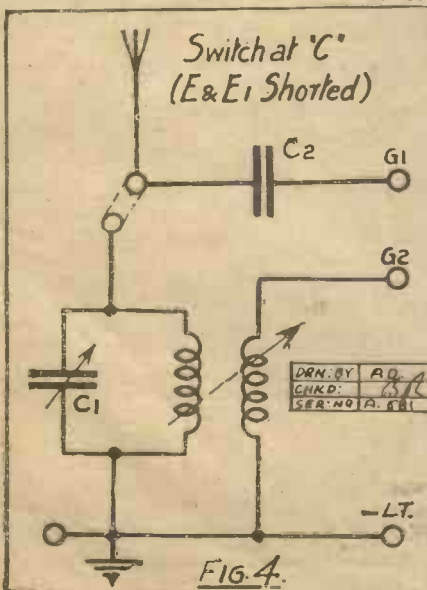
If it is desired to cut out interference other than described in (1), (2) and (3), terminals E and E1 should be short-circuited, earth joined to E, aerial to AE, while G2 should be connected to the aerial terminal on the existing tuning arrangements instead of G2.



The complete circuit is shown in Fig. 1. The arrangement when the switch is at a, b and c respectively is shown in Figs. 2, 3 and 4.

The Various Circuits.

From Fig. 2 it will be seen that when the switch is at a (see Fig. 1) the wave-trap is out of circuit, and the aerial and earth



become connected straight through to the existing tuning arrangements.

When the switch is at b (see Fig. 2), the arrangement becomes a series drain circuit, which is extremely efficient. Using this arrangement, it is possible to cut out a relay station completely from a few hundred yards distance, while a main station can be eliminated sufficiently well to permit the reception of stations on adjacent waves.

With the b arrangement, provided suitable coils are used (see list of components) it is possible to eliminate Daventry and receive wave-lengths slightly longer, as in the case of the Paris station.

The arrangement with the switch at c, E and E1 shorted, and the terminal G2 connected to the aerial terminal on the existing tuning arrangements is particularly useful in cutting out interference from ships at sea transmitting on 600 metres. It may also be used, provided suitable coils are used (see list of components) for cutting out Daventry, and receiving wave-lengths which are shorter.

Experiments may be made with the switch at c and the terminal G1 to the existing aerial terminal. With this arrangement, many unusual phenomena are observed, and it is possible to perform extremely difficult tuning feats in a simple manner.

The eliminator should be connected up, as previously instructed, bearing in mind the type of interference experienced.

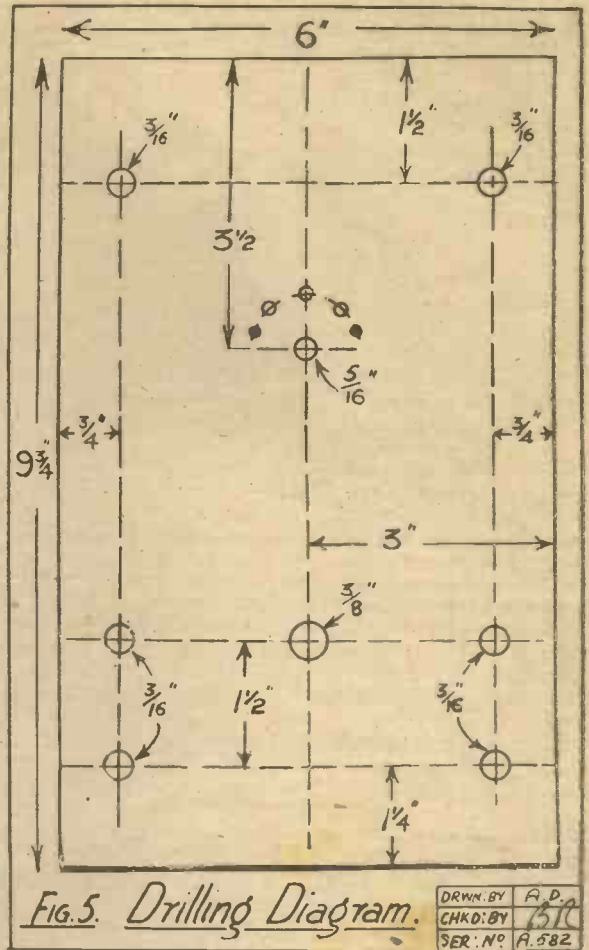
The switch should be placed at a, and the interfering station tuned in to maximum strength, on the set itself, without touching the eliminator. Then the switch should be moved to b, and the adjustment of coils and condenser in the eliminator should be made until the interfering signal is reduced to a minimum, or completely cut out. Leave the eliminator for the time, and return to the tuning arrangements in the set proper and tune in the desired station. The interfering station will not be heard so long as the adjustment of the eliminator remains unaltered.

Increasing Signal Strength.

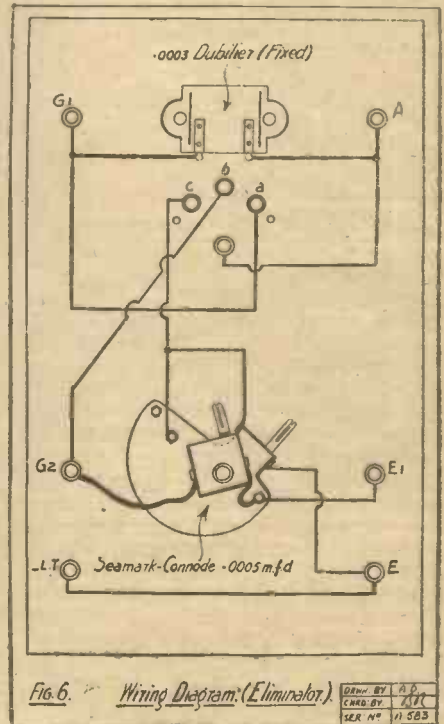
By attaching the eliminator to any set, apart from cutting out interference, it is possible to materially strengthen signals. This should be done in the following manner. Switch at a, tune in the desired station on existing tuning arrangements. Move switch to b, leaving tuning arrangements on, set and manipulate eliminator coils and condenser until signals are increased.

There are, of course, forms of interference with which it is impossible satisfactorily to deal, however good the eliminating system employed happens to be. In this category is heterodyning, whether caused by oscillating listeners or interfering C.W. or broadcasting stations.

Heterodyning is, in effect, a modulation of the actual carrier wave of a broadcasting



station, and noises caused by such can hardly be eliminated without eliminating the heterodyned broadcasting station. However, the "Complete Eliminator" will be found to be capable of satisfactorily dealing with most kinds of interference.



WHAT is the real reason why the 4-electrode valve has not become really popular in England?

I put it down chiefly to this fact: It was brought forward for the purpose of producing effects which the 3-electrode valve would not give, but at that time very rapid advances were being made in 3-electrode valve construction, resulting in valves which were every bit equal for most purposes to the 4-electrode tubes then being produced, and easier to construct and use.

Whether it is now possible to still further improve the 4-electrode tube, using all the tricks employed with the 3-electrode one, I am not quite sure, but extensive experimental work is in hand in this direction.

The method of using the 4-electrode valve to give a low resistance in the plate

CASCADE HIGH-FREQUENCY AMPLIFICATION.

WITH FOUR ELECTRODE VALVES.

Another Use for Unidyne Tubes.

By CAPTAIN H. J. ROUND.

(Chief Research Engineer, Marconi's Wireless Telegraph Co., Ltd.)

This article has been specially written for "P.W." readers by the Chief Research Engineer of the Marconi Co. Captain Round explains various useful methods whereby Unidyne constructors can utilise their four-electrode valves in interesting experiments.—THE EDITOR.

days. If the second grid were earthed there would be very fair screening between the first grid and the plate, and there is, due to the construction, very little remaining capacity in leads.

A short investigation with one circuit showed that I would get the best magnification per stage with a more or less conventional arrangement where the second grid was brought to the H.T. positive terminal.

You must note that although with regard to D.C. potentials, H.T. + is not earth, it is effectively earth for A.C. potentials.

Further Shielding Arranged.

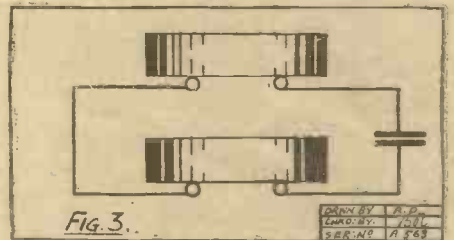
If one takes any of the standard 4-electrode tubes it will be seen why they are not much use for this shielding process. It is

circuit such as Fig. 2 the tendency to oscillate is so great that without taking further precautions the circuit cannot be used.

To magnify our weak signals before rectification is our strong desire—the desire has resulted in various inventions, such as resistance damped inter-valve transformers, neutrodyne, and other anti-reaction arrangements, all of which have their particular merits or demerits. If we could reduce this capacity between plate and grid of each valve to a much smaller value, we should be able to use the circuit of Fig. 2, even, perhaps, adding another circuit, without running into oscillation trouble.

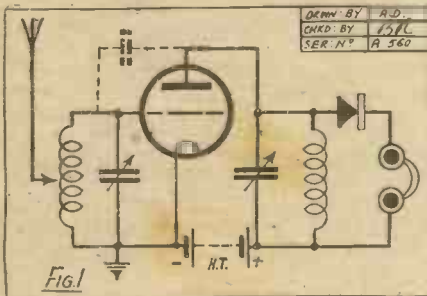
Using the Second Grid.

It is an old German suggestion, I believe, to use the second grid of a 4-electrode valve as an electrical shield between the active grid and the plate. It is very difficult to make sure theoretically how much shielding can be produced in this way, because the shield is not naturally perfect, due to the holes in it, and also the constants of the valve are considerably altered by the intro-



duction of such a shield. because the leading out wires from the inner grid and plate are close to one another, and it is not much use shielding between grid and plate if you put in capacity elsewhere.

The idea of removing all serious induction between the circuits was carried out in the

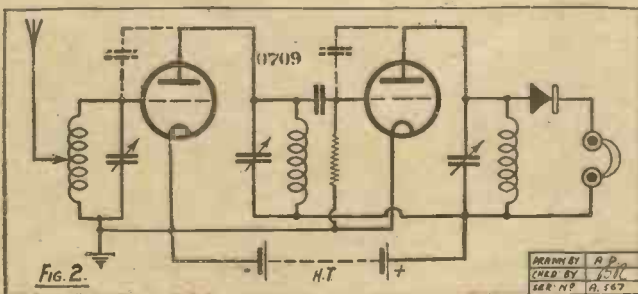
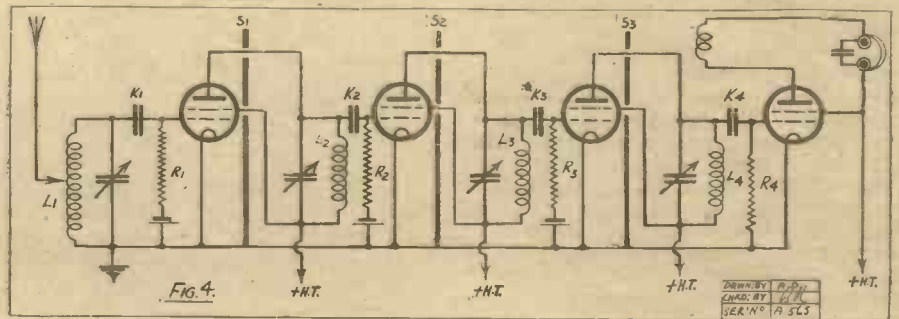


circuit has been so much written about, particularly in "P.W.," that I propose to draw attention to a different property of the valve, which property must be taken into account in the construction, when manufacturers really settle down to provide valves. Unfortunately, I am forced to write about a method of receiving for which only one make of valve is suitable, and that is an expensive and heavy current-consuming tube.

(Captain Round is not, of course, referring to a Unidyne valve, but to the Marconi F.E. type.—Ed.)

Inter-electrode Capacity.

If we take a 3-electrode valve and couple two tuned circuits together, as in Fig. 1, putting, say, a rectifier on the second coil and an aerial on the first coil, it is well known that owing to the capacity between the grid and plate of the valve, the circuit is liable to self-oscillate, and if we take a



duction of such a shield. So I determined to try out what one could get by experimental trial. I succeeded in finding one valve which was moderately suitable for use with the scheme, the Marconi F.E.1, but as this tube is really only privately made for use on certain ship apparatus no attempt has been made to put it on the market at a reasonable price for broadcasting purposes. Also, in addition, the filament consumption is 1½ amperes, a young power tube in these

building up of an amplifier. Actually it was only built on a wooden plank about 3 ft. long and 8 in. wide. A thin sheet of copper covered this over. First I arranged three H.F.'s, a rectifier and one note mag., and later four H.F.'s, one rectifier and two note mags. Each coil was simply two standard plug-in coils arranged astatically to prevent magnetic reaction and connected in series, and between each dual coil a vertical sheet of copper effected sufficient electrical shielding.

Wherever possible the copper sheathing was used on the return path to earth, and across H.T. and the grid bias battery were Mansbridge condensers to prevent any chance of coupling by the resistance of the

(Continued on next page.)

CASCADE H.F. AMPLIFICATION.

(Continued from previous page.)

batteries. Three valves H.F. with reaction gave a very respectable magnification and excellent selectivity, and were not at all difficult to handle, showing no tendency to self-oscillate, but batteries for filaments were a nuisance as four valves consumed 6 amperes at 4 volts, and sometimes nearer 8 volts, owing to the voltage drop in the battery.

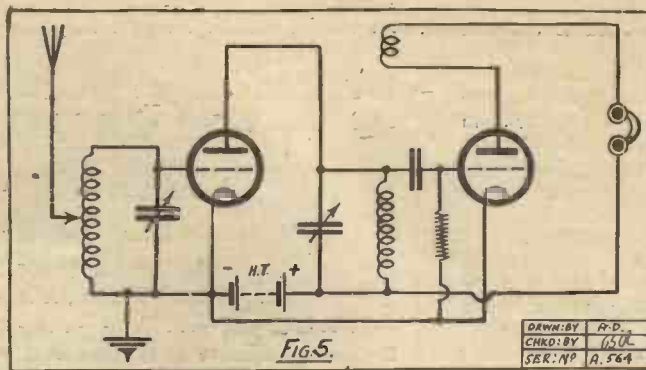
However, I was out to prove a principle, and consumption of current did not matter very much.

The diagram, Fig. 4, shows how the three H.F. and detector set was connected except for such minor details as filament rheostats, batteries and blocking condensers. L_1 was coupled to a reaction coil by means of a two-coil holder. L_1, L_2, L_3, L_4 each consisted of two L 50 coils connected so that their outside field was a

First of all, I calibrated every condenser in wave-lengths, otherwise I found I got lost; but once calibrated (it takes about half an hour to do) everything was easy. The sensitiveness was sufficient on a small aerial with one note mag. to get Birmingham and Bournemouth in daylight nearly loud-speaker strength, and of course everybody romped in at night if conditions were favourable.

Tuning was very good. Bournemouth separated out from London at 4 miles, and Glasgow and all waves above, I was able to receive at Marconi House on an aerial under the main aerial, when Marconi House was transmitting, a feat I have not succeeded in equalling with any other set.

The practical necessity of working to commercial valves in design decided me to



lay aside this method for the time being, but I hope to revive it again some day in some form or other.

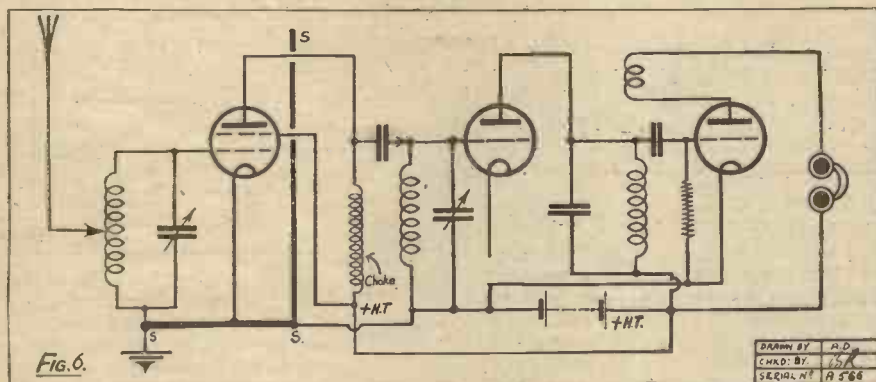
It is worth while considering the effect on the valve constants of this introduction of a second grid at positive potential, but beyond stating that in general it increases the magnification and the resistance of the valve, I will not go into it further, otherwise attention may be drawn away from the chief point which I have tried to bring forward.

A Practical Circuit.

I very much doubt if many will have the necessary patience to build up such a set, but I might make the suggestion that for those with sets with one H.F. (Fig. 5) who find difficulty in putting another H.F. on owing to oscillation, they might try one stage of the above circuit in front of their present arrangement. (Fig. 6).

I have shown it added with a choke feed so that the present set need not be disturbed, but of course any modification may be used.

(SS indicates a screen which is earthed close up to the valve pip.)



minimum. Fig. 3 shows how to connect these astatically; about 1 in. between ends of coils is O.K.

By the way, some coils on the market are very bad, but as it is, of course, impossible to say here which are bad, I will mention that of those I have measured, Burndep't's are O.K., and as good as any, particularly in the lower L values, such as 25 - 100.

The shielding pieces, S_1, S_2, S_3 , were pieces of copper about 8 in. high and the width of the board—the plate clip was brought as near to this shielding strip and the plate connection run through into the next compartment with as short a lead as possible.

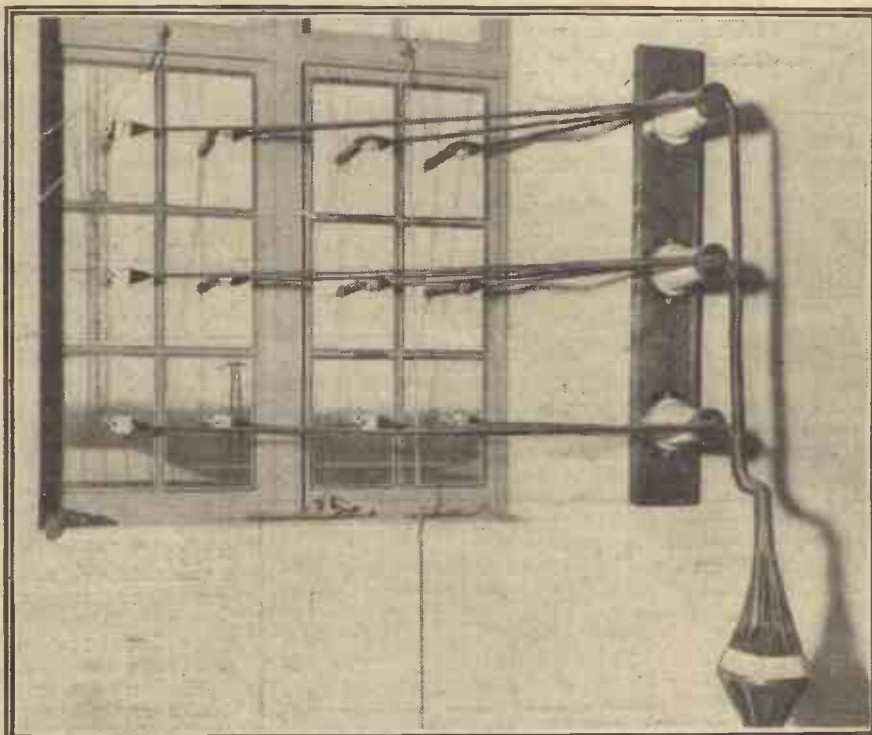
Excellent Results Obtained.

The variable condensers required were of the 4/6 variety, and gave quite good results (I was not after appearances).

K_1, K_2, K_3, K_4 were .0003 mfd. mica condensers. These *must* be non-leaky, because otherwise positive potential gets on to the inner grid of the next valve.

R_1, R_2, R_3 were .5 megohm leaks and R_4 was a 1 megohm leak, the last valve being a rectifier.

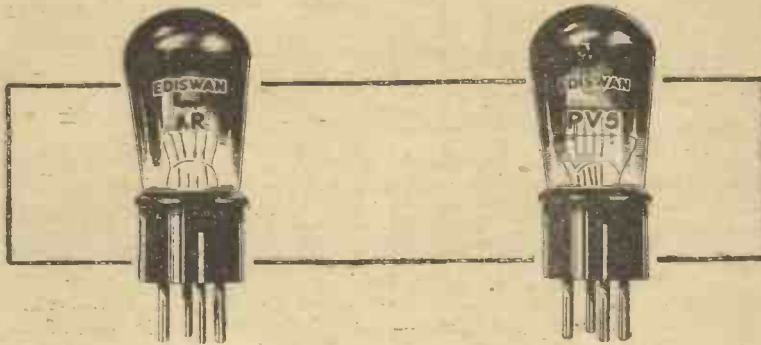
Instead of a last F.E.1 I also used with almost as good effect a D.E.V. for the rectifier, the shielding not being so necessary in this last circuit. Reaction was rather good and smooth, but not of much use as one got almost everything without it.



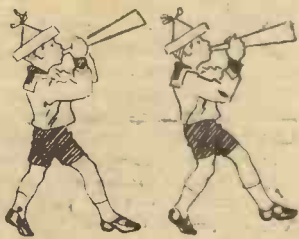
A recent photograph of one of the four earth lead-in arrangements in use at the Hillmorton (Rugby) station.

THE HAPPY FAMILY

"Affinities"



There is a decided affinity, a quite definite link between each Edison Receiving Valve and Edison Power Valve. The Receiving Valves are supplied either H.F. or L.F. and the best Power Valve to use is shown in the table opposite.



They always get on well together. It's like that in every large family. Always two that will work—or play—better with one another than with anybody else. Every Edison valve has its family affinity.

It gives good service in any conditions . . . the best service when it is employed with its "twin."

The Valves to Use.

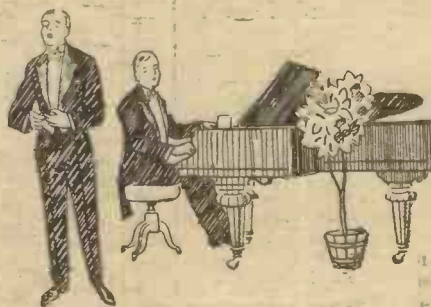
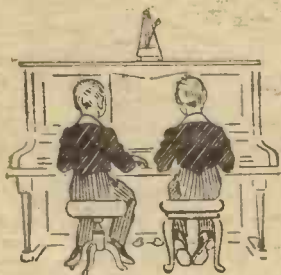
Receiving.	Accumulator or Battery Volts.	Power.
A.R. - -	6	P.V.5
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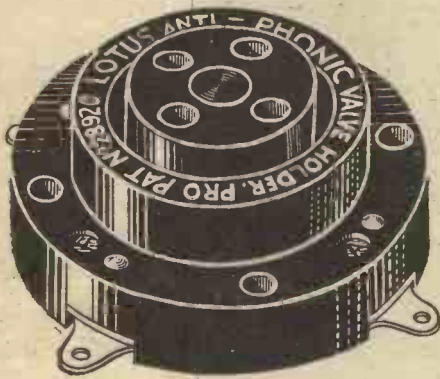
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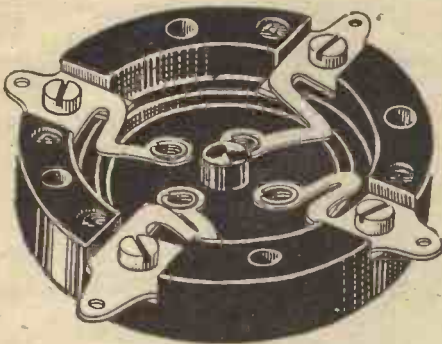
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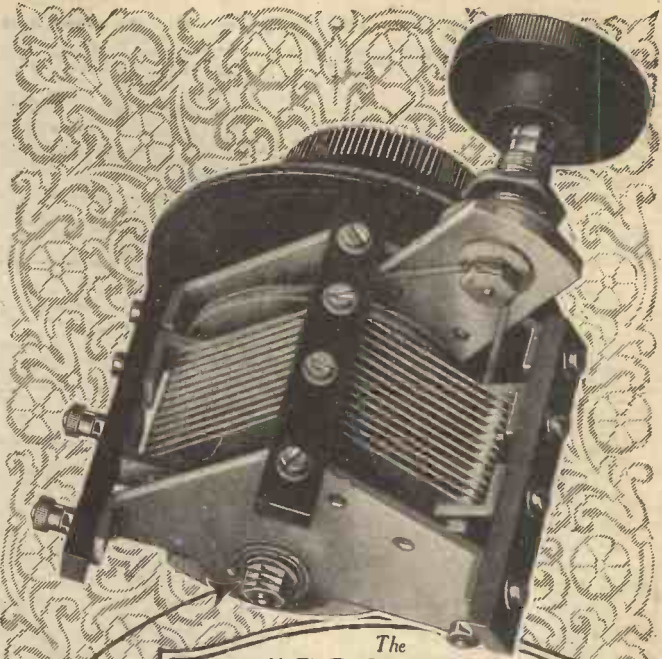
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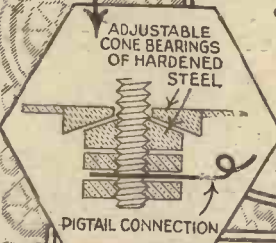
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NO BACK LASH

with its ratio of 10 to 1 makes it possible to dispense entirely with the customary vernier and its attendant losses. Backlash is avoided not temporarily but permanently and movement is smooth, permitting fine adjustment. This model can also be arranged for remote control, as shown in the illustration below. Also supplied without slow motion feature when the condenser is one-hole fixed. Both models are constructed to eliminate hand capacity, for low loss, and to give a compensated square law effect. Cone bearings of hardened steel ensure constant calibration and a pigtail connection gives permanent positive contact.

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COSMOS

One Valve L.F. Amplifier



the ordinary movements of a living-room. If, however, even when the room is quiet, the present 'phone-signals can only be heard by wearing the telephones, the signal strength is insufficient to work a loud speaker with a 1-valve amplifier.

It is often asked whether a 1-valve L.F. amplifier will bring in more stations, or will only increase the strength of those signals which can already be tuned-in upon the detector (whether the latter is valve or crystal).

It is true that occasionally another station—which was formerly inaudible—can be picked up with the L.F. amplifier, but, generally speaking, the addition does not bring in other stations, but merely increases

(Continued on next page.)

The Set Designed, Described and Constructed by the "P.W." Technical Staff. The diagram for this set will be found on the Blue Print Sheet given away with this issue.

If you already possess a crystal receiver, but have determined to make a start upon the construction of a valve set, you will be well advised to consider the claims of the 1-valve L.F. amplifier. Not only is it one of the handiest and most useful little pieces of apparatus it is possible to possess, but it is easily made, trouble-free, and not at all expensive. Perhaps its advantages will be most easily realised if we consider the uses of such an instrument. As is now generally well-known, a wireless valve can act either as a detector or as an amplifier. Acting in the latter capacity it can amplify the wireless currents either before they are detected—in which case it

are "common" terminals—that is to say, like terminals are joined to like, the right-hand H.T. + is connected to the left-hand H.T. +, etc.

When the amplifier is added to a crystal set, the four left-hand battery terminals are not used, but the batteries are connected to their respective right-hand terminals.

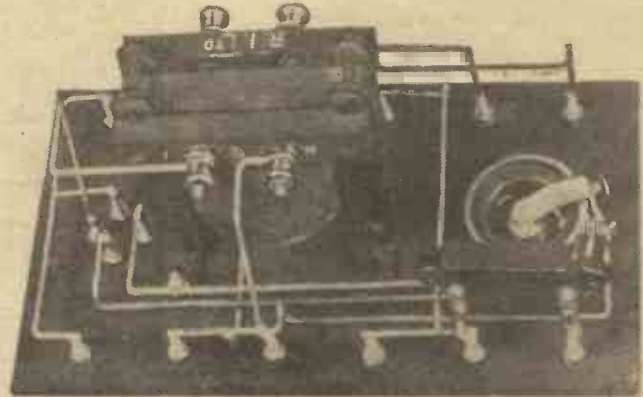
When the amplifier is added to a valve set, the batteries must be connected carefully, or the L.T. battery may be shorted, so this point is discussed at length on the next page.

What it will do.

The results obtainable with this instrument will, of course, depend to a great degree upon the strength of the signals put into the "input" terminals. If these are weak telephone signals, the effect of the amplifier will be to strengthen them greatly, allowing, say, half a dozen pairs of telephones to be worked at full strength.

If, however, the telephone signals are already at full strength, then the amplifier will enable a loud speaker to be used. No hard-and-fast rule can be laid down, but a good test to determine whether 'phone signals are strong enough to work a loud speaker after a 1-valve amplifier has been added, is the following:

Place the 'phones on the table, or in the position that the loud speaker will occupy. Keep the room quiet and notice whether, during a talk, the voice in the 'phones can be heard all over the room. If so, the effect of the amplifier will be to make the loud speaker give distinct signals, audible through



Layout, spacing, and wiring will be clear from this illustration, showing the back-of-panel connections.

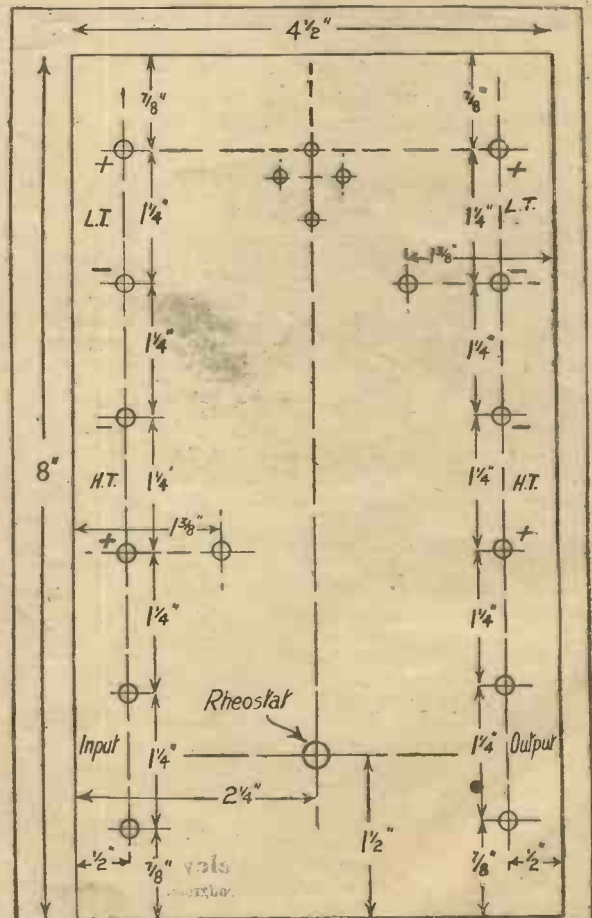


The arrangement of the terminals is shown by this view of the complete amplifier.

is called an H.F. (high-frequency) amplifier—or after they have been detected, in which case it is styled an L.F. (low-frequency) amplifier. The latter is the type with which we are dealing.

It is immaterial whether the receiver to which the L.F. amplifier is to be connected is a valve or a crystal set. In either case, its telephone terminals should be connected by short wires or strips to the "input" terminals of the L.F. amplifier. Opposite to the amplifier's "input" terminals there is a pair marked "output," and to these the 'phones, (or loud speaker) should be connected.

The remaining eight terminals are marked for battery connections, and they



Front of Panel showing Drilling Layout.

DRW. BY G. D. CHAS. SER. 12/18/26

BRIGHT OR DULL EMITTERS? A SUPPORT FOR SMALL DRILLS.

FROM A CORRESPONDENT.

THE question of bright or dull valves keeps on cropping up in the mind of those who contemplate installing a valve receiver. And with the question comes the other query which is almost inseparable from it—are dull emitters as efficient as the bright ones?

The answer to the latter can only be found by trial, but as so many listeners have found it by that means, there is no need for everyone to follow the same route—it is too expensive. Instead, let them take the results obtained from exhaustive tests as

bright emitters, but initial cost is slightly greater. Consider these two and the choice is easy.

WHEN working good-quality ebonite panels it is often exceedingly difficult indeed to use $\frac{1}{8}$ in. to $\frac{1}{2}$ in. drills, and to get sufficient pressure on them without bending or breaking them at the same time.

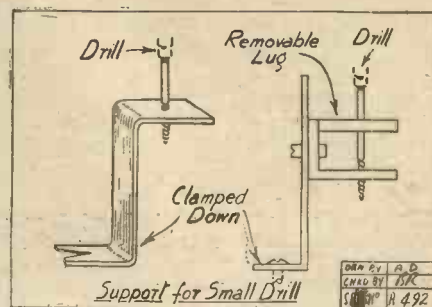
The use of the following device, however, overcomes this trouble to a very great extent, and the experimenter who constructs for himself such a tool, will find it of the greatest assistance to him in his constructional work.

The Drill Support.

As will be seen from the illustration, this drill support consists of a small iron or brass casting which is clamped securely to the work bench, and through the top of which is bored a small hole, sufficiently

wide in diameter to just allow the drill to slip easily through it.

Another form of the drill support is also illustrated. This is similar in construction, but it is provided with an interchangeable and double-lug bracket, which permits the use of a number of bushings,



each one specially suitable for use with any particular size of drill.

Such articles can easily be made from heavy brass or iron sheet, or from other metals. Their use will enable the drill to be gently supported, and the requisite pressure given to it, and, what is more, there will be very little fear of the point of the drill slipping, and of thus detracting from the appearance of the panel.



A well-made 5-valve set belonging to Mr. Westron, 1, Fernhill Avenue, Weymouth.

“good enough,” and be assured that dull emitters are every whit as good as—if not better—than their brighter brothers.

The first question can now be tackled, and this can be answered very easily. Bright valves take more current—filament—for their operation and so require a larger L.T. battery than the D.E.'s. On the other hand, they are cheaper to buy than the dull valves and last nearly as long. Balance the two statements together and you have the answer.

If charging an accumulator is an easy matter then bright valves will be cheaper, but if charging is difficult then the listener will be well advised to use dull emitters—they will pay in the long run.

Above all, remember that the choice is mainly one of accumulator size and charging troubles, it has nothing to do with the H.T. voltage, design of the set, or efficiency. Cost of upkeep for dull emitters is less—according to the valve used—than that for

the strength of signals from those stations which previously could be tuned in.

The set can be used with either a bright or dull-emitter valve, and, of course, the batteries necessary will depend upon the specifications of the valve maker.

The actual components used in the set shown in the photographs need but little comment, as they are all of standard design and makes, and are probably already well known to readers. The panel, terminals and wire, etc., were obtained from Messrs. Peto-Scott, and the cabinet from the Caxton Wood Turnery Co. (Market Harborough).

The fixed condenser across the “output” terminals is a Dubilier, and the filament resistance a “Precision.” The transformer, which should be of the “first stage” type, when the amplifier is to be added direct to the crystal or valve detector, is an “R.I.”

The construction of the amplifier is simplicity itself. The panel is first marked out in accordance with the drilling diagram, which appears on the previous page.

Connecting up the Amplifier.

All valve legs are spaced to standard measurements, and a template showing the correct positions for the holes was published in “P.W.” No. 190, page 1180. After drilling, the terminals and valve sockets are mounted, and their ends touched up with a file, ready for soldering.

It will be seen from the photograph that there is no need to mount the .002 fixed condenser directly to the panel, as it can be firmly supported by its own joints.

There is no need to detail the wiring, as this is made perfectly clear by the Blue

Print. The wire used was square section tinned copper wire of No. 18 gauge, but any similar thick copper wire will do instead.

Either bright or dull-emitter valves are suitable, and of course, the values of H.T. and L.T. batteries will depend upon the valve chosen.

POINT-TO-POINT CONNECTIONS.

The two input terminals are connected to the terminals marked I.P. and O.P. of the L.F. transformer. I.S. transformer terminal is taken to the grid socket of the valve holder, O.S. terminal being joined to the L.T. negative rheostat lead, which is also connected to the corresponding L.T.—terminal on the opposite side of the panel.

The other side of the rheostat is joined to one filament socket of the valve holder, the other filament socket being joined to the lead connecting the two L.T. positive terminals together.

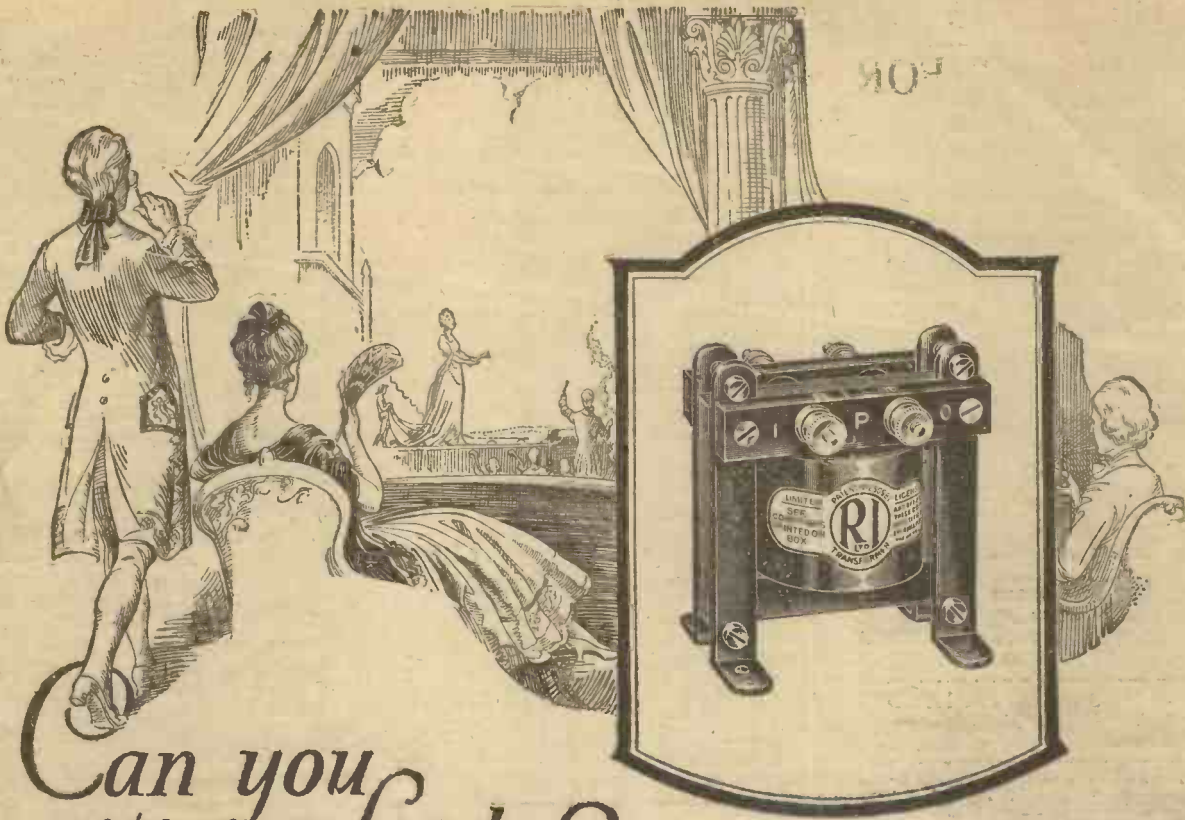
Plate socket of the valve holder to bottom output (phone) terminal, the other output terminal connects the two H.T. positive terminals together.

The H.T. negative terminals are (if necessary) connected to the adjoining L.T. negative terminals.

A .002 fixed condenser is connected across the output terminals.

When adding this amplifier to a valve set, the internal connections of the latter should be examined. If its H.T. negative is connected to its L.T. negative, all the corresponding terminals on both sets may be joined together.

If, however, the valve-set's H.T. negative is connected to its L.T. positive, the H.T. negative terminals of the amplifier must not be connected (internally) to the L.T. negative. (In such a case these H.T. negative terminals are unnecessary and should be isolated, or alternatively, no external connection should be made to either of the amplifiers' H.T. negative terminals.)



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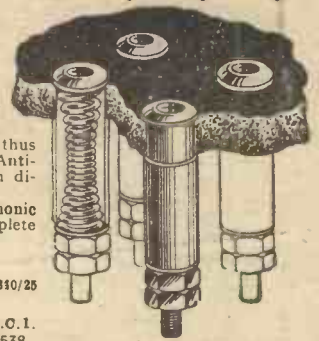
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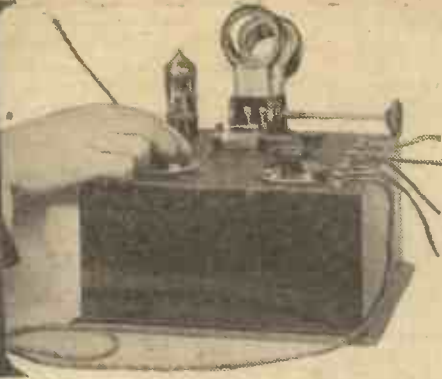
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ONE VALVE REFLEX & CRYSTAL DETECTOR



For the construction of the receiver shown in the photographs, the components mentioned below were used, though other components of good make, can be used if desired. The blue print gives the lay-out and circuit diagrams, together with the wiring diagram showing the required connections underneath the panel.

Lotus 2-way coil holder, Lamplugh 0005 variable condenser, Peto-Scott 0003 variable condenser, Ripault L.F. transformer, Linsenstat Major rheostat, Wates "K" tubular 0003 and 002 fixed condensers, Watmel 001 fixed condenser, Burndept crystal detector.

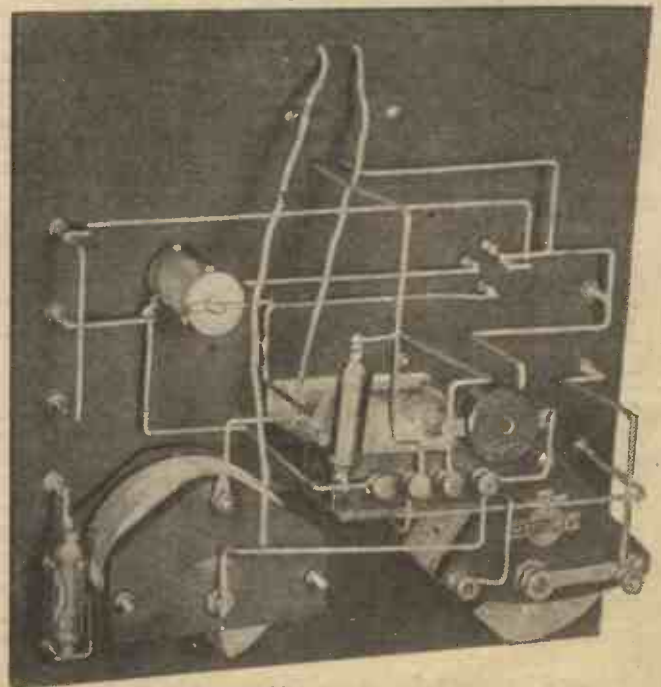
Constructional Details.

The panel drilling dimensions are given in the diagram reproduced on the next page, the measurements referring to the particular types of components mentioned. Other components can be used if desired, provided they are of reliable manufacture, though the panel diagram will have to be modified somewhat in order to suit the different components.

Wiring should be carried out with stout wire, either 16 or 18 gauge square tinned copper, or 16 gauge Glazite, all connections being firmly made and, if possible, soldered.

A word of warning concerning the crystal detector should be given here. It will be noticed that in the particular type and make mentioned above, the two supports acting also as contacts are enamelled, and when the set was first tried no results were obtained. Tests revealed the fact that the enamel on the detector supports was also covering the contact areas (for crystal cup and socket connections) and thus insulating the crystal and cat's-whisker from the circuit. After carefully sandpapering the points of contact, the detector was tried again and everything was found to be in order. After the wiring has been completed the set should have its transfers affixed, and can be tested out. Coils should be chosen as required from the list given

(Continued on next page.)



This under-panel photograph gives a clear idea of the lay-out of components and the wiring.

The Set designed, described and constructed by the "P.W." Technical Staff. The diagram for this set will be found on the Blue Print given away with this issue.

PROBABLY no other 1-valve receiver has enjoyed such popularity as has that in which the valve is made to amplify at both high and low frequency while a crystal is used for rectification. Commonly known as a 1-valve and crystal reflex receiver, this type of set is easy to build and presents no serious difficulties in operation.

For the information of intending constructors it would perhaps be of advantage

end there. If the set is used within 10 miles from a main B.B.C. station, 4 miles from a relay station, or 50 or so from 5 X X, the set will operate a loud speaker.

The distances given are only approximate and probably will be exceeded in a great many cases, but they give some idea of the capabilities of the set.

These results are, of course, dependent upon the use of a moderately efficient outdoor aerial and earth system, and will be greatly reduced if an indoor aerial is employed, while in the case of a frame aerial they will be reduced by about 80 per cent, at least. The circuit is not really suitable for use with this latter type of aerial, so that we do not advise constructors to attempt it. An indoor aerial stretched across the room would be far more efficient.

Further Amplification.

Owing to the flat tuning caused by the use of a crystal detector, the 1-valve reflex receiver is not very selective as a rule, in fact, the tuning is inclined to err on the "flat" side. Constructors should not, therefore, expect to be able to cut out the local station at about 5 miles and receive another only 10-20 metres wave-length apart without interference from the local transmission. The set is designed more from the point of view of signal strength than of sheer selectivity, and for the latter a tuned stage of high-frequency amplification is usually preferable.

This latter could be added to the reflex receiver, but it would be a difficult matter, and would endanger the stability of the receiver—in short, it is not recommended. L.F. amplification can be added without difficulty if still greater signal strength is desired, coupling of the amplifier being carried out in the usual way.



The complete receiver has a neat and business-like appearance.

if the capabilities of the receiver were discussed before details of construction, etc., are given.

In the first place, it must be remembered that the best of any receiver can only be obtained by careful handling after a little practice has made the operator familiar with the tuning and adjustments of the set.

Results Possible.

This type of set should, on a fairly good aerial and earth system, bring in several of the B.B.C. stations and probably some Continental ones as well. It is adaptable by means of plug-in coils to any wave-length above about 100 metres so that Daventry, Radiola, Eiffel Tower can be picked up as well as many other stations working on various wave-lengths. With regard to the wave-length range, the list of coil sizes given at the end of the article may be of assistance.

It will have been seen that a considerable range of reception may be expected, provided headphones are employed, but the usefulness of the reflex receiver does not

ONE VALVE REFLEX & CRYSTAL DETECTOR.

(Continued from previous page.)

below, and a valve suitable for general purpose or L.F. work should be used. About 60 volts H.T. should be available unless the valve chosen is a power valve, when about 100 can be used. On actual test the set was found to give very satisfactory results both with regard to range and signal strength, and a B.4 valve was used with every success. This type of valve can be thoroughly recommended for use in this receiver, and it will give every satisfaction.

Suitable Coils to Use.

If other valves are chosen they can be of either bright or dull emitter type as long as the L.T. battery is suitable for use with the particular type of valve chosen.

If on test it is found that on increasing the coupling between the two coils the signals are weakened (the set should be tested on local broadcasting first), in spite of careful tuning of the two variable condensers and adjustment of the crystal detector, it is a sign that the anode (or reaction) coil needs reversing, and the leads to it should be changed over.

POINT-TO-POINT CONNECTIONS.

Aerial parallel terminal to fixed plates of .0005 variable condenser, plug of fixed coil holder and grid socket of valve holder.

Aerial series terminal to moving plates of .0005 variable condenser, earth terminal to socket of fixed coil holder, O.S. of L.F. transformer and one side of .0003 fixed condenser.

Other side of .0003 fixed condenser and I.S. of L.F. transformer to L.T. negative, which is also connected to one side of the rheostat. Other side of rheostat to one filament socket of valve holder, other filament socket to L.T. positive, which is joined to H.T. negative.

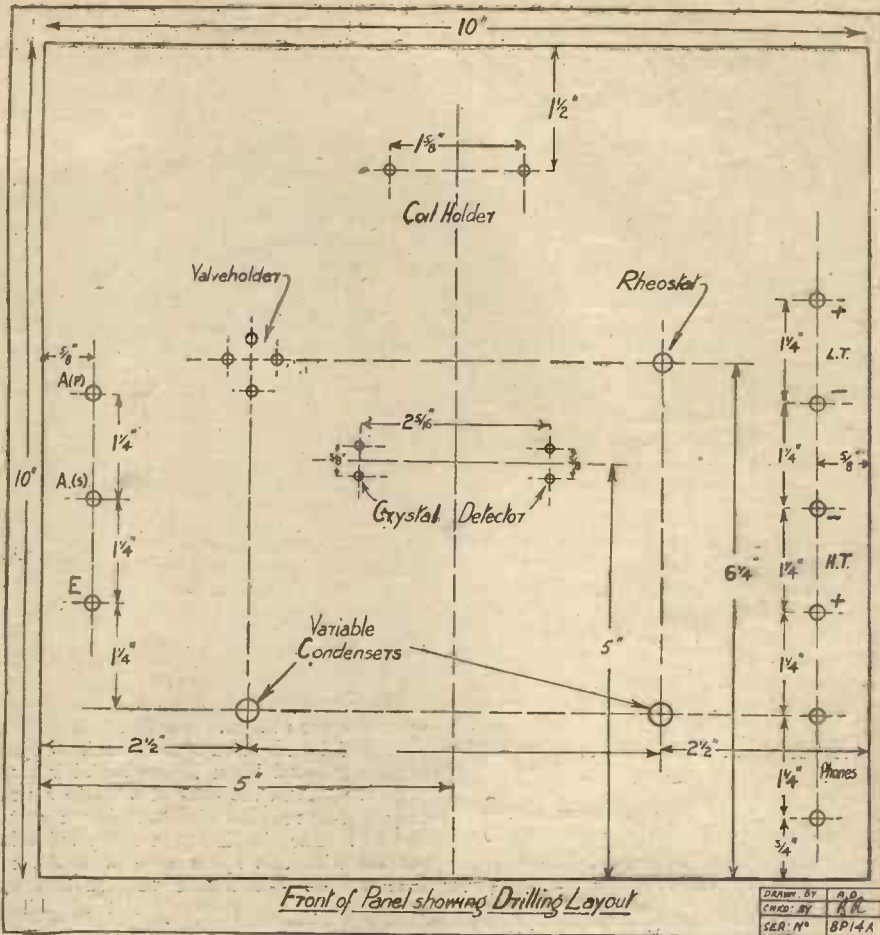
Plate socket of valve holder to one side of crystal detector, fixed plates of .0003 variable condenser, and to socket of moving coil holder.

Other side of crystal detector to I.P. of L.F. transformer, O.P. of which is taken to plug of moving coil holder, moving plates of .0003 variable condenser, and to one 'phone terminal. The other 'phone terminal is joined to H.T. positive.

A .002 fixed condenser is connected across the 'phone terminals, and a .001 across the I.P. and O.P. terminals of the L.F. transformer.

The three-terminal system of series-parallel tuning has been employed, and details of the connections for this are given in the accompanying blue print (No. 7). Series should always be tried when using the set on wave-lengths below 450 metres, it being remembered that for this method of tuning the aerial coil must be one size larger than if parallel tuning is utilised. The list of coils will make this clear.

Home-made spiderweb coils can be used if desired, the winding being carried out on cardboard formers of 1 in. centre, and having 11 slots. The wire used should be of $\frac{3}{4}$ gauge for coils up to 75 turns, and 26 or 28 for larger coils.



In the case of the latter (above 100 turns) the wire can be wound in duplex fashion—that is, missing one slot every time. By this means the required number of turns can be obtained in less depth of winding and the overall size of the coil is kept moderately small.

If bought coils are used, these can be of any good make, such as Igranic, Lissen, Tangent, Burndept, Atlas, etc., the latter type having been used when the original receiver was tested. The main point to bear in mind is that the coils should have as low a self capacity as possible, or a serious loss of efficiency may result.

WAVE-LENGTH	AERIAL COIL	ANODE COIL
Metres		
250—300	35-50 (S) 25 (P)	35—50
300—400	50 (S) 35 (P)	50
360—500	75 (S) 50 (P)	75
420—600	100 (S) 75 (P)	100
600—1000	100 (P)	150
1000—1700	150 (P)	200
1400—2000	200 (P)	250
1800—2800	250 (P)	300

S denotes "Series" tuning.
P denotes "Parallel" tuning.

CASING FOR BASKET COILS.

OWING to their narrow and flimsy structure, basket coils are sometimes difficult to mount. However, anyone who has a few old gramophone records, including some of the cylindrical phonograph records, can make from them protective casings that will not impair the efficiency of the coils, but will keep them dry and dustproof.

Procure a coil plug provided with a strip of material fastened to it, intended to be used for binding on honeycomb coils. From a cylindrical record cut a ring the same width as the coil plug, and from the centres of two disc records cut plates of

similar diameter to the ring. The coil, of course, should fit comfortably inside the ring.

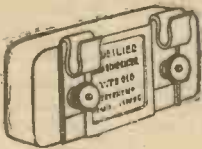
Complete Protection Provided.

Fix the ring by means of the strip of material to the coil plug, and make two holes in the ring exactly above the two connecting screws in the plug. Connect the coil to the screws by bringing the wires through the holes, then, before fixing the side plates, test the coil on the set.

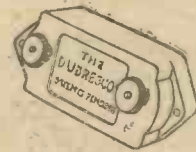
Assuming that it is O.K., the plates may then be fitted. They can be stuck on with Seccotine or Chatterton's compound, "laced" on with twine through a series of holes in ring and plates, or bound on with passepartout binding. For making holes in the composition used for gramophone records use a hot nail or steel knitting needle.

Over the holes in the centre of the plates gum an ivoryine label, and mark on it the number of turns on the coil.

30 MILLION DUBILIER Condensers *Are now in use*



Type 610 Mica Condenser
for general use in receiving
circuits. Capacities
0.0001-0.015µF.
From 3/-



The Dubrescon
Permanent Valve
Protector - 6/-

These stupendous figures seem at first sight almost incredible. Yet they are correct, for Dubilier products are known and used all over the world.

The World's leading set manufacturers have standardised on Dubilier condenser equipment; the World's most important transmitting stations are equipped with banks of Dubilier Condensers, and every important Government department in the principal countries of the World makes use of Dubilier products for radio purposes.

The Dubilier Condenser Co. (1925) Ltd. manufacture Fixed Mica Condensers, Variable Air Condensers, Anode Resistances, Grid Leaks, the Dubrescon Valve Protector, the Ducon Aerial Adaptor, the Minicap Switch and the Mansbridge Variometer.

The Company are also sole concessionaires for the products of the Mansbridge Condenser Co. Ltd.

Specify Dubilier



ADVERT. OF THE DUBILIER CONDENSER CO. (1925) LTD., DUCON WORKS, VICTOR ROAD, NORTH ACTON, W.3.

TELEPHONE: CHISWICK 2241-2'S.
B.P.S. 172



They cost less now!

Watmel—the better fixed condensers are now sold at reduced prices, made possible by the great demand. Wherever a fixed condenser is needed you should specify Watmel and make sure of trouble-free results. Mica sheets securely clamped between the plates render it impossible for the capacity to vary. No wax whatsoever is used in their construction. One hole fixing is provided, and remember that every Watmel is guaranteed to be correct within 5% of its marked capacity.

NOTE THE NEW PRICES:

'0005 to '002	2/-	Combined grid leak and condenser	2/6
reduced from 2/6.		reduced from 3/-.	
'0025 to '006	2/6	Combined variable Grid Leak and Condenser, New Model	3/6
reduced from 3/6.			
<i>(Size '006 is the ideal condenser with choke & resistance coupling.)</i>			
Other Watmel products worth buying:			
Grid Leak (Black Knob) 5 to 5 megohms	2/6		
Auode Resistance (Red Knob) 50,000 to 100,000 ohms	3/6		

THE **Watmel**

WIRELESS CO. LTD.,
332a, Goswell Rd., London. E.C.1.
 Telephone: 7990 Clerkenwell.
 Lan-ashire and Cheshire Representative:—Mr. J. B. Leuce, 23, Hartley Street, Levenshulme, Manchester.

It Really is Surprising!

Such a thought is the common experience of many a listener when he first uses the "Brownie Wireless." Never before has he heard such clear-toned voluminous reproduction from a crystal receiver. Results have conclusively proved that in spite of its moderate price the "Brownie Wireless" has no peer in efficiency. At a distance of 25-30 miles from the local station (15 miles relay stations) or 120 miles from 5 XX you can't better "Brownie." The "Brownie Wireless" Model No. 2 embodies all the features of the Standard "Brownie" Receiver. It is capable of resisting extreme climatic conditions. The

outer casing is hydraulically moulded under a pressure of 60 tons, forming a pleasing and substantially designed piece of apparatus. The receiver has a natural wave-length up to 600 metres and a standard plug and socket coil attachment is provided, which, with the aid of a special coil (price 2/9 extra) makes the set adaptable to 5XX. Complete, including the famous D.L.5 Crystal and Palladium Cat-whisker.

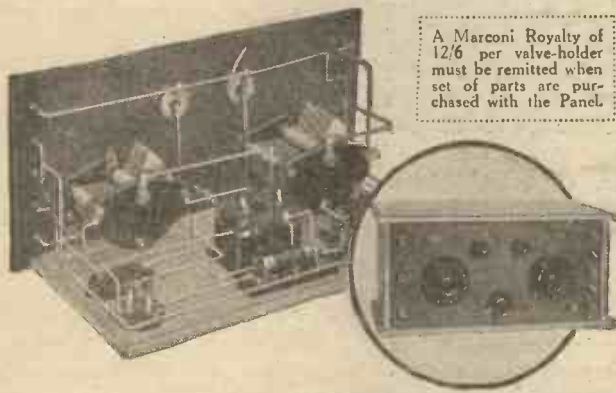


PRICE **10/6**

"BROWNIE WIRELESS" MODEL No. 2

The Standard "Brownie." Just as good as ever 7/6
 but now complete with ebonite base
 5 XX Loading Coil for the Standard 2/-

THE BROWNIE WIRELESS CO. (of Great Britain) LTD
 (Incorporating the J. W. B. Wireless Co.),
310a-312a, Euston Road, London, N.W.1.
 Phone: Museum 3747.



A Marconi Royalty of 12/6 per valve-holder must be remitted when set of parts are purchased with the Panel.

66'3 buys all the parts for this "P.W." Set

NO need to spend a lot of money on a ready-built receiver when you can build the splendid 2-Valve Continental Set shown above for just over £3. Originally designed by the "Popular Wireless" Technical Staff, this is a wonderful Set for long-distance reception. Now that good valves are so reasonable in price no one can say that a Valve Receiver is costly to build or expensive to run.

The splendid Set shown here is only one of many described in the Pilot Manual (post free 3d.). Send for your copy to-day, and see what you save when you build your own set.

PETO-SCOTT CO., Ltd.,
 77, CITY ROAD, LONDON, E.C.1.
 Also at 62, High Holborn, London.
 W.C.1 - WALTHAMSTOW—320, Wood St.
 PLIMOUTH—4, Bank of England Place.
 LIVERPOOL—4, Manchester Street.

The 1926 Unidyne (1-Valve)

The 1926 Unidyne (1-valve) described in "Popular Wireless" during October, 1925, is another fine set. By making use of a new type of valve having an additional grid it completely abolishes the High Tension Battery, thereby effecting a very material saving in running costs. Thus the possibility of burning out valves through wrong battery connections is eliminated. A little over £3 brings the complete set of parts—almost the only expenditure. **63/9**

SAVE 50%

by using a

MELLOWTONE COUPLER

—in place of COILS and HOLDERS!



PRICES from **5/6**

The "MELLOWTONE" Coupler is neat, compact and finely finished—plugs into standard valve holder, takes up small panel space and replaces coils and holders. It is designed to avoid distortion, giving excellent selectivity and perfectly smooth reaction control.

Obtainable at all dealers. Write for Illustrated List.

MELLOWTONE
 MIDLAND RADIOTELEPHONE MFRS LTD.
 BRITTELL LANE WORKS
STOURBRIDGE

Radio-Ads.

BROADCAST NOTES.

By O. H. M.

Dance Music Transmissions—Another Wireless Society—Those "Surplus" Funds—A Poor-Reception Area—A New Radio Revue.

ACCORDING to present arrangements the first broadcast in Britain of a fistic encounter will take place on February 22nd, when it is proposed to put on the air the final contest for the Lonsdale belt. This contest will be relayed from the National Sporting Club. It is hoped that Lord Lonsdale will do a special broadcast from the London Studio. As an entertainment, the actual fight will not be of much account, but listeners will be amused by the ring-side patter.

In connection with this broadcast I understand that the B.B.C. will give a donation to Harry Preston's Boy's Club at Brighton. In a recent address to Boston business men Mr. David Satnoff, Vice-President of the United States Radio Corporation, made a feature of what he termed the broadening effect of Radio on pious old ladies, who until they heard a boxing broadcast, had looked with great disfavour on the noble art of self-defence. One wonders if a similar result will be produced on this side of the Atlantic!

Dance Music Transmissions.

I hear that the B.B.C. are considerably exercised over the problem of dance music, quite apart from difficulties with outside bands. Recently it was decided to extend the Daventry service of dance music to 2 a.m. twice a week. This was regarded as an experiment, it having been represented that, particularly in country houses, there was a demand for dance music after midnight. Considerable expense and increased pressure on staff were involved in meeting this alleged demand.

After the new facilities had been in existence some weeks, the B.B.C. asked listeners to indicate whether they found the new service of any use. There were only ten replies and these not enthusiastic. I advise those who wish the late dance music to be kept on to lose no time in expressing their views. In the absence of any evidence to the contrary, the B.B.C. would be justified in coming to the conclusion that they were wasting money by these late transmissions.

But there seems much less doubt of the reality of the demand for earlier dance music. Starting on February 27th, 2 LO will put out Dance Music from 9 to 10, and from 10.30 to midnight once a month. On the same evening 5 XX will run dance music continuously from eight o'clock to midnight, allowing only for a break of ten minutes for the news.

Bransby Williams Again.

It was good news to hear that Bransby Williams was likely to be available for the special Dickens Birthday Programme this week. Some high-brows find fault with Mr. Williams' Dickens characterisation, but the vast majority of listeners have a grateful recollection of his appearances before the microphone last autumn.

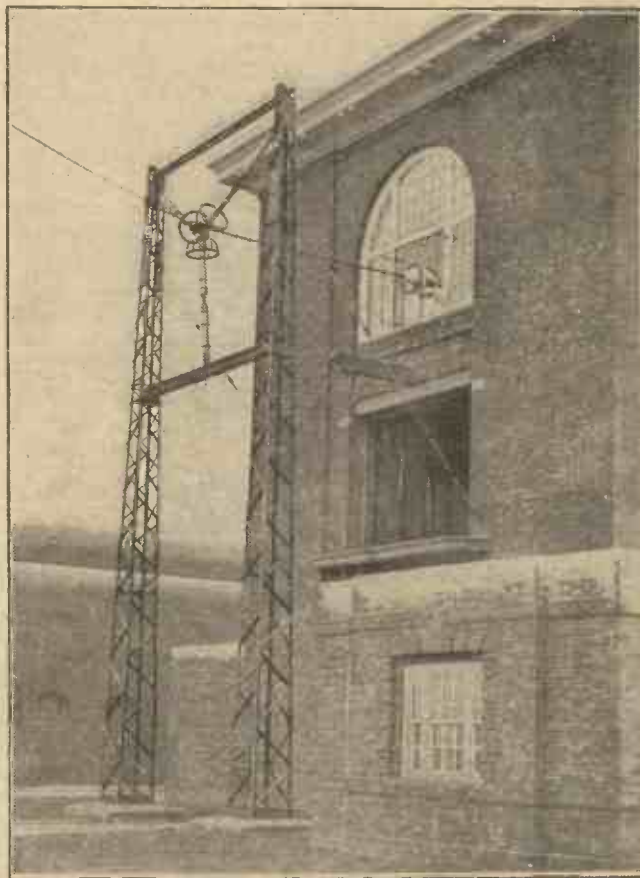
Next to Sir Harry Lauder Mr. Bransby Williams had probably the biggest radio audiences of the past year.

Another Wireless Society.

So another Wireless society has come into existence. This is the Wireless Association, of which Lord Drogheda is chairman, and Colonel Halsey, brother of Sir Lionel Halsey, one of the moving spirits. They aim at making the Wireless Association the prototype of the Automobile Association. They propose, among other things, to provide accumulator charging service, legal service, insurance, and receiving-set hire service.

Those "Surplus" Funds.

Despite the oft-repeated desire of the B.B.C. to come again to the rescue of the B.N.O.C., there is as yet no move on the



The aerial lead-in at the Rugby Station.

part of the Post Office to release the funds required for this purpose. Meanwhile, the position of the B.N.O.C. is rapidly reaching a state of extreme acuteness.

There is indeed a danger of the whole project going under. This would be a catastrophe to British art. The obvious remedy is for the Post Office to disgorge a small part of the large sums of licence money which they are withholding from the B.B.C. The provision of first-class artistes is an expensive business, and the withholding of the licence "surplus" is a serious matter.

A Poor-Reception Area.

The news that the B.B.C. is making special arrangements for a great Welsh programme from London on March 1st, St. David's Day, will be welcome in the Principality. Sir Walford Davies has the London Programme in hand.

It is proposed that the special programme from Cardiff that night shall be relayed also from 5 XX. Other stations on the borders of Wales will signalise the occasion appropriately. There is undoubtedly a growing dissatisfaction in North Wales. There is no chance for crystal users there. The valve users complain that they cannot get Cardiff and that they are forced to fall back on Daventry and Manchester.

The problem in North Wales is complicated by the difficult geography. The B.B.C. are quite alive to the situation and are sending engineers to test reception in various centres with a view to an immediate extension of facilities.

A New Radio Revue.

The new B.B.C. Revue will make its bow on February 13th, apparently undeterred by the ominous number. "Radio Radiance" has had a good run, but it was right to take it off.

There is a good deal of secrecy about its successor, but from what I have heard in confidence, I have no hesitation in promising listeners a really first-class show.

There will be more variety and the production will be better adapted than its predecessor to the special requirements of the medium.

The Committee.

There is one thing about the Broadcasting Committee which nobody can deny. There is hardly ever a dull moment. Whenever the proceedings threaten dullness, there is a flash of humour from one or other of the versatile members of the Committee. The cross-examination of witnesses is conducted with spirit. Those witnesses who show signs of petulance with the B.B.C. are apt to

be pulled up rather sharply if they cannot justify their criticism to the hilt.

From the proceedings so far, there is no doubt that B.B.C. stock is very high. But there is still a good deal of evidence to be taken and a fair proportion of it is bound to be hostile to the present order of things in Broadcasting. Already the Committee has been able clearly to prove the diversity of opinions and requirements existing, and have rendered invaluable service in that the problems of ideal construction have at last been made more or less clearly apparent.



Traders and manufacturers are invited to submit wireless sets and component parts to the "P.W." Technical Dept. 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.

SOME very good plug-in coils were recently sent us for test by Messrs. Radio (Hove) Ltd., Westbourne Place, Hove, Sussex. They are known as the "Lees," and retail at prices ranging from 4s. 2d. (35 turns) to 8s. 6d. (300 turns). Wound with stout gauge wire in a novel manner, they have ample turn and layer spacing. On test we found them to possess very low self-capacities and H.F. resistances, with the result that with them tuning was sharp and high percentages of maximum energy carried through. They coupled very well, too, and functioned excellently in all usual positions.

The "Lees" coils have a "standard" appearance, are neat and compact, rigidly mounted on their holders, and are provided with excellently fitting plugs and sockets.

The same firm also sent us one of their "Hovaphone" H.F. transformers, and one

of their "Hovaphone" neutrodyne units. Both transformers are similarly priced (i.e. 6s. 6d.), similar in appearance, and cover similar ranges of wave-lengths—in the case of the first-named definitely stated as 300 to 600 metres, and indicated in the case of the second-named by the words "Broadcast Range."

Wound in sections, nicely finished and operating well in their individual capacities, both can be recommended to the attention of our readers.

* * *

The G.E.C. people recently sent us samples of the new Geophone L.F. transformer for test. It has a rather novel appearance, as it is provided with a metal case of crystalline finish. Its shape, too, is slightly out of the ordinary, but it is decidedly distinctive and nothing if not compact and convenient in form.

The terminals, which are marked both in I.P.'s, O.P.'s, anodes and pluses, etc., are situated near the base in order to make them more convenient for wiring. Two connecting points are also provided for "earthing" the case should it be desired.

Two ratios are available, 2—1, which is recommended for use after general purpose valves, such as the D.E.R. and D.E.3, etc., and which is priced at 22s. 6d.; and 4—1, which is recommended for employment after such low impedance valves as the D.E.4 or D.E.5. This model sells at 25s. It will be seen, therefore, that in a two-valve L.F. amplifier (transformer coupled) using, say, a D.E.R. (two-volts dull emitter) in the first stage and a small two-volt power valve (dull emitter) in the second the 2—1 and the 4—1 ratio Geophone L.F. transformers should be employed in that order.

On test these G.E.C. products gave very good results, as a matter of fact we tested them in a two-valve amplifier exactly as indicated above. Amplification was robust and frequency distortion inappreciable, tone being as

(Continued on page 1318.)



An artistic radio poster.



The Coil that has created a WIRELESS SENSATION

—wavelength range 180 to 5,300 metres

—and NOT A TAPPED COIL!

The BLUE SPOT MULTIDYNE COIL has created a sensation among Radio Experts wherever it has been introduced. It entirely eliminates all other forms of aerial tuning—it cuts out immediately the old "sets" of plug-in coils for different wave-lengths. The BLUE SPOT MULTIDYNE COIL consists of eight absolutely distinct coils incorporated in the usual shape of a single plug-in-coil.

Any one or more of these eight distinct coils can be brought into the circuit as desired by means of a simple switch lever—and because this is *not* a tapped coil there are *no* dead-end effects, and tuning is singularly sharp and clear. The BLUE SPOT MULTIDYNE is an absolute revolution in plug-in coils; it can be used for any set or any circuit—crystal or multi-valve, parallel, series or loose-coupled tuning, or for reaction.

Scrap those old sets of coils to-day!

Ask your retailer for the BLUE SPOT MULTIDYNE COIL, in case of difficulty in obtaining, send direct to us.

Price **13/6**

POST FREE

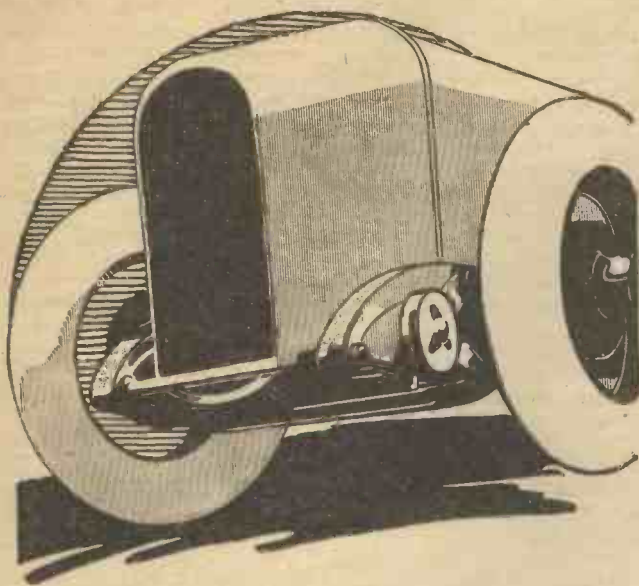
"BLUE SPOT" MULTIDYNE

ALL-WAVE COIL
(3 Provisional Patents)

Write to-day to:—

LINDALL'S Ltd., 68, LOMBARD ST., BIRMINGHAM

LONDON AND EXPORT AGENTS:—BARKER & CO. (SUPPLIES) LTD., 59-60, CHANCERY LANE, LONDON, W.C.2.



SMOOTHING OUT SHOCKS



The purpose of the Mansbridge Condenser is to smooth out the shocks in your head-phone and loud speaker reception.

Every H.T. battery causes intermittent crackling noises owing to partial polarisation and other internal irregularities

which cannot be controlled. A Mansbridge Condenser across the H.T. terminals of your set, however, at once eliminates these noises (which sound very like atmospheric).

Mansbridge Condensers are made in capacities from 0.2 to 2 microfarads, at prices from 2/6 to 5/-.

It is important to note that the only condensers made by the Mansbridge Condenser Co., Ltd., carry the words "Mansbridge Condenser" embossed on the case as illustrated above. There are many imitations, but only those bearing this characteristic are the genuine products of the Mansbridge Condenser Co., Ltd., and guaranteed and sold by the Dubilier Condenser Co. (1925) Ltd.

Note that the screw terminals are now also fitted with soldering tags.

MANUFACTURED BY THE
MANSBRIDGE
 CONDENSER CO. LTD.
 GUARANTEED & SOLD BY THE
DUBILIER
 CONDENSER CO. (1925) LTD.

ADVERT. OF THE DUBILIER CONDENSER CO. (1925) LTD., DUCON WORKS, VICTORIA RD., NORTH ACTON, W.3 TELEPHONE: CHISWICK 2241-2-3 E.P.S. 6

'I think the following is a record' writes this Vancouver Listener



"To Neutron Ltd.—I think the following is a record: Saturday evening, Dec. 26th, 1925, on a home-made Crystal Set, with single slider Tuner, and mounted on wood, using an old Neutron Crystal, I heard K G O Oakland, Calif. (2,000 watts, frequency 830 kilocycles) a distance of 800 miles (as the crow flies).—Yours truly, V. Jackson."

This is *not* a record—not even for Neutron. But it is one more of hundreds of similar letters received from literally every part of the world.

And this letter is not published as a suggestion that even Neutron Crystal will guarantee to you exactly similar results; so much depends upon your aerial, coils, and conditions of reception.

But Neutron will get the best out of your set. It will be a revelation to you if you will compare Neutron with other crystals. Test it to-day.

NEUTRON
TRADE MARK

The World's Greatest Radio Crystal

Synthetic, sensitive all over, and right through. Concert tested & guaranteed.

Wholesale enquiries to: Neutron Distributors, Sentinel House, London W.C.1.

H.C.W.

Sold by Radio Dealers the World over at 1/6. Manufactured by Neutron, Ltd.

APPARATUS TESTED.

(Continued from page 1316.)

good as we have heard. Doubtless the high standard which marked the reproduction was due in no small manner to the matching of suitable valves with good transformers—"team work" is as vital in a valve set as it is in other spheres.

We can thoroughly recommend these Geophone L.F. transformers to those of our readers who appreciate high-class components designed not merely to function but to operate with a high degree of efficiency.

Messrs. V. R. Pleasance, 56, Forgate, Sheffield, recently sent us one of their Armonic Anti-capacity valve holders. It is so designed that while the 4 valve sockets are quite rigid, they are fixed only on their outer sides to the ebonite frame, the centre of which is carved away to give an insulation of air. Two types are available—one for baseboard and the other for back-of-panel mounting—at a standard price of 2/6 each.

Messrs. Tungstalite, Ltd., of Tungstalite Crystal fame, have placed an automatic crystal on the market. It is of very simple design, consisting of one of their round crystals mounted on a finely threaded rod. To the latter a neat adjusting knob is fixed. Against the cylindrical crystal and in light contact with it, is a fine metal ribbon which is permanently fixed in position. Thus by rotating the little knob the crystal revolves and at the same time travels

slowly up or down in accordance with the direction of the rotation of the knob.

Therefore the metal ribbon "cat's-whisker" traverses practically the whole surface of the crystal. Not that it has to do this during every operation of adjustment—just a little twist of the control knob either the one way or the other is all that can ever be necessary. As soon as we hooked up the Tungstalite Automatic good signals were received, and the detector gave every indication of excellent stability combined with sensitivity. Mechanical vibration does not seem to worry it, and the enclosing transparent case keeps the crystal and its contact quite free from dust, etc. It is a neat and well finished little component, and is by no means overpriced at 3/9. Listeners and amateurs, too, should find its sensitivity, reliability, and simplicity factors well worth considering when they contemplate their next purchase in this direction.

Messrs. J. Morris & Co., of Ravald St., Salford, have sent us some of their "Ravald" tube wire for examination. It is made of 16 S.W.G. split copper tinned tubing and is sold in packets of six 2 ft. lengths at 1s. 8d. per packet. The idea is, of course, quite a good one, for such tubing forms a very excellent H.F. conductor. It can be bent quite easily, although the use of round-nosed pliers is advisable, and soldered connections can be made in the usual way.

Messrs. Garnett, Whiteley & Co., Ltd., Broadgreen Road, Liverpool, recently sent us samples of their new "Lotus" Buoyancy Anti-microphonic valve-holder.

Made of bakelite with nickel-silver springs and phosphor-bronze sockets they are very attractive in appearance. The springing is excellent and the sockets are sunk in order to prevent "shorts" accidentally occurring.

The connections through to the soldering points are positive, and no trouble could ever be experienced from bad internal contacts, as is possible with some types we have examined. The four points are marked "G," "F," etc., both on the base and top of the holder.

This "Lotus" product is designed for base-board mounting and at the price asked, 2s. 3d., can be thoroughly recommended.

The 6-valve Igranite super-het. and 10-valve amplifier which provides the patients of the London Hospital with broadcasting.



MAKE THE WORLD YOUR NEIGHBOUR

LAST week your friend logged many foreign stations. You probably managed about two. Do not blame your set for this, it is in all probability the fault of your Headphones.

Standard Headphones respond to the weakest signals and are, in addition to being super-sensitive, a pleasure to the wearer. The new headbands caress the head, and the receivers can be worn for many hours without the slightest discomfort.

ORDER YOURS TO-DAY.

Standard Telephones and Cables Limited

Formerly Western Electric.

Connaught House, Aldwych, London, W.C.2 'Phone: Central 7345 (10 lines).

Works: NORTH WOOLWICH, NEW SOUTHGATE and HENDON.

Branches: Glasgow, Leeds, Birmingham, Manchester, Newcastle, Cardiff, Southampton, Liverpool and Dublin.



PRICE
PER
PAIR **20/-**



Build the wonderful new RADION NEUTRODYNE

SOON everyone will be building Neutrodyne. For long-distance reception and perfect stability there is nothing to equal them. The new Radion Book (post free 6d.) gives fullest constructional details of the magnificent 5-Valve Neutrodyne illustrated above. Send for a copy to-day, you'll find complete in-

structions also given for building three other unique and efficient Receivers at low cost, a 1-Valve Set, a two-Valve Amplifier, and a self-contained Loud Speaker Set. If your Wireless Dealer cannot supply you with this Book, send 6d. to us and we will post you a copy immediately.

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American Hard Rubber Company (Britain) Ltd.
 Head Office: 13a Fore Street, Depots: 120 Wellington Street, Glasgow,
 116 Snow Hill, Birmingham.
 London, E.C. 2 Irish Agents: 8 Corporation Street, Belfast.

Gilbert Ad. 4508

LOOK TO THE AERIAL CONNECTION



You may have a tip-top aerial and a fin set, yet if the lead-in connection is faulty the results will be poor. The best way to attach the lead-in to the aerial is to twist the wires thoroughly together and solder with FLUXITE.

SOLDER WITH FLUXITE FOR THE MINIMUM EFFORT AND THE MAXIMUM EFFICIENCY.

Ask your Ironmonger or Hardware Dealer to show you the neat little

FLUXITE SOLDERING SET

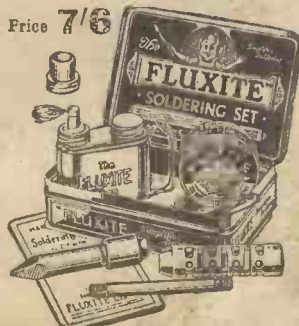
It is perfectly simple to use, and will last for years in constant use. It contains a special "small space" Soldering Iron with non-heating metal handle, a pocket Blow-lamp. FLUXITE, solder, etc., and full instructions. Price 7/6. Write to us should you be unable to obtain it.

FLUXITE SIMPLIFIES SOLDERING

All Hardware and Ironmongery Stores sell FLUXITE in tins, price 8d., 1/4. & 2/8.

Buy a Tin To-day.

FLUXITE LTD. (Dept. 324.) West Lane Works, Rotherhithe, S.E.16.



ANOTHER USE FOR FLUXITE. Hardening Tools & Case Hardening. ASK FOR LEAFLET on improved methods.



COSMOS PERMACONS

FIXED CONDENSERS GIVING FIXED RESULTS

The "Cosmos" Permacon is an ideal fixed condenser, being light in weight, of guaranteed accurate capacity, and having the lowest possible losses.

The dielectric is mica and each condenser is tested at 500 Volts during inspection. Nickel plated cases give them a particularly neat appearance.

·0001 mfd.	1/6
·0002 "	1/6
·0005 "	1/6
·0003 " (with clip for grid leak)	1/8
·001 "	1/8
·002 "	1/10
·005 "	2/8
·01 "	3/9

"COSMOS" GRID LEAKS are uniform and permanent. 1, 1, 2 and 3 megohms, each 1/6

Ask for copy of the Cosmos Components Brochure.

METRO-VICK SUPPLIES LTD.
 (Proprietors—Metro-Vick & Elee. Co. Ltd.)

4, Central Buildings, Westminster, LONDON, S.W.1

- MICA DIELECTRIC
- GUARANTEED ACCURATE CAPACITY
- LOW LOSS
- TESTED AT 500 VOLTS



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The Editor will be pleased to consider articles and photographs dealing with all subjects appertaining to wireless work. The Editor cannot accept responsibility for manuscripts and photos. Every care will be taken to return MSS. not accepted for publication. A stamped and addressed envelope must be sent with every article. All contributions to be addressed to The Editor, The Fleetway House, Farringdon Street, London, E.C.4. All inquiries concerning advertising rates, etc., to be addressed to the Sole Agents, Messrs. John H. Lilc, Ltd., 4, Ludgate Circus, London, E.C.4.

The Editor desires to direct the attention of his readers to the fact that, as much of the information given in the columns of this paper is of a technical nature and 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 trader would be well advised to obtain permission of the patentees to use the patents before doing so.

PATENT ADVICE FOR READERS.

The Editor will be very pleased to recommend readers of POPULAR WIRELESS who have any wireless inventions to patent, or who desire advice on patent questions, to our patent agent. Letters dealing with patent questions, if sent to the Editor, will be forwarded to our own patent advisers, where every facility and help will be afforded to readers.

TECHNICAL QUERIES.

Letters should be addressed to:
Technical Query Dept.,
"Popular Wireless,"
The Fleetway House,
Farringdon Street,
London, E.C.4.

They should be written on one side of the paper only, and **MUST** be accompanied by a stamped addressed envelope.

Queries should be asked in the form of the numbered questions: (1), (2), (3), etc., but may be accompanied by a short letter giving any necessary additional particulars as briefly as possible.

For every question asked a fee of 6d. should be enclosed. A copy of the numbered questions should be kept, so that the replies may be given under the numbers. (It is not possible to reproduce the question in the answer.)

IMPORTANT.—If a wiring diagram, panel lay-out or list of point-to-point wiring is required, an additional fee of 1/- must be enclosed.

Wiring diagrams of commercial apparatus, such as sets of any particular manufacture, etc., cannot be supplied. (Such particulars can only be obtained from the makers.)

Readers may submit their own diagrams, etc., for correction or for criticism. The fee is 1/- per diagram, and these should be large, and as clear as possible.

No questions can be answered by 'phone. Remittances should be in the form of Postal Orders.

Questions and Answers

AN EFFICIENT 3-VALVER.

"EFFICIENCY" (St. Albans).—What in your opinion is the most reliable and efficient 3-valve set for all-round reception? I do not wish this to be complicated, but desire efficiency combined with ease of operation.

The most suitable combination of three valves for the reception of stations on all standard wave lengths, is one consisting of one H.F., a detector and one L.F. A pictorial diagram of this circuit is given below.

A series parallel aerial arrangement is allowed for, and this allows for a wide range of wave-lengths to be covered by one coil. For example, a 50-turn honeycomb coil in conjunction with the 0005 variable condenser, can be made to tune between 190 to 600 metres with a standard P.M.G. aerial. It also has several other advantages as compared with switches, including that of cheapness. When receiving on the shorter wave-lengths it is advisable to employ

(Continued on page 1322.)

EDISON BELL RADIO

GOOD NEWS FOR CONSTRUCTORS!

BIG REDUCTIONS!

IN THE PRICE OF

Edison Bell

FIXED CONDENSERS.

Reduced as from Jan. 1, 1926

Latest Price Lists from your dealer

or Manufacturers:

J. E. HOUGH Ltd., Edison Bell Works, London, S.E.15
and HUNTINGDON.

TESTED 500 VOLTS
FLAT TYPE



TESTED 500 VOLTS
UPRIGHT TYPE



INSIST ON EDISON BELL CONDENSERS

THEY ARE BRITISH MADE AND GUARANTEED BY A NAME WITH 30 YEARS REPUTATION BEHIND IT

Modernise your sets— with Igranic-Pacent Jacks & Plugs



Three Spring Automatic Jack.
Generally used after last valve for connecting 'phones or loud speaker. As plug is withdrawn the filament supply is switched off. Price 2/6



Igranic-Pacent Autoplug.
This plug is entirely shock-proof. Connections made instantly by means of reliable spring connectors. Shell of Bakelite. No screws used in its assembly. Price 2/6
With gold plated metal parts. Price 4/-

Switching in modern receivers becomes simple and reliable when Igranic-Pacent Jacks and Plugs are fitted. Used for inter-stage switching, the mere slipping of the 'phone or loud-speaker plug into a jack determines the number of valves in use. Ten types of jacks are available for all radio purposes.



Ask your dealer about Igranic-Pacent Radio Essentials—they are standard equipment on 40 famous American manufactured sets.

Write for List P. 35 which describes the entire range.

Branches:
BIRMINGHAM
BRISTOL
CARDIFF



GLASGOW
LEEDS
MANCHESTER
NEWCASTLE

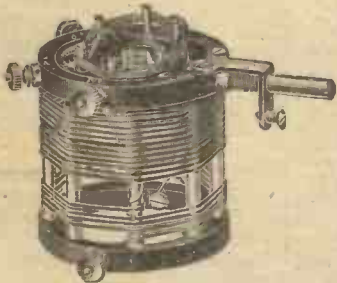
149, QUEEN VICTORIA ST.,
LONDON.

Works: ELSTOW ROAD,
BEDFORD.

Exclusive Manufacturing Licensees of PACENT Radio Essentials

The latest AMERICAN WONDER

A remarkable SHORT-WAVE TUNER



SPECIAL FEATURES.

- Wound on Quartzite Formers.
- Spaced Flat Copper Ribbon.
- Reactance wound on Low Loss Quartzite Rotor.
- Two Hole Fixing to Panel.
- Wave Length 25 to 100 Metres with .0005 Condenser in parallel.

PRICE 36/- EACH.

Will suit Short-Wave Receiver Circuit recently introduced.

Send 6d. to cover cost of Postage for our Latest International Catalogue. (Mention this paper.)

WILL DAY LTD. (Dept. D)

The Real Radio Supply House,
19, LISLE STREET, W.C.2

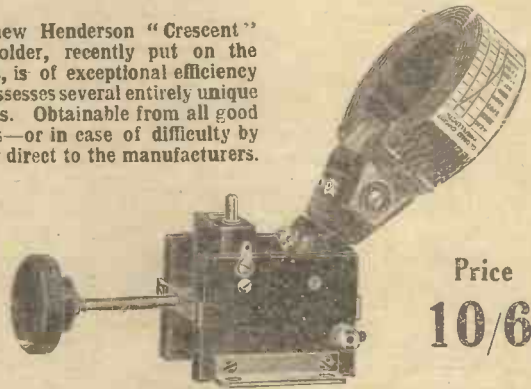
'PHONE: 4577 Regent. TELEGRAMS: Titles, Westrand.

Henderson
Instruments

Fine Tuning Assured by Fine Movement

This new Henderson "Crescent" Coil Holder, recently put on the market, is of exceptional efficiency and possesses several entirely unique features. Obtainable from all good Dealers—or in case of difficulty by writing direct to the manufacturers.

Prov. Pat.



Price
10/6

The NEW HENDERSON "CRESCENT" COIL HOLDER

The coil moves in same plane as spindle, saving panel and cabinet space. Fine tuning guaranteed by micrometer adjustment at all angles. Rigidity assured in any position and complete freedom from backlash or whip.

Manufacturers:—

W. J. HENDERSON & CO., Ltd.,
351, FULHAM ROAD, LONDON, S.W.10

'Phone: Kensington 8983.

GREAT SUCCESS OF THE LOWFORMA

This set embodying a LOWFORMA erected by the Technical Staff of the WIRELESS MAGAZINE and fully described in the February issue (1926) has received the KDKA (East Pittsburg) 62 metres transmission at Loud Speaker strength on a 21 ft. indoor aerial in London.

The LOWFORMA is a valuable unit which can be utilized in the erection of numerous Crystal and Valve Sets frequently securing 50 p.c. Better Results.

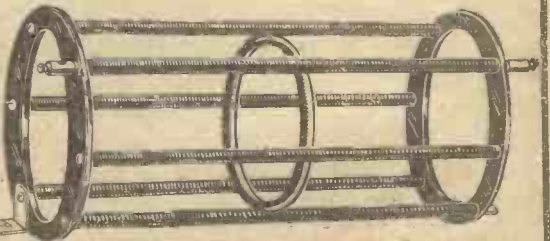


Prices:

3 1/2 inches diameter by 5 inches long 4/9

6 in. 5/-

7 inch 5/6



OF ALL DEALERS—in case of difficulty write the makers—

A. H. CLACKSON LTD., (DEPT. F.)
Head Offices: 119, FLEET STREET, LONDON, E.C.4.

RADIOTORIAL QUESTIONS AND ANSWERS.

(Continued from page 1320.)

the series tuning arrangement, in which case the aerial should be connected to aerial (S) terminal and earth to E terminal:

This arrangement gives sharp tuning, and is of great advantage when receiving broadcast transmissions. For the longer wave-lengths, the parallel arrangement should be used. In this case the aerial is connected to A (P), and the A (S) and E

interfering with other sets in the neighbourhood. It is advisable to employ the smallest reaction coil that will give reaction effects, as it will be found that a much smoother control over the oscillations produced is possible, and hence a resultant increase in the ease of control.

The side of the reaction coil which is not connected to the plate of the detector valve is taken to the centre contact of an S.P.D.T. switch. This allows for either two or three valves to be employed. The circuit can then be used as an H.F. and detector for 'phone signals or as a three valve for loud-speaker results. If it is desired, a power valve can be used in the last stage, in which case separate H.T. and grid bias are advisable.

It is possible that you are too far away from the sending station to hear the speech, even although the carrier wave is distinct. You may, however, be unsuccessful on account of your set not having a very well-defined oscillation point. The effect of this would be that in the case of weak signals as soon as you commenced to loosen the reaction coupling, you lost the carrier wave. In order to hear very weak telephony it is necessary that the valves should be only just off the oscillation point.

If the reaction is arranged so that the slightest movement passes the set into full oscillation you will be unable to make the necessary fine adjustment.

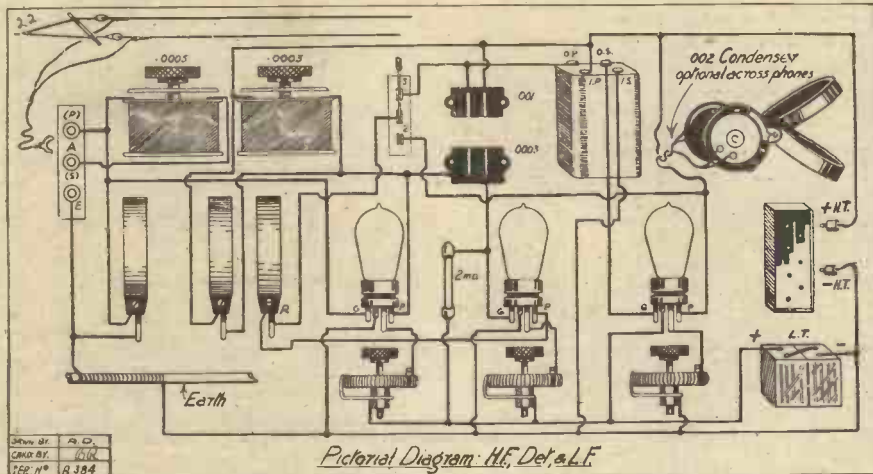
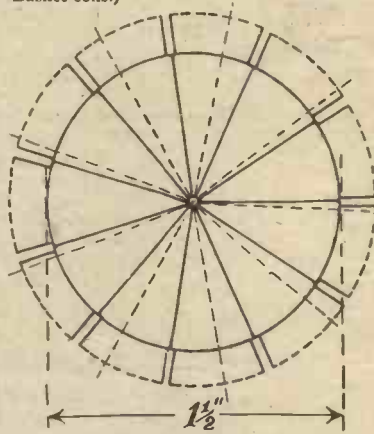
For the Constructor

NO. 4—TEMPLATE FOR SPIDER-WEB COILS.

Spider-web coil formers having a centre diameter of 1½ inches can be made from this sketch.

The heavy lines show how eleven segments should be marked out, and how the slots are cut down towards the centre. The dotted lines show the arrangement for nine slots.

(Note:—The angles are the same for Basket coils.)



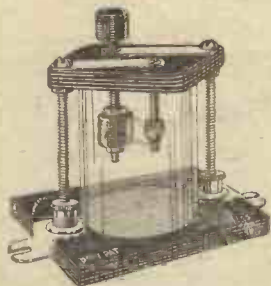
terminals are shorted by a bare wire or strip. The filament rheostat of the first valve is placed in the positive lead to the accumulator, the detector valve rheostat being connected in a similar way; whereas the L.F. valve rheostat is connected in the negative lead to the accumulator.

Reaction is obtained by coupling the reaction coil to the anode coil. This allows for reaction effects to be obtained with the least possible chance of

OSCILLATION CONTROL.

J. L. (Bristol).—When listening in on broadcasting wave-lengths I have often heard the carrier wave of a station, or of different stations, but so far I have not been successful in hearing speech. What is the reason?

The INVENTION OF 1926



SPECIAL FEATURES:

- A special sensitive cylindrical crystal, which **PROPELS** as it **ROTATES**.
- Hairline metal ribbon, permanent automatic contact.
- Special non-actinic glass cover.
- All metal parts nickel plated.

If you want your reception to be

- CLEARER** than it has ever been before.
- UNAFFECTED AND COMPLETELY STABLE** in the presence of excessive vibration.
- SELECTIVE** to an exceptional degree.
- AND ALL SECURED AUTOMATICALLY**, no holes to drill, no crystals or other components to buy or replace.

Your wish will be more than satisfied by

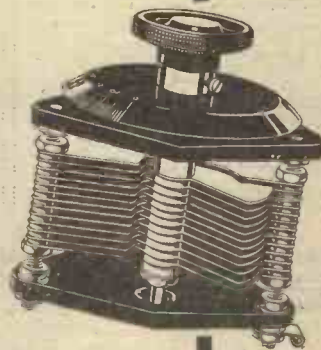
TUNGSTALITE AUTOMATIC DETECTOR

3/9

from all dealers, or direct from

TUNGSTALITE LTD.,
47, Farringdon Road, LONDON, E.C.1,
or
41, Call Lane, LEEDS.

STILL SETTING ITS OWN STANDARD



Single, Double, and Triple Types in stock. All ranges. Twelve months' guarantee with every instrument. Order from your dealer or direct from BOWYER-LOWE CO., LTD., LETCHWORTH.

At its price, the Bowyer-Lowe Standard Square Law Condenser is still unequalled for precision. Apart from the more expensive Bowyer-Lowe "Four Square," it has the highest capacity ratio of any Square Law Condenser. It is no larger than ordinary condensers; it yields results that every amateur seeks. The

SIGNAL STRENGTH WAVELENGTH RANGE SELECTIVITY

of this condenser are so great that every set in which it is installed becomes a better, more efficient receiver. In many cases it makes all the difference between success and failure. Ask your dealer for it. Test it, use it regularly.

THE BOWYER-LOWE STANDARD TYPE SQUARE LAW CONDENSER

LISENIN

POSITIVE GRIP PLUGS & SOCKETS

Pat. No. 248/25.

LISENIN Positive Grip Plugs are designed to take the smallest flex up to 5 m/m cable and single strand wires from 16 to 40 s.w.g., also Electron Wire.

"A" illustrates insulated (Erinoid) sleeve, cable with ends bared and recessed cone.

"B" shows cone section in position. Being concave, it allows smallest flex to fit up tight, precluding any possibility of bared wire breaking with continual use.

"C" Bared ends turned back; cone fits into concave recess in plug. Erinoid sleeve is then slipped down and plug screwed into it. A vice-like grip is made and an absolutely positive connection.

"D" illustrates plug and socket complete with indication disc and nuts. Sleeves and indicators are made in red and black. Plugs and sockets N. Plated. SPADE END, POSITIVE GRIP, terminals, suitable for accumulator leads, etc., also supplied.

ELECTRICALLY MECHANICALLY PERFECT

RETAIL PRICE **6d.** PLUG AND SOCKET OR SPADE END TERMINAL

STOCKED BY ALL LEADING DEALERS.

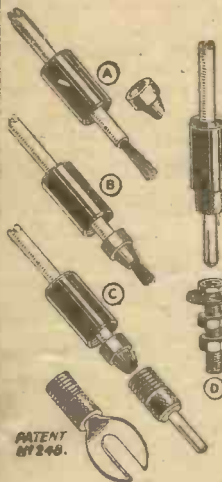
Sole Manufacturers and Patentees:

The LISENIN WIRELESS CO.
1a, Edgware Road, London, W.2

Phone Paddington 2734

Sample doz. assorted, sent post free, 6s.

If your Dealer does not stock give his name and address.



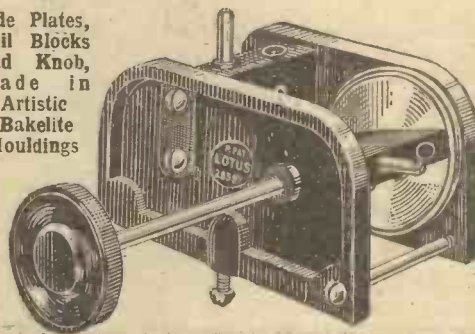
PATENT 248/25.

Get more out of your Set

Fit a

LOTUS Geared Vernier COIL HOLDER

Side Plates, Coil Blocks and Knob, made in Artistic Bakelite Mouldings



You have experienced that annoying and irritating fading away of volume after tuning your coils. This is due to the moving block falling. The Lotus Moving Block **CANNOT FALL.**

The Vernier movement comprises three sets of enclosed precision machine-cut gears, and reduces the speed of the moving coil block by eight times.

Has the Largest Sale of any type of Vernier Coil Holder

There are Two Types of Lotus Coil Holders:

For Outside Panel Mounting: Two-way, 7/-; Three-way, 10/6
For Inside Baseboard Mounting with 6 in. handle: Two-way, 8/-; Three-way, 12/6

From all first-class Radio Dealers

GARNETT, WHITELEY & Co., Ltd.,
BROADGREEN RD., LIVERPOOL

An evening with a Remarkable New Circuit

Although hundreds of wireless enthusiasts have responded to our advertisement which offered for sale the Ormsby Long Range Selective Circuit, there are undoubtedly many who are perhaps a little sceptical. To dispel all doubts concerning the extraordinary performance of this circuit, we give in illustrated form the results of an evening's actual test on 4 valves, under normal conditions with a 75 feet aerial 25 feet high, eight miles from London.

This circuit is extremely selective without loss of volume and for purity of tone it is irreproachable. **500 MILES ON LOUD SPEAKER.**

This circuit will give loud speaker results 500 miles away and will **CUT OUT THE LOCAL STATION.** The Circuit Envelope contains 2 simple wiring charts, layout and template for baseboard and valves, and full instructions for building. Send Postal Order for 2/6.

8/15 CUT OUT LONDON.

9/20 ROME speaker results

8/20 PRAGUE on speaker

10/5 CARDIFF speaker results

9/5 PARIS speaker results

11/6 MADRID speaker results

Please state if for 3 or 4 valves, and write name and address clearly.



2/6

M. ORMSBY & CO.
28, PAGE ST., WESTMINSTER, LONDON.

Phone: Victoria 1987.



Stop that continued vibration of the filament!

USE the Clearer Tone Valve Holder and float your valves—secure from the ever-present, tone - destroying vibrations caused by street traffic, indoor footsteps and the hundred and one other microphonic disturbances. So thoroughly does this new holder cushion the valve that foreign noises are completely dissipated. The springs, though delicately adjusted, are immensely strong and the tightest valve can be inserted without fear of damaging them. Each spring has one turn only. Bakelite construction of the body of the holder ensures high insulation, low capacity and sturdiness.

each **2/9**



There are terminal connections for the experimenter and soldering tags for the permanent set.



The springs themselves form the valve pin sockets. No soldered joints—all one solid metal piece—from tag to valve leg. No flexible wire connections. The spring supports are not affected by stiff bus-bar wiring. For good reception with Dull Emitter Valves, Benjamin Clearer Tone Anti-Microphonic Valve Holders are essential.



Patents Pending.

BRITISH BENJAMIN MADE CLEARER TONE VALVE HOLDER (ANTI-MICROPHONIC)

From your Dealer or Direct from THE BENJAMIN ELECTRIC Ltd., Brantwood Works, Tariff Road, Tottenham, N.17.

The Benjamin Battery Switch gives perfect current control, 2/- each.

Correspondence

Letters from readers discussing interesting and topical wireless events or recording unusual experiences are always welcomed, but it must be clearly understood that the publication of such does in no way indicate that we associate ourselves with the views expressed by our correspondents, and we cannot accept any responsibility for information given.—Editor.

UNDYNE RESULTS.

The Editor, POPULAR WIRELESS.
Dear Sir,—Perhaps an account of my experiences with a one-valve Undyne may interest you. This is my second set I have made—my other being a single-valve straight circuit—and I find it is superior to the H.T. set as regards DX work. On my first trial of the set I found I had connected the grids the wrong way round, but on putting this right the set functioned perfectly. I have had most of the B.B.C. stations and three foreign stations as well, one of the latter coming in with wonderful clarity and volume. A distinguishing feature about this station is that a gong sounds once before each item and twice after. Can anyone please tell me what this station is? Hoping this may be of interest to you,

Yours faithfully,
L. BILSON.

41, Harrington Street,
Mansfield.
(The station is probably Hamburg.—Tech. Editor.)

THE SHANGHAI BROADCASTING STATION.

The Editor, POPULAR WIRELESS.
Dear Sir,—I was extremely surprised to read in POPULAR WIRELESS of the 23rd October, that a Paris schoolboy had succeeded in receiving programmes broadcast from our local station on four separate occasions in the course of one month. I think that you will admit that this must be a record feat, both as regard reception and, more especially, as regards transmission when I tell you that the power at the aerial input is only 100 watts (one hundred watts); two U.Y. 203 transmitting tubes of 50 watts each being connected in parallel in the oscillator circuit, and two similar tubes for the modulator. What makes this feat more remarkable is the fact that owing to the great difference in time between Shanghai and Paris, viz., 7 hours 56 minutes, there must invariably be a belt of daylight somewhere between these two points during the hours which our station is working.

The call letters of the Shanghai station are K.R.C. and the wavelength is 356 metres, and not 365 metres as mentioned by you. The station is owned and operated by Mr. Roy E. Delay, manager of the Kellogg Switchboard & Supply Co., manufacturers of telephone and radio apparatus, whose head office is in Chicago, U.S.A.

One of the main causes which contribute to the efficiency of our little station is Mr. Delay's fetish of "insulation: first, last, and all the time." The aerial is of the five-wire T type, suspended between two steel tubular masts 95 feet high, and is insulated at every point by heavy Pyrex glass insulators. The counterpoise, which is insulated in the same manner, is suspended about 10 ft. above the ground and runs directly under the aerial.

It would be very interesting to know if any amateur in Great Britain has succeeded in duplicating the feat of M. Gustave Durand, and in case any should care to try, I am appending a time-table of our station.

LOCAL TIME. GREENWICH M. TIME.

9.45 a.m. to 10.30 a.m. . . . 1.40 a.m.—2.31 a.m.
News and market reports in English and Chinese.
12.30 p.m. to 1.30 p.m. . . . 4.34 a.m.—5.34 a.m.
Music and topical speeches in English and Chinese.
6 p.m. to 7 p.m. . . . 10.04 a.m.—11.04 a.m.
News and music. English only.
8.30 p.m. to 9.15 p.m. . . . 12.34 p.m.—1.19 p.m.
Music and news. Chinese only.
9.30 p.m. to 11.00 p.m. . . . 1.34 p.m.—3.04 p.m.
Hotel Plaza orchestra; jazz music, etc.

SUNDAYS.

11 a.m. to noon 3.04 a.m.—4.04 a.m.
Church service. English only.
7.30 p.m. to 9 p.m. 11.34 a.m.—1.04 p.m.
Japanese concert. Japanese only.
9.30 to 11 p.m., Hotel Plaza orchestra.

Wishing your paper every success, which it so richly deserves.

Yours faithfully,
H. H. WILLIAMSON.

6, Quinsan Garden, Shanghai,

THE B.B.C. TALKS.

To the Editor, POPULAR WIRELESS.
I have read the letter of Mr. Rudland in the issue of the 12th ult. I think it is as well that "New States man" and Mr. Rudland should know that I, and heaps of other people, much appreciate the "potted science and history" talks the B.B.C. give us. I only wish there were more of them!

I, personally, put down the 'phones when music of "a light and tuneful character" comes through. In spite of the fact that the greater part of the B.B.C. programme does not suit me, I propose, nevertheless, to continue paying my licence fee.

(Continued on page 1326.)

SCRAP YOUR H.T. BATTERY



If your Electric Supply is by DIRECT CURRENT obtain H.T. Current through the

"EKCO"

H.T. UNIT (Prov. Pat.)

by just attaching adapter to lamp-socket, reading-lamp, or power-plus!

SIZE 6"x6"x5"

ENSURES PERFECT RECEPTION.
LASTS A LIFETIME.
RUNNING EXPENSES NEGLIGIBLE.
SAVES COST IN FEW MONTHS.

UNITS TO SUIT } from 29/6
ALL SETS }
SEND FOR PARTICULARS—FREE!
E. K. COLE, (Dept. A), 505, London Road,
WESTCLIFF-ON-SEA.

HEADPHONES REPAIRED—

Re-wound & re-magnetised 5/- per pair, Loud Speakers repaired 5/-, Transformers re-wound 5/- each. All work guaranteed and tested before delivery.
Write for Trade Prices. Phone: Clerk, 1795.
MASON & CO., 44, East Road, City Road, N.1.

The FAMOUS GENERAL RADIOPHONES




YOURS for 6/-

Latest Standard Model General Radiophones (made by the well-known General Radio Co., Ltd.) Super Sensitive and Highly Efficient.
Receivers matched in tone. Magnets of highly expensive Cobalt steel. Diaphragms triple tested. Beautifully comfortable, highly finished, weight 7 ozs. Fully guaranteed. Sent on receipt of 6d. deposit. If satisfied, send 2/6 on receipt and balance by instalments of 5/- monthly until only 2/1- is paid. Price, full cash with order (or within 7 days of receipt), 2/1.
SIMPSON'S (BRIGHTON) LTD.
(Dept. 1623), 94, Queen's Road, Brighton, Sussex.

RADIO REGISTERED PANELS

7" x 5", 1/-
7" x 6", 1/3
10" x 8", 2/1
10" x 9", 2/4
11" x 9", 2/7
12" x 10", 3/-
14" x 12", 4/-



8" x 5", 1/2
9" x 6", 1/7
11" x 8", 2/3
12" x 8", 2/6
12" x 9", 2/10
14" x 10", 3/5
3/4" thick;
Post Free;

Money back guarantee that each and all Panels are free from surface leakage, Megger test Infinity. Callers, cut any size, & quote by Post, or Phone Clerk-ewell 7853. Sample & prices, post free to the Trade.
CROXSONIA CO., 10, South St., MOORGATE, E.C.

PLEASE be sure to mention POPULAR WIRELESS when communicating with Advertisers

THANKS!

French Wireless Manufacturer wishes to get in touch with amateurs at once, either sex, to act as agents in London, Provinces, and Colonies, for the distribution of his model. Owing to rate of exchange exceptional terms are offered. Write, enclosing International coupon for reply, to Mr. Bouillard, Engineer, 9, Rue du Cher, Paris XX.

F.E.A.R.

L.F. TRANSFORMERS

ALL RATIOS.

Maurice Bobin,

21 Warwick Lane, London, E.C.4
Phone, Cen. 4872.



WONDERFUL LOW LOSS STRAIGHT LINE FREQUENCY CONDENSERS THE CONDENSER OF THE FUTURE

Supreme SELECTIVITY.

Each station has a CLEAR TUNING SPACE.

CROWDING entirely ELIMINATED.

SIMPLIFIED tuning.

DISTINCT and DEFINITE Radio reception.

PRECISION workmanship.

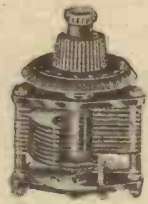
Solid Brass vanes (a very important factor).

Central position of rotor INSURES MINIMUM panel space.

ONE HOLE FIXING.



LOW LOSS



EBONITE ENDS

Pigtail connection to rotor gives silent working.

Special Spring top Bush gives a firm but easy movement.

LOW LOSS SKELETON ENDS or Ebonite if preferred.

All HIGHEST possible QUALITY.

Everyone AMAZED at the beauty and finish of these Condensers, and to compete with the OUT OF DATE AMERICAN CONDENSERS now on the market, we ask you to try the BRITISH ARTICLE.

FOR A LIMITED PERIOD,

to introduce them to you, if you mention "Popular Wireless," I offer them AT PRACTICALLY COST PRICE

and guarantee them to be equal to many Condensers at treble the price.

Including knob & dial as sketch.

*0003 5/11

*0005 6/6

With geared dial, 12-1 ratio, 6/- each extra.

POST 6d. PER SET.

PLEASE STATE LOW LOSS OR EBONITE ENDS.

Including knob & dial as sketch.

With vernier

*0003 7/11

*0005 8/6

POST 6d. PER SET.

TELEFUNKEN.—Adjustable; lighter than a feather, 15/11 pr.

ADJUSTABLE "KAY RAY."—Limited number, fine value, 8/11 pr.

BROWN'S A2 type, 30/-; B.T.H., 20/-; Western Electric, 20/-; Sterling, 22/6; Do. Lilliput, 20/-; British Ericsson, 22/6; Brandes, 20/-; Brown's, 20/- pr.

N. and K. PATTERN.—High class, splendid tone, 8/6.

SIEMENS EBONITE.—Cut in, 2 to 4 in. squared edges.—3/6 in. dia. sq. inch. 1 in. is 1/2 sq. inch. Postage extra.

PHILLIPS 4 ELECTRODE

Can be used on ordinary circuit, 10/- post free.

RECOGNISED WEST END DISTRIBUTOR of the manufactures of Edison Bell, Jackmans (JB) Polar, Igranite, Peerless, Eureka, Magnium, Burndett, Lotus, Duxler, Marconi, Dorwood, Sterling, Success, B.T.H., McMichael, Lissen, Woodhall, Utility, R.I., Boyer-Lowe, Amplion, Formo, Brunet, Ormond, Vesly, Newey, P and M, and everything that is worth stocking. Every endeavour made to obtain goods not listed.

VERNIER CONDENSERS.—3-plate, 3/11; 5-plate, 4/6; Michron, 3/6; Colvern, 2/8; Ormond, 2/6; Gambrell, 5/6.

STRADIA H.F. TRANSFORMERS.—Barrel type, B.C.C., 6XX and Neutrodyne, 5/6 each. Made by Stirling's, Ltd.

LOTUS.—Geared 8-1 Coil stands, 2-way, 7/- (with exhandles, 8/-); 7-way, 10/6.

DORWOOD FIXED.—01 to .006, 3/- each; .0003 (with grid-lead clip), 2/6.

COSMOS (MET. VICKERS) VALVES.—A43, 7/6; GP. 8P. 18, 12/6; Red or Green Spot, 12/6.

ACCUMULATORS.—Very special. Best make, 2v, 40, 8/11; 2v, 60, 10/11; 2v, 80, 13/11; also 4v, 10, 14/11; 4v, 60, 17/11; 4v, 80, 24/6. Post 1/- extra.

COIL STANDS.—2-way Standard, 2/9; Cam. V., 4/6; Geared, 4/4; 4/6, 6/-; 3-way Standard, 5/-; Cam. 6/6; Geared, 7/6.

H.F. TRANSFORMERS.—Barrel Type, Stradia, 6/6; Boyer-Lowe, 7/-; Magnium, 7/-; McMichael, 10/-; Do. Superon, 4/7, 12/6; Energo Standard B.B.C., 3/11; 8XX, 4/6.

L.F. TRANSFORMERS.—Ferranti, 17/6; New Model, 25/-; Ormond, 14/11; Shrouded, 17/6; Royal, 20/-; Powpung, 14/6; Formo, 10/6; Crois, 9/-; Wate Supra, 12/6; Lissen, 7/1, 21/-; T2, 15/-; T3, 12/6; Eureka Concert Grand, 25/-; 2nd Stage, 21/-; Baby Grand, 15/-; Reflex, 15/-; Success L.F., Black, 21/-.

J. B. JACKSON BROS.—Variable Condensers, Sq. Law, .001, 9/6; .0005, 8/-; .0003, 7/-; with vernier, 4/- each extra. Geared .0003, 15/-; .0003, 13/-; Low Loss, 10/6 and 9/-.

MOUNTED COILS, GOSWELL.—25, 1/6; 35, 1/9; 50, 2/-; 75, 2/3; 100, 2/9; 150, 3/-; 175, 3/6; 200, 3/9; 250, 5/3; 300, 6/4.

STAR.—25, 1/3; 35, 1/6; 50, 1/9; 75, 2/-; 100, 2/3; 150, 2/6; 175, 2/9; 230, 3/-; 300, 3/6.

IGRANIC.—Honeycomb, 25, 35, 4/2; 50, 4/6; 75, 4/10; 100, 6/2; 150, 7/-; 200, 8/-; 250, 9/6; 300, 9/6; 400, 10/6; 500, 10/3; 600, 11/-; 750, 12/6; 1,250, 15/6; 1,500, 17/6.

LISSEN.—25, 35, 4/10 each; 50, 5/-; 60, 75, 5/4 each; 100, 6/9; 150, 7/-; 200, 8/5; Lissen X, 9/6, 6/-; 60, 6/4; 75, 6/5; 250, 9/6; Tuner, 22/6. Mark III, Var., 17/6.

LISSEN PARTS.—Anode or Variable Grid Leak, 2/6 each; L.F. or H.F. Choke, 10/6; Switches, D.P.D.T., 5 point Reversing, 4/- each; 2-way series Par., 2/9 each; Minor, 3/8; Major, 7/6; Universal, 10/6; Potentiometer or Wire Rheostat, 4/- each; Neutrodyne Condenser, 4/6; Coils 25, 35, 4/20 each; 50, 5/-; 60, 75, 5/4 each; 100, 6/8; 150, 7/-; 200, 8/5; Lissen X, 50, 9/6; 60, 6/4; 75, 6/5; 250, 9/6; Tuner, 22/6. Mark III, Var., 17/6.

CHOKES.—Lissen H.F. or L.F., 10/-; R.I., 10/-; Success, 10/-.

MANSBRIDGE CONDENSERS T.C.C.—2 mid., 4/8; 1 mid., 3/4; 25, 3/-; 5, 3/4.

FIXED CONDENSERS.—Dublier .0001, 2, 3, 4, 8, each 2/6; .001, 2, 3, 4, 5, 6, each 3/-; Grid Leak, 2/6; Edison Bell, .001, 2, 3, 4, 5, 1/-; .002, 3, 4, 5, 6, 1/6; .0003 and Grid Leak, 2/-; Post 2d. each. Thera guaranteed capacity, 1/3 & 2/- each; McMichael, with clips, same price as Dublier.

CRYSTAL DETECTORS.—Enclosed. Burndett, 4/-; Kay Ray Micrometer, 2/6; Permanent R.I., 6/-; One-hole fixing, 7/6; Kay Ray, 2/6; Liberty, 3/6.

HEADPHONES.—4,000 ohms. Ericsson E.V. Continental, Lovely tones, exquisitely finished, 10/6 pr.

DR. NESPER.—Adjustable; the perfect 'phone, 12/11 pr.

N. and K.—Absolutely genuine. Standard Model, 12/11; New Light weight, 13/6; Best stamped on outside of case: N. and K.

"BRUNET".—The old original. As good as ever; new design, 12/6 pr.

VAR. GRID LEAKS.—Lissen, 2/6; Walnut, 2/8; Bretwood, 3/6; Anode Res., Lissen, 2/8; Wadmel, 3/6; Bretwood, 3/-.

VALVE HOLDERS.—Sterling, 4/-; Burndett, or Magnium, 5/-, 2/6; Benjamin, 2/8; Apex, 1/8; Aeronmic, 1/6; Standard, 1/3; Anti-cap shrouded, red for plate, 1/3; or 3 for 3/-; Ditto, nickel legs, 1/3; Athol, 1/3; H.T.C., 1/6, O.P., 1/3.

LOUD SPEAKERS.—Dinkle, 30/-; Baby Sterling, 50/-; Floral, 55/-; Amplion A.K. 111, 50/-; 114, 65/-; A.R. 19, 25 5s.; Radio Lux Models, from 44 15s.; Ultra, 27/6; Sparta, 50/-, 95/-; Beco Models, 50/-; C.A.V., 27/6; Brown's, all models.

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LISSEN PARTS.—Anode or Variable Grid Leak, 2/6 each; L.F. or H.F. Choke, 10/6; Switches, D.P.D.T., 5 point Reversing, 4/- each; 2-way series Par., 2/9 each; Minor, 3/8; Major, 7/6; Universal, 10/6; Potentiometer or Wire Rheostat, 4/- each; Neutrodyne Condenser, 4/6; Coils 25, 35, 4/20 each; 50, 5/-; 60, 75, 5/4 each; 100, 6/8; 150, 7/-; 200, 8/5; Lissen X, 50, 9/6; 60, 6/4; 75, 6/5; 250, 9/6; Tuner, 22/6. Mark III, Var., 17/6.

CHOKES.—Lissen H.F. or L.F., 10/-; R.I., 10/-; Success, 10/-.

MANSBRIDGE CONDENSERS T.C.C.—2 mid., 4/8; 1 mid., 3/4; 25, 3/-; 5, 3/4.

FIXED CONDENSERS.—Dublier .0001, 2, 3, 4, 8, each 2/6; .001, 2, 3, 4, 5, 6, each 3/-; Grid Leak, 2/6; Edison Bell, .001, 2, 3, 4, 5, 1/-; .002, 3, 4, 5, 6, 1/6; .0003 and Grid Leak, 2/-; Post 2d. each. Thera guaranteed capacity, 1/3 & 2/- each; McMichael, with clips, same price as Dublier.

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K. RAYMOND

Hours of Business 9 to 8 DAILY 9 to 9 SATURDAY (LISLE STREET) 11 to 1 SUNDAY

TWO SHOPS—so you will ALWAYS find ONE OPEN

27 & 28a LISLE STREET, LEICESTER SQUARE, W.C.2

Phone: Opposite DALY'S GALLERY DOOR (BACK OF DALY'S THEATRE) BE SURE IT'S RAYMOND'S GERRARD 4637

UNSOLICITED TESTIMONIAL

382, Cranbrook Road, Hford, Essex.

Messrs. Raymond,

I am writing to let you know the wonderful change you have made in my one valve Straight set.

On Sunday evening (with 210 working) I was successful in receiving Radio Berne, Dublin, Hamburg and Newcastle at excellent 'phone strength. All these stations had previously passed me by.

I can only say that if there is a 100 per cent. condenser on the market, yours is IT.

Harry R. Prockter.

SPECIAL OFFERS I

VARIOMETERS.—Solid Ebonite former, Ball Rotor, one-hole fixing, 300/600 metres, smooth rotation, terminal connections, wound green silk wire, 4/3. Post, 6d.

TAPPED VARIABLE COUPLER.—200/600 metres. Solid ebonite former, wound best double covered green silk wire, tapped tens and units, terminal connections, Ball Rotor Reaction, one-hole fixing, Knob & Dial. A lovely instrument, 8/11 post, 6d. Also with 5XX attachment, special reaction for same, 12/11 post, 6d.

DUPEX VARIOMETER, (series parallel). Best ebonite former, wound double green silk, grooved stator, Ball rotor coupling, 3XX or B.I.C. by turning small knob. A very high-class and efficient article, 7/11, post 6d. Extension handle to fit any knob, nickel fittings, 1/-.

COMBINED LEAD-IN TUBE and Lightning Switch, with indication tablet to earth. "to set," 12 in. 2/-.

FINESTONE LOW LOSS COILS.—35, 1/6; 50, 1/9; 75, 2/-; 100, 2/8; 150, 2/9; 200, 3/6; 250, 3/9; 300, 4/-; Post 3d. each.

2-WAY COIL HOLDERS.—Ebonite base (nickel or brass), extension handles, very compact, 2/-.

PANEL COIL HOLDER.—To mount coils at the back of panel. Only knob and dial seen above panel, holder has reaction side movement. Beautiful little article, 2/6, post, 3d.

"NEWY" 4-POINT CONDENSER.—Zero Loss, Lowest Min. cap. 360 in. geared control. Sq. law tuning. .001, 20/-; .0005, 17/6; .0003, 15/-.

NEWY 2-WAY VERNIER COIL HOLDER. Fine adjustment Bakelite with oxidation. Heavy coils will not drop. 5/6. Post 6d.

CLEARTRON VALVES C.O.B. 12/6

Phi. v. 3, anode 30-120 C.T.15 12/6

Phi. v. 1, 8, 0.15 amps, anode 30-120 12/6

KAY-RAY VARIABLE CONDENSERS

"DE LUXE" LOW LOSS MODEL. SQUARE LAW With Vernier. . . . 12/6

.001 8/11 .001 7/6

.0005 7/11 .0005 5/11

.0003 7/6 .0003 5/6

High-grade Ebonite ends, one-hole fixing, knob and dial.

ORMOND.

Square Law Low Loss, Ebonite or Skeleton ends. .001 10/6, .0005 9/6, .0003 9/- Above with vernier 1/6 each less no vernier).

IGRANIC. .0003 . . 21/- .0005 . . 24/-

POLAR STOCKIST.

Crystal 1/6

Detector 3/6

Bobbin Rheostats 5/6

Junior .0003 5/6

Junior .0003 5/6

Coil Unit 7/6

2-way CV 6/6

TO WIRELESS GOODS MANUFACTURERS AND MERCHANTS, EXPERIMENTERS, Etc.

By Order of the Liquidator. Without Reserve.

13, HIGH HOLBORN, W.C.1

HENRY J. SHAW is instructed to sell BY AUCTION WITHOUT RESERVE, ON THURSDAY, FEBRUARY 18th, at 11-30 prompt, the Complete Stock of a Wireless Goods Factor, including 200 POLAR RADIOPHONE 7, 3 & 2-Valve Sets in Chippendale, Jacobean, and Globe Wernicke Cabinets, Polar L.F. & H.F. Amplifiers, 120 POLAR BLOK Crystal Sets, Combined Crystal and Valve Sets, and 1, 2, 3, 4, 5-Valve Sets, 40 ELWELL Portable Sets, ELWELL ARISTOPHONE 1, 2, & 4-Valve Sets, ELWELL Loud Speakers, 500 POLAR CAM VERNIER Coil Holders (3 and 2-way), 3,000 POLAR UNIVERSAL 2-way Coil Holders, 500 DUBILIER Fixed Condensers, 500 prs. POLAR Headphones, 80 prs. Gambroco Headphones, B.T.H. Headphones, 100 IGRANIC TRANSFORMERS, 300 Holderstats, 150 Lissenstats, 400 POLAR Variable Condensers, 50 ELWELL VARIOMETERS, ELWELL Rectifying Units, ELWELL H.F. Transformers, ELWELL H.F. & L.F. Tuning Units, 22 MAGNAVOX Loud Speakers, WESTERN Electric Loud Speakers, POLAR BLOK Cabinets, fittings and parts, POLAR BLOK large assortment of small accessories, 4,000 Coils of Aerial, 200 Coils of Flexible, Large Quantities of Lead-in and Connecting Flex and Insulated Wire, 300 New 2, 4 & 6 Volt Accumulators. On view day previous and morning of sale. Catalogues from the Auctioneer: 85, Newington Causeway, S.E. 1. Phone: Hop 3802.

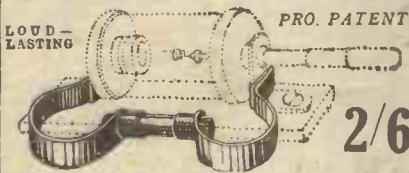
REPAIRS SETS PHONES TRANSFORMERS

Officially Approved by Radio Association.
ALL WORK GUARANTEED—LOWEST RATES—24 HOUR SERVICE
JOHN W. MILLER, 68, Farringdon St., E.C.4.
Phone: Central 1950.

EASY PAYMENTS.

LOUD SPEAKERS. Any make. Your selection. Amplion, Brown, Spartz, Sterling, etc. Quarter deposit. Balance six monthly payments.
Accumulators, Headphones and parts, similar terms. Send a list of the parts you are requiring and we will forward you a quotation on the hire purchase system.
H. W. HOLMES, 29, Foley Street, Great Portland Street, W.1. Phone: Museum 1414

"Leave the Catswhisker alone." THE KLIP-ON PERMANENT DETECTOR

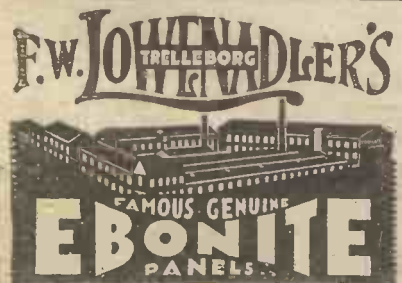


Can be pushed on your present detector, as illustrated, in two seconds, and will ensure loud reception without further trouble. It is unaffected by vibration of any sort. All metal parts, including phosphor bronze springs, silver-plated.
From all Dealers, or direct from
PARTRIDGES, Ltd., 140, Northwood St., Birmingham

CABINETS SOLID 3" OAK

American style, with baseboards, Carr. Paid.
10 x 8. 10/6 12 x 10. 11/6 14 x 12. 13/6
16 x 8. 13/6 20 x 8. 16/6 20 x 12. 17/6
CULBICO, 25, PAPER ST., LONDON, E.C.1.

WHEN replying to advertisements please mention "Popular Wireless and Wireless Review" to ensure prompt attention. THANKS!



CORRESPONDENCE.

(Continued from page 1324)

My great cause of complaint against the B.B.C. is that they have rendered it so difficult to receive other stations, foreign or English, as I like to listen to the talks from Eiffel Tower, Radio-Paris, etc., when "tuneful music" is being broadcast from 2 L.O.

Yours faithfully,

OSBERT A. CAYLEY.
33, Kenilworth Road, Ealing, W.5.

OSCILLATING CRYSTAL EXPERIMENTS.

To the Editor, POPULAR WIRELESS.
Dear Sir,—It may interest you to know that I have constructed a receiving set consisting of one permanent crystal detector and fourteen oscillating crystal amplifiers. The whole set is run off the electric cells that actuate the front door bell, and the reception has been remarkable.

European stations can only be endured when the loud speaker is tightly muffled in a blanket; New Zealand comes in so powerfully that a headphone laid on the sound-box of the gramophone fills the room.

My most outstanding success, however, was obtained when accidentally tuning in an afternoon concert from Peru. The windows were shattered, and a large crowd assembled round the house, wondering and delighted at the volume of music that was apparently coming from massed bands within.

I shall be delighted to supply you with any further particulars.

Yours truly,
HENRY FERGUSSON.

42, Studley Road, Harrogate.

THE DX UNIDYNE 2-VALVER.

The Editor POPULAR WIRELESS
Dear Sir,—Having made this receiver, no doubt you will be interested to hear about my results.

Receiver was roughly assembled and put in for test on the 8th Inst., using U.C. 4 valves, and was coupled to a 2-stage L.F. (H.T.) amplifier, so that results could be compared with those of my H.T. DX receiver, (1 v 2).

The following stations were received at good loud-speaker strength: Cardiff, London, Union Radio-Madrid, Manchester, Bournemouth, Dublin, Hamburg, and Toulouse. The strength of these stations was equal to that of the 1 v 2 H.T. receiver, but I must emphasise that the signals were exceptionally clear from the Unidyne, most notably the speech from Hamburg. (This station's announcer is, in my opinion, equal to H. W. Arlin, late of K D K A.) So much for the "Local" stations.

At 1.45 a.m. on the 9th Inst., I gave the receiver a trial on reception from U.S.A. WBZ was badly heterodyned; K D K A's carrier picked up very clearly but nothing resolved; WPG weak music heard but fading bad.

Changing over to the H.T. 1 v 2, I found results on WBZ the same; K D K A's carrier just audible, and WPG's carrier audible, but nothing resolved. These tests were carried out on 'phones and reception was undoubtedly very bad, but it will be seen that the Unidyne was the better receiver.

At 3 p.m. on Sunday I picked up very clear concert and orchestral music from Radio-Berne, and it was quite audible from the loud speaker; speech in this case was also exceptionally clear, the announcements being given by a lady.

As regards control, reaction was found to be critical though perfectly smooth in action. The grid coil proved handy for final adjustments, and could be well likened to a remier reaction control. Slight capacity effects were noticed on the condensers during the U.S. trial, but no vernier attachments are fitted to the condensers used.

The lay-out of the receiver is of my own design—similar to the American style—valves on platforms or shelves behind panel and coil holder on baseboard. The circuit is, of course, the same as given on page 793 of "P.W." No. 181.

It is hoped that a better report will be given on DX reception when conditions improve. I shall rely on this receiver during the transatlantic tests, as I feel confident that if there is anything to be picked up from across the "Pond" this will be the receiver to get it.

Yours very truly,
EDWARD TAPLEE.

Ivy Dene, 97, Seymour Road,
Gloucester.

THE "P.W." ULTRA CRYSTAL SET.

The Editor, POPULAR WIRELESS.
Dear Sir,—Am writing to thank you for printing the "Main Station and 5 X X Ultra Crystal Set." I have tested a large number of circuits, but have not had one to give such good results, also easy change-over from main stations to 5 X X.

I have received 2 L O (65 miles), 5 X X (80 miles), also two French stations (call signs I was not able to hear); the first two stations on three pairs of 'phones quite comfortably. Only alteration to circuit was I used a 150 basket coil I had by me instead of two 75-turn coils in series.

Thanking you for all the valuable information I have received from POPULAR WIRELESS.

Yours truly,
S. I. DYER.
(A Regular Reader since No. 1).

Ark Farm, Wheetstead,
Bury St. Edmunds.

SHORT-WAVE RECEPTION.

The Editor, POPULAR WIRELESS,
Dear Sir,—I should like to thank you for publishing details of Mr. Simmond's short-wave set.

The following results were obtained on a set made following 2 O D's instructions, and using home-made variable condensers.

I logged the first station on the 13th December, 1925, and since then have logged 125 stations.

These include 52 British amateurs, the most important being 2 O D, 2 N M, 5 N J, 6 T B, and 2 W J. All were on telephony, except the first.

K D K A and W G Y on 63 and 41.9 metres respectively were tuned in easily on the single valve, as well as W I R, W Q O, W I Z, I A X A and four others.

South African A 4 L and A 6 N have also been logged on the two valves.

The remainder of the stations received came from nearly every country in Europe including Spain and Italy, Norway and Sweden.

I congratulate you for obtaining the exclusive articles of such experienced amateurs as 2 O D and 2 N M, but could I make a suggestion which I think would be welcomed by many experimenters? Could you not arrange to have a special short-wave corner every week, in which should be included news of the progress of the more important short-wave amateurs together with letters of readers' results and experiences on their sets? Q R A's could also be provided.

This is all very useful for serious short-wave experimenters.

Hoping the above will interest you. I remain,
Yours faithfully, E. J. LEWIS.

37, Pathfield Road, Streatham Common,
London, S.W.

THE ONE-VALVE UNIDYNE.

The Editor, POPULAR WIRELESS.
Dear Sir,—It is with pleasure I write you this letter on results obtained with the 1926 one-valve Unidyne, as described in POPULAR WIRELESS.

Using a P.M.G. single-wire outdoor aerial, I obtain:
2 L O on loud speaker, fair strength.
Bournemouth on 'phones, fair strength.
Newcastle on 'phones, fair strength.
Darenty on 'phones, loud strength.
Birmingham on 'phones, fair strength.
Radio-Toulouse on 'phones, loud strength.
Radio-Paris on 'phones, loud strength.

All these stations can be received after careful tuning and patience.

Have any readers constructed the "Super" set, which works a loud speaker without the need for valves or batteries?

Wishing POPULAR WIRELESS and Readers a happy and progressive year.

Yours faithfully,
H. A. BRACEY.
Factory Square,
Streatham, S.W.10.

"P.W." REFLEX SET.

The Editor, POPULAR WIRELESS.
Dear Sir,—I feel I must write and tell you what a fine circuit the "P.W." Reflex is. I have made up the one-valve reflex and added one stage of L.F. The set has never given me any trouble, although I find it necessary to keep the H.T. to the maximum for the particular valve. My aerial, although outdoors, is little better than an indoor one, being entirely surrounded by houses twice as high as the aerial.

I am receiving 2 L O on the loud speaker with excellent purity at a strength which is far too loud for a medium-sized room. I can also receive all B.B.C. stations on the 'phones, Bournemouth, Madrid, and several other foreign stations at loud-speaker strength. Dull or bright emitters work equally well in the set, and I can recommend this set even to the novice with every confidence.

Congratulations and best wishes for 1926.
Yours faithfully,
R. NOBLE.
123, Alderney Street,
Pimlico, London, S.W.1.

THE STRAIGHT THREE-VALVER.

The Editor, POPULAR WIRELESS.
Dear Sir,—I have great pleasure in writing to tell you what a success I have found a "Straight Three-Valver," as designed by Mr. K. D. Rogers, in your issue of "P.W." for Nov. 25th, 1925.

I have constructed other receivers from various designs on sale, but up to the present have not found one to beat the Three-valver.

I can get both Bournemouth and Darenty on the small loud speaker quite easily, and of satisfactory strength. Thanking you for such a splendid design.
Yours truly,

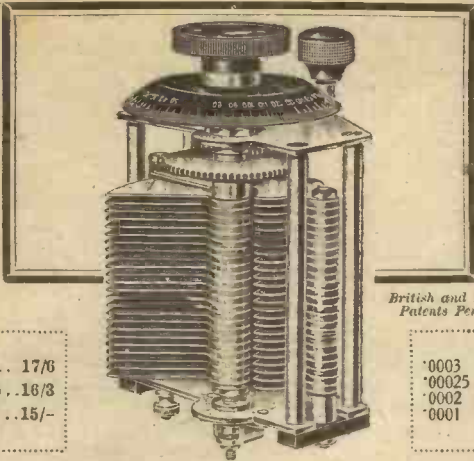
32, Kent Street, Northam,
Southampton.
E. TRAVERS.

NEXT WEEK!

Another 2/- Gift Next Week!

Four More Blue Prints given away with every copy of "P.W.," on sale Next Thursday.

Order Your Copy Now and Don't Miss this Magnificent Gift.



British and Foreign Patents Pending.

'001 .. 17/6
'00075 .. 16/3
'0005 .. 15/-

'0003 .. 13/6
'00025 .. 13/3
'0002 .. 13/-
'0001 .. 12/9

The J.B. Geared Low Loss Condenser provides micrometer tuning.

FEATURES:
A SECOND Knob is provided, by means of which the most hair-breadth adjustment may be obtained, controlling a gear having a ratio of 60-1. The gear in no way interferes with the free motion of the spindle to provide for quick searching.

WHETHER you need a precision condenser to search out distant stations, or a sharp tuning instrument to give you maximum results from local transmissions, you'll find the J.B. Geared Low Loss Condenser a revelation in real tuning efficiency.

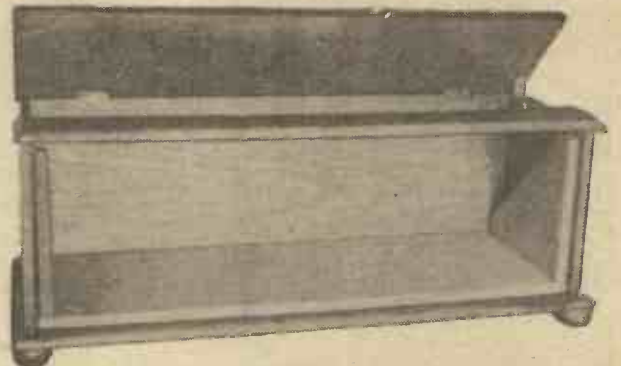
Just as the engineer's micrometer makes it possible to determine minute measurements, so the J.B. Geared Low Loss Condenser makes it possible to obtain the minute variations in capacity so essential to efficient tuning.

OBTAINABLE from all DEALERS.

JACKSON BROS.
8, POLAND ST- OXFORD ST
LONDON - W 1.
(First Floor)
Telephone:-
GERRARD 7414

CAXTON 4-VALVE CABINET

Made for Editor of Wireless Magazine for Set "As good as money can buy" described in issue February, 1925.



Cash with Order. Fumed Oak ... £1 5 0
or Real Mahogany polished ... £1 14 0

With detachable recess fitted Base Board to mount 21 in. by 7 in. panel to slide out of Cabinet front. Extra 10/- with two beaded front doors totally enclosing fitted panel.

Cabinet overall length 22½ ins. Width 8½ ins. Height 9 ins. Polished with the new enamel that gives a glass hard surface that cannot be soiled or scratched.

SENT FREE.—Catalogue of standard Wireless Cabinets in various sizes and woods. Special Cabinets made to customer's orders.

PACKED AND DELIVERED FREE IN U.K.

CAXTON WOOD TURNERY CO., Market Harborough



Where there's a child there should be cocoa

CHILDREN are brain-workers and manual workers too, and many overgrow their strength at school and play. Now Cocoa is food, and gives the children extra strength to keep pace with their growing bodies. It is the children's idea of a really delicious drink for breakfast and supper.

"Keep fit on cocoa"

BOURNVILLE
By test the best

See the name "Cadbury" on every piece of chocolate

BUY BRITISH GOODS

A GOOD L.F. TRANSFORMER at the competitive price of **7/6** Postage 3d.

If your dealer cannot supply send direct to **The H. T. C. ELECTRICAL CO., LTD.,**

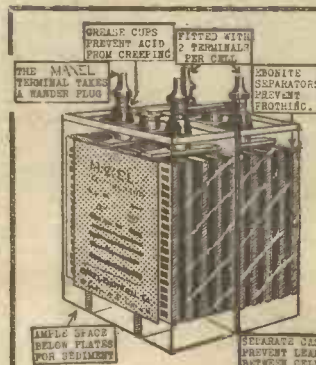
Twelve months' guarantee—money back if desired. Standard ratios 4-1.

Why buy a foreigner when we make you this offer?

Guaranteed and made by

The H. T. C. ELECTRICAL CO., LTD.,
2, Boundaries Road, BALHAM, S.W.12

Telephone: Battersea 374.



The New **MAXEL Accumulator**

Specially designed for Wireless. GUARANTEED TWELVE MONTHS! If you live too far away to call and see the Battery Mail your Order to us for the size you want. We will willingly return your money if you are disappointed. Now fitted with NON-CORROSIVE Wander-plug Terminal.

	AMPS.			
	40	60	80	110
2 VOLT ..	7/6	9/6	11/9	14/6
4 VOLT ..	15/-	19/-	22/6	28/6
6 VOLT ..	22/6	27/9	33/6	39/-

Packing 1/- extra per battery.

H.T. BATTERIES 60 VOLT 7/6 post free

MAXEL ELECTRICAL CO. 28, Clipstone Street, Great Portland Street, W.1.
Telephone: MUSEUM 708.

FOREIGN RADIO NEWS.

(Continued from page 1288.)

Short-wave Work in Germany.

A special meeting of the German section of the International Radio Amateurs Union was held at Iena on January 10th, under the presidency of Professor Esau, to draft out a programme of active short wave-length work to be done by members during the next few months.

Austria's Radio Show.

The first radio exhibition held in Austria, outside the capital, was opened at Linz on January 17th, and proved a great success.

The interest shown in this exhibition, by both the public and the authorities, is an index of the important rôle which radio now plays in public life in Austria.

For its size, Austria has the greatest number of broadcasting stations in Europe, namely, thirteen. The list is as follows: travelling across the country from West to East: Bregenz, Innsbruck, Ried, Salzburg, Villach, Linz, Wels, Klagenfurt, Sanct Polten, Vienna-Neustadt, Eisenstadt, Graz and Vienna.

GREAT NEW BOOK FOR CHILDREN.

THURSDAY, February 11th, will see the publication of Part 1 of the **CHILDREN'S COLOUR BOOK OF LANDS & PEOPLES**. With this wonderful work, containing 3,000 photographic illustrations, including 700 full-page colour plates, children will be able, in imagination, to wander at will in every corner of the world. No more superb picture book has ever been issued, and the articles have been specially written to appeal to young people. Its educational value will be of the very highest. Each fortnightly part will cost 1s. 3d.

EBONITE BUSHES

FOR MOUNTING ON WOOD. PERFECT INSULATION. Two required for each hole. Orders under 1/- send 1/4d. postage. Size of hole 4BA, 2BA, 1/4", 5/16", 3/8". Price each: 1d. 1d. 1 1/2d. 2d. 2d. DAREX RADIO CO., Standard Works, Forest Hill, S.E. 23.

The **BROWN A** at 22/6 or **A2** at 15/- are the best for use with the P.W. Paper Diaphragm, Loudspeaker, Frames, &c. Stamp for List. **GOODMANS, 68, FARRINADON STREET, E.C.4.**

SPECIAL NOTE

All communications concerning advertising in "Popular Wireless" must be sent to

JOHN H. LILE Ltd.,

4 Ludgate Circus, London, E.C.4. (Phone: CITY 7261)

and NOT to the Editorial or Publishing Offices.

LITTLE WIRELESS GADGETS.



H.T. BATTERY PLUG, NO. 73.

M.A.P. Co., 246 Gt. Lister St. Birmingham.

Liberty

PERMANENT DETECTOR

The Original One-Hole Fixing Detector Stops Fiddling with Catswhiskers

Every Liberty from tested on actual all dealers broadcasting and or direct faultily guaranteed.

Tested and Unanimously recommended by the Wireless Press



PRICE **3/6**

50% More Efficiency
50% Lower Price

The 100% DETECTOR

Refuse inferior imitations. Insist on seeing name "LIBERTY".

Fixing in panel (1-hole fixing) brackets or to existing detector terminals by 2 pieces copper wire.

THE "Liberty" Detector gives more sensitive reception Permanently than a catswhisker gives Temporarily. No hunting for that special spot lost by the slightest vibration. The "Liberty" is entirely unaffected by vibration, sensitive all over, and that loud spot cannot be lost. **EADI-ARC Electrical Co., Ltd., Bennett Street, London, W.4.**

THE 'PHONE REPAIR SERVICE

Phones Rewound and Remagnetized... 4/6
Phones Remagnetized and Readjusted... 2/-
Loud Speakers and Transformers Rewound.
Earcaps, Leads, Diaphragms. Postage extra.
The H.R.P. Co., 46, St. Mary's Road, Leyton, E.10

FINANCE. City firm, one of whose directors has some commercial and technical experience of wireless, is open to consider financial co-operation with manufacturers desiring to expand. Going concern with proved record and prospects of profitable expansion only can be considered. Confidential outline of proposals in first instance to **Thomas Day, Pinners Hall, London, E.C.**

2-VALVE AMPLIFIER, 35/-

1-valve Amplifier, 20/-, both perfect as new. Valves, 4/6 each; smart Headphones, 8/6 pair; new 4-Volt Accumulator, celluloid case, 13/-; new 66-Volt H.T. Battery, guaranteed 7/-; 2-Valve All-Station Set, 24. Approval willingly.
P. TAYLOR, 57, Studley Road, Stockwell, LONDON.

Two Remarkable Coil Plugs



Each 1/3. Postage 2d.

"The Universal" Patent Expanding Plug is a marvel of efficiency and neatness. Expanding Band quickly and firmly mounts any size coil. Perfect Low-loss reversible Plug and Socket. Adds fine finish to all Home-made Coils.

Send to-day to **Goodman, Uttley & Harris, Broad Street Chambers, Broad Street, Sheffield.**



Trade Enquiries Solicited.

THE MIRACLE 2-VALVE RECEIVING SET

is the world's greatest Wireless Bargain. Stations over 400 miles distant clearly heard on the Loud Speaker. Easy Payments. List free. **-WORLD'S WIRELESS STORES, WALLINGTON.**

EBONITE

PANELS, RODS or TUBES, in all sizes, cut while you wait. Any article in Ebonite can be quoted for. Best quality. Lowest prices.

BURGE, WARREN & RIDGLEY, LTD., 91-92, Great Saffron Hill, London, E.C.1

Makers of the B.W.R. 2-speed Vernier Coil Holder. latest improvement. Illustrated List FREE.

25/- buys the famous Dunham 2-VALVE LOUD SPEAKER RECEIVER COMPLETE

with all necessary Valves, Batteries, Telephones for long-distance stations and Brown Loud Speaker, balance payable £1 per month for 12 months.

Send two penny stamps for catalogue of 14 different sets we make, or your deposit to-day for quick delivery.

C. S. DUNHAM, Radio Eng. (Late of Marconi Sc. Inst. Co.), P.W. Catalogue Department, 234-6, Brixton Hill, London, S.W.2. Established over four years ago. Members of the B.B.C. since its inauguration.

New Wireless Control Invention.

A Dutch engineer, M. Willem Goethal, this week carried out some tests in the artillery polygone at Vincennes of his invention for radio control of an automobile.

The tests were supervised by representatives of a leading French engineering firm, and took place under conditions which ensured absolute *bona fides*. They were, however, only partially successful.

A 40 h.p. automobile, entirely empty, was manoeuvred at will by the inventor by means of his apparatus, which was installed on a public seat, so long as it was within range of about 150 yards. Beyond that, the control gradually and quickly weakened, till at a range of about 250 yards it completely failed to act.

The inventor, who is confident that he will be able to so increase the strength of his apparatus, as to overcome this grave defect, refused to give any indications as to the nature of the device beyond saying that he used what he called a "chromium cell."

Soviet Short-Wave Experiments.

The Soviet radio laboratory at Nijni Novgorod has set up an experimental station for short wave-length transmission.

Tests are at present being made with controlled waves, and a new valve invented by M. Bontch-Bruevitch, director of the laboratory, is being tried out in this connection. The prospects are that by this means it will be possible to install very powerful stations with an extensive range and using short wave-lengths.

An Original Competition.

A humorous journal, the "Merle Blanc," has inaugurated an original contest, and is offering a prize for the man who can tell the story containing the most convincing and most artistic lies.

The prize-winning story, the work of the unknown greatest liar in France, will, it is understood, be broadcast by one of the Paris radio stations.

In order to add an element of sex competition, a special prize is offered for the best lying story told by a woman.

Broadcasting Station for Antwerp.

The complaints heard for the past few months in the Antwerp district that the Brussels programmes of Radio Belgique are very badly received, although the two cities are so near each other, has now led to a movement to set up a broadcasting station in Antwerp, which will both relay the Brussels programme and issue original programmes of its own.

The new station will be under the joint control of Radio-Belgique and the Antwerp zoological society. The post will be installed in the Zoological Gardens.

French and Flemish will be used for announcements from this station.

BETTER THAN THREE



A new general purpose Valve with the wonderful "N" filament

YOU can now have the advantages of the unique "N" filament for every valve in your receiver!

The New P.M.3

1. Better than three "R" type valves because the ample proportions of the "N" filament are equivalent to three ordinary filaments.
2. Requires ONLY ONE-TENTH AMPERE filament current. A saving of over 85% of your accumulator energy giving each charge SEVEN TIMES THE LIFE.
3. Is so economical of heating power that no sign of glow can be discerned.
4. Will operate from either dry cells or accumulator. From 3 to 4 Volts may be used with perfect safety.
5. Free from all microphonic disturbances.

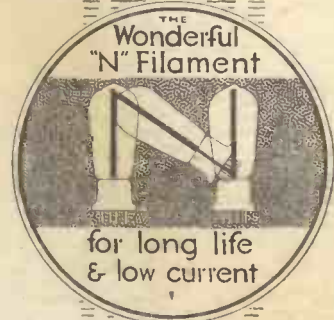
The P.M.3 16/6

Suitable for all stages of amplification in any circuit.

THE IDEAL COMBINATION for any receiver - P.M.3. valves followed by a P.M.4. for POWER AMPLIFICATION with loud speakers.

The Finest Loud Speaker Valve, the P.M.4. 22/6

GET ONE FROM YOUR RADIO DEALER.



Mullard

THE MASTER VALVE

Q The illustration shows a simple but really effective loud speaker horn—that can be covered with fancy paper or painted so as to resemble a factory article—made for a few pence by following the easy directions supplied with every 'Lissen' Loud Speaking Unit, a new Lissen product yielding results equal to the most expensive instrument on the market and sold at the record low price of **13/6**



A powerful loud speaker that costs less than headphones

Hardly credible—but true. For less than the price of a pair of 'phones you can buy the 'Lissen' Loud Speaking Unit that only needs the addition of a horn to make it a powerful, full-sized instrument, equal in volume, purity and tone to the most costly on the market.

Any good horn will do. If you have a spare one in the house from a gramophone or a loud-speaker it will serve admirably. If not, there are directions with every 'Lissen' Loud Speaking Unit and full-sized patterns, telling you how to make a simple but attractive and really efficient horn for a few pence. Or, by using

the Lissen Reed (price 1/- extra), a cone or any other diaphragm working on the reed principle can be quickly made and fitted, yielding results equal to an expensive speaker. By removing the sound-box and substituting the 'Lissen' Unit, any gramophone can instantly be converted into a loud speaker.

Make this test. Go to your nearest dealer and ask him to put on the most expensive loud speaker in his stock. Then put the same horn on the 'Lissen' Unit—keep the input voltage the same, no matter how high—and see if you can notice any difference.

Your Dealer will gladly demonstrate.

LISSEN LIMITED

Lissenium Works, 8-16, Friars Lane, Richmond, Surrey.

Phone: Richmond 2285 (4 lines).

'Grams: "Lissenium, Phone, London."



The complete Unit with 'Lissen' Reed-attached ready to receive a cone—or any other diaphragm working on the reed principle.



The 'Lissen' Reed Attachment (patent pending) Price 1/-.



Showing method of attaching Reed to the 'Lissen' Loud Speaking Unit.

All applications for Advertisement Space in POPULAR WIRELESS AND WIRELESS REVIEW to be made to JOHN H. LILE, LTD. (Sole Agents), 4, Ludgate Circus, London, E.C. 4. Phone: City 7261 (2 lines).