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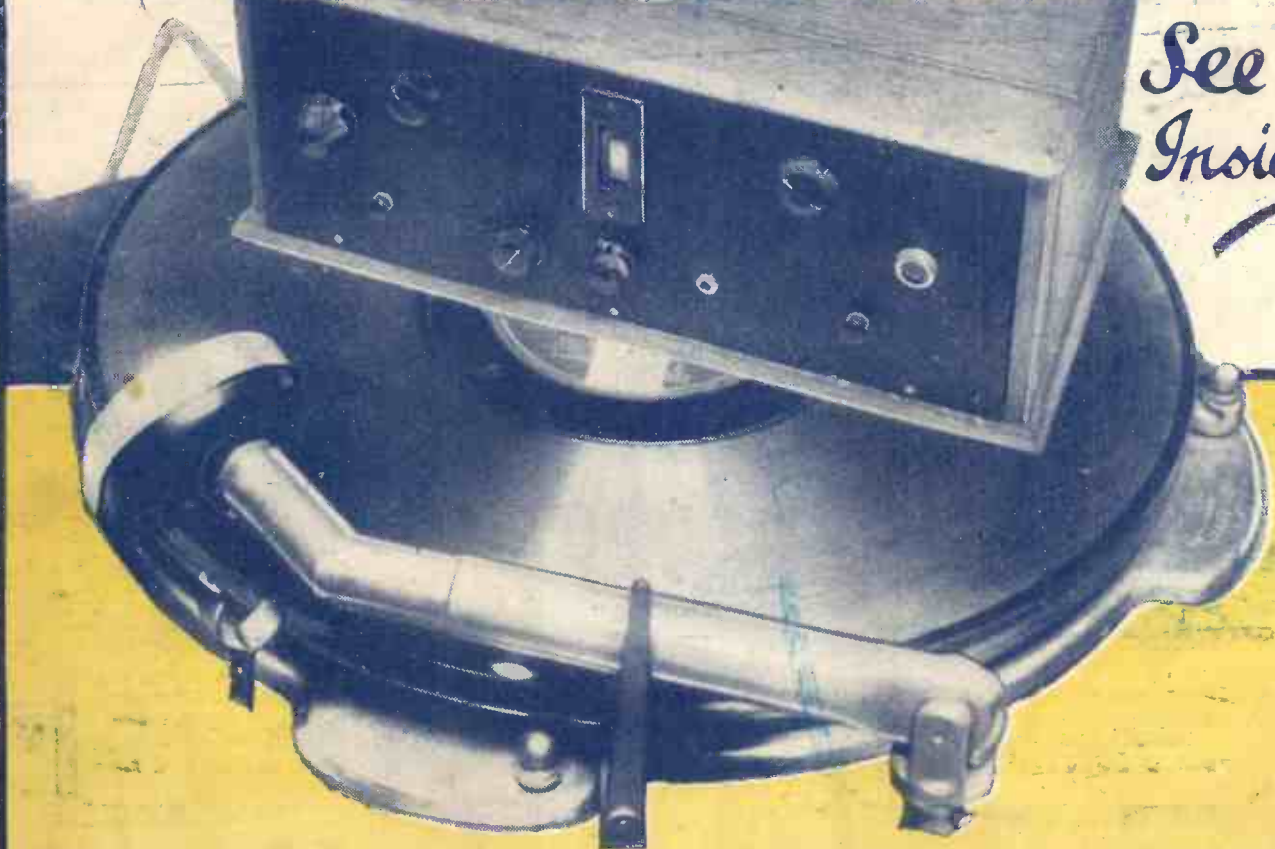
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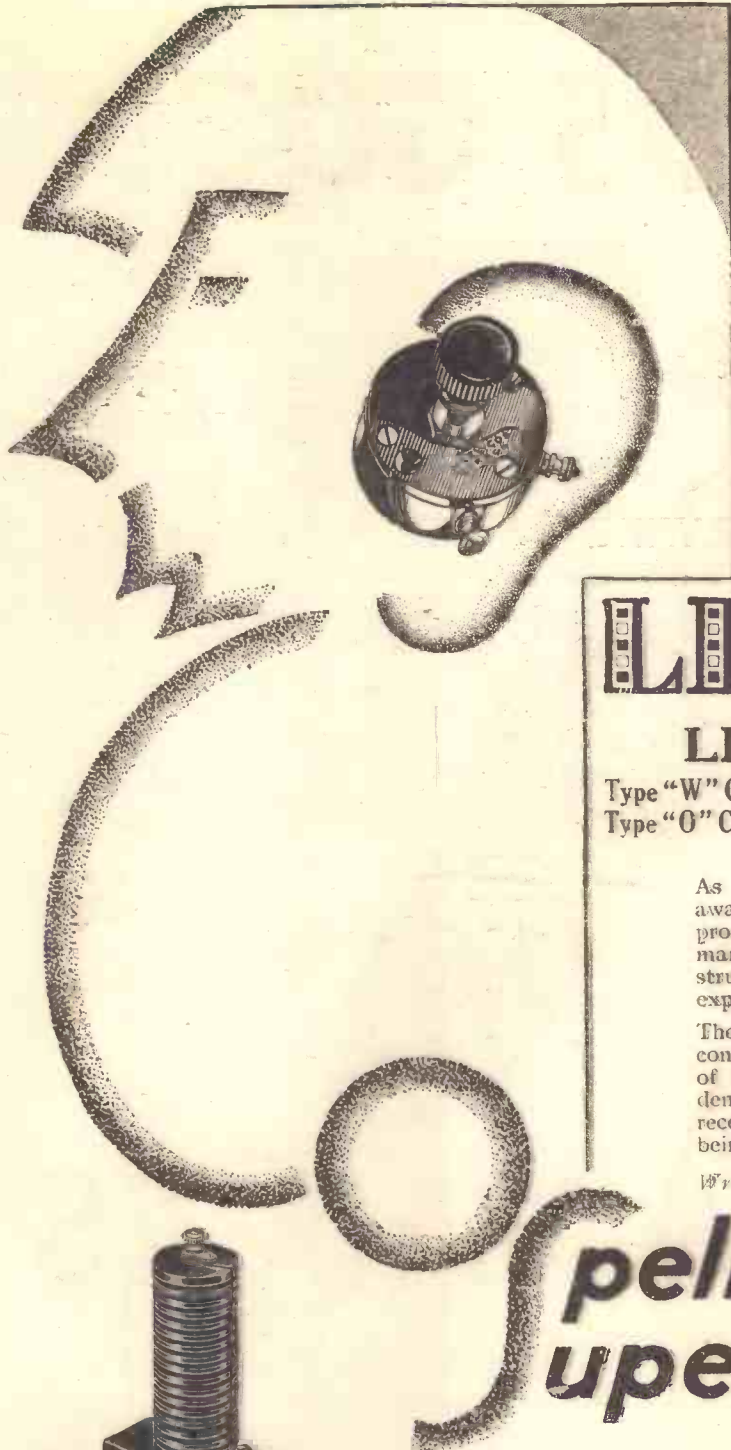
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March 7th, 1931.

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Inside*





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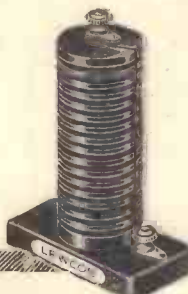
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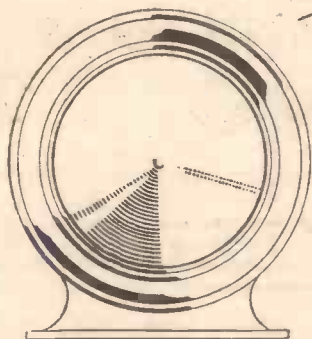
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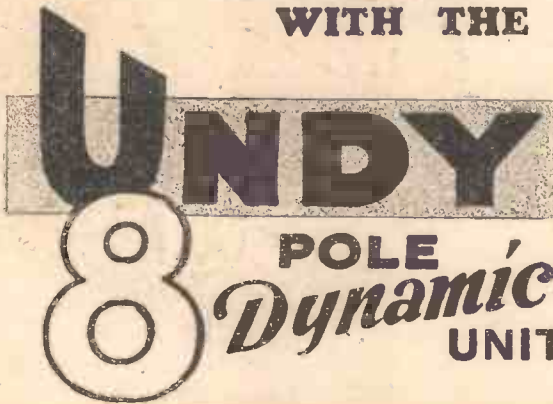
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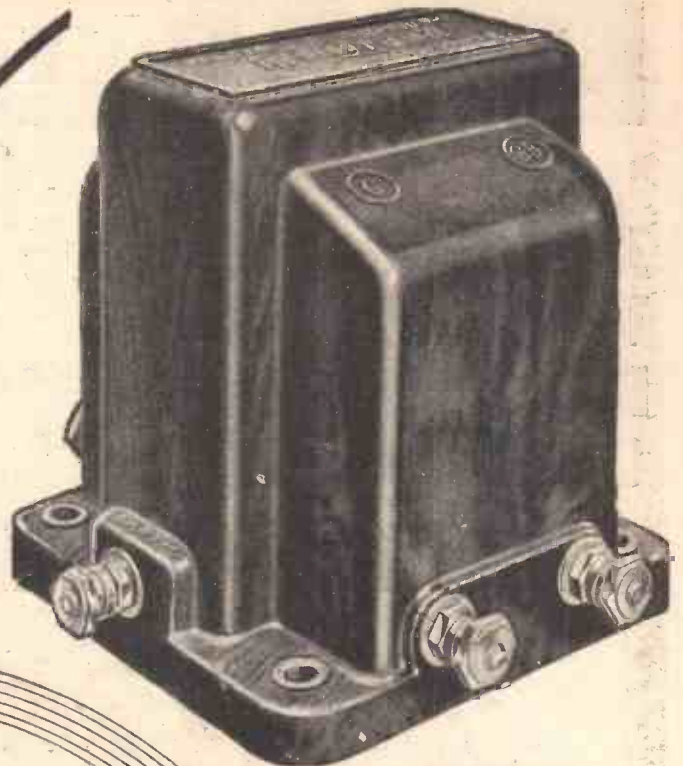
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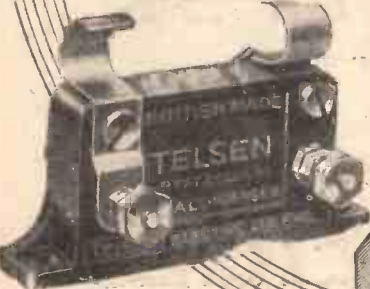
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**RADIO EXCHANGES
 PRINCE TO BROADCAST
 WELL DONE, AMATEURS
 "HOLLOW KNOCKERY"**

RADIO NOTES & NEWS

**VALVE SIX-FOOTERS
 EASTER IN MARCH!
 FRED SAYS—
 WATCH YOUR WIRING**

A Critical Confession.

I AM the last person in the world qualified to criticise the conductor's interpretation of a piece of music, and so it gradually dawned upon me recently that when I complained that the B.B.C.'s rendering of César Franck's Symphony was all wrong, I was judging it from the standard of my gramophone record of that work. Probably I should have said the record was wrong had I heard the B.B.C.'s rendering first.

As an ignoramus in musical matters I would express the wish that great composers would write their pieces as they mean them to be played, and not leave it open to musicians to monkey with the time and expression.

Radio Exchanges.

FOR good or ill the idea of distributing broadcast programmes to subscribers from a central exchange is "catching on," in spite of the little hindrances from Town Councils here and there. The first London exchange which I have heard of is at Bowes Park, N. The programmes are picked up by a master receiver and passed over trunk lines to the subscribers' houses, where simply by plugging-in their loud speakers the subscribers get their radio on tap. And the price is 1/6 per week.

Depression in U.S.A.

I AM sorry to learn that the radio trade in the States is feeling the pinch of the world's trade depression. It's not all honey to be rolling in European gold, after all, they find. In December, the Bureau of Labour Statistics reports, forty-five radio-factories decreased their staffs from 41,257 to 31,256, and the weekly wages bill in the same factories decreased from about £181,300 in November to about £128,500. Too bad! Never mind, perhaps we shall go ahead over here and thus redress the balance of trade.

From what I hear the British Industrial Fair and the Buenos Aires Exhibition ought to move things quite a bit in that direction.

Empire Radio Week.

IF the Radio Society of Great Britain had sent me the news in time I should have been able to let you know about the British Empire Radio Week in advance. However, I did not receive the notice until February 17th and the Week began on February 22nd.

I applaud the idea, which was intended

several emotional seconds. But I did not suspect that the clock over the British talking shop held any particular attraction for Americans, and I am, therefore, surprised to find in a San Francisco newspaper the statement that the most impressive broadcast of 1930 was the booming of "Big Ben." I wonder why they thought so?

STOPPING A SPEAK-EASY



For a long time the Prohibition officers of the U.S.A. had a suspicion that the rum-runners were using radio to aid them in their nefarious schemes, and finally they found the guilty station, shown above and confiscated the whole of the apparatus.

to foster friendship between radio amateurs throughout the Empire, and hope that the Week was begun and renewed many pleasant acquaintances.

"Big Ben" the "Big Noise."

I CAN well believe that to an overseas Briton, especially exiled Englishmen, the reception of "Big Ben" gives

"Are We Downhearted?"

A MIDST the gloomy threats of Chancellors and the dolorous clamour of strikes, lockouts, and choruses about "world trade depression," it bucks one up not a little to read, for instance, about the extensions which have been made to the works of the Chloride Electrical Storage Company, near Manchester, the largest battery-making plant in the British Empire.

New laboratories for analysis and research, medical and dental clinics, and inspection and other offices, are comprised in a fine new building some 1,800 sq. feet in area. *That* doesn't look like depression, anyhow!

The Prince's Next Broadcast.

IF all goes well, the Prince of Wales will open the British Exhibition at Buenos Aires on March 14th, and his speech will be "beam" broadcast to Canada and Europe by the station of "Trans-radio Internacional," the Argentine's great wireless company.

The broadcast is expected to take place at about 3 p.m. G.M.T., and the transmitter L S G will send it out on 19,900 kilocycles, and L S Y will send on 20,700 kilocycles. Perhaps, some of you may like to try for this.

Amateurs to the Rescue.

A MATEUR transmitters are not, generally speaking, beloved or encouraged by the authorities, and only when at some time of crisis they have kept the lines of communication intact do they receive acknowledgment of their work. It was Mr. F. A. Mayer, of Wickford, Essex, who during the period of confusion after the earthquake at Napier, N.Z., kept up communication with another amateur,

(Continued on next page.)

RADIO NOTES AND NEWS

(Continued from previous page.)

Mr. Mills of Hastings, N.Z. Mr. Mills' set was heaved up together with the town, but he collected the bits and re-erected them on boxes out in the open, with fires and general pandemonium all around him. A stout fella!

A Good Investment.

ONE of the soundest sixpennyworths on the bookstalls—apart from two copies of "P.W."!—is the March "Wireless Constructor." About 60 pages; ten a penny, with the illustrations thrown in, and all inky! Victor King describes the "Paratone" Four, an all-wave set of high selectivity, simple to operate, and a treat to make. In this issue also are full instructions for making the "Brytatone" Amplifier—high-grade, inexpensive, and effective. And, besides these, there is the "Plus-Stage" One, the first of a step by step series of constructions. You'll like this number no end!

The "Hollow Knockery."

UP to the time of writing these Notes, the B.B.C. has given no sign that it intends to adopt a more lovable interval signal. Since I last gave a collection of descriptions of this "Micky Mouse" music, the B.B.C.'s famous hollow knockery, I have seen in a contemporary another apt description—"a death tick in goloshes." Quite funny, that! As an emergency device, this diabolically monotonous "dup, dup, dup" is not half a bad wheeze, but as a permanency it is unthinkable.

Wonders Never Cease!

F. H. la T. (Market Harbour), the owner of a "Magic" Three, tells of magic. He has a crystal receiver who sits on top of his "Magic" Three. Having listened-in on his crystal, for a change, he switched on the "Magic," inadvertently leaving the aerial and earth on the crystal set. He was surprised to find that the coupling between the crystal set and the valve set was effective through two thicknesses of wood, and that whilst the polish on the top of the valve cabinet does not appear to matter, the air between the two sets does matter. Dear sir, you should read up the properties of electro-magnetic coupling. Air means *distance*; polish means nothing.

Valve Six-Footers.

K D K A is now playing with some 200-k.w. "toobs"—two, to be precise—which stand six feet high in their stockings! And before long, it is hoped, those giants will be disturbing the ether. They say that five tons of water for cooling purposes is passed through the jacket of each valve every hour. Regular Pussyfeet are they not? Well, soon there will be no credit at all in logging America; she'll be *jamming* us!

Strymgeour House!

HA! So the new B.B.C. headquarters is to be "dry." Artists will be able to get drinks there, but those drinks will be unalcoholic, and uninspiring. It was alleged in some newspapers that Mrs. Philip Snowden was at the bottom of this;

but I understand that the allegation annoyed her—though she declined to repudiate it. I can hardly believe that a decision to make "Broadcasting House" teetotal was reached because of the opinions of one of the Board of Governors.

The Stravinsky Complex.

EVER since I became interested in music I have consistently felt that of all kinds of writers those who write about music, musical performances and musical composers succeed in turning out the bilgiest bilge, those who deal with ART, meaning pictures and sculperly, coming jolly good seconds. The outburst of print about the Stravinsky stuff which has been foisted upon listeners of late has first dazzled and then sickened me. The

SHORT WAVES.

Lady in antique shop: "Can you show me something in an antique radio, circa 1921, with original cat's-whisker and crystal?"—*"Radio Digest."*

A newly married couple recently received six different wireless sets as wedding gifts.

A pessimistic correspondent says he supposes they'll decide to rent that vacant flat above his.

A case was reported in the "Evening Standard" recently of a lady who entered the room and asked her husband the time. Before he could look at his watch, the loud speaker very helpfully remarked: "The time is now twenty-seven and a half minutes past ten."

A reader from Portsmouth says he's been trying to train his loud speaker ever since, but nothing will induce it to answer his wife's questions when he comes home about 2 a.m.

"And how is your little girl getting on at her new school?"

"I've taken her away. She complained that the acoustics were so bad."—*"Sunday Pictorial."*

A correspondent writes in "London Opinion":

"Tom is experimenting with a variable grid. Don't ask me what a variable grid is. It's something to do with the flux density per square inch, and it involves thousands of intricate calculations and results in a nasty noise. But we had the nasty noise before, so we're really not much better off."

APOLOGIES TO LONGFELLOW.

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

critics have a well-defined Stravinsky complex, of the same kind as that which has, in the realm of sculpture, attacked writers who have to describe some of those mudpies of Epstein.

Stravinskyitis in Excelsis.

"HE is not so much a mathematician as a chemist of the analytical order . . ." That's a comfort. I thought that he is a composer. "The spiritual home of Stravinsky is with the strict contrapuntalists." "Stravinsky's reputation, trumpeted at us across the Channel, has vanished into sight. He is seen to be a composer with little or no musical, as opposed to technical, invention . . ." One bit in the "Spectator's" report on a recent concert sums up for me my opinion of Chamber music ravers and pretended lovers of that kind of stuff, "The snobs of the London world of music are not merely snobs. They are also unintelligent and indiscriminating."

The Magnetised Watch.

REFERRING to Captain Eckersley's reply to M. C. in our February 7th issue, S. B. P. (Clapton, N.E.) confirms that the process of demagnetising a watch is not one to be carried out at home, and adds that any watch repairer will get it done, or, if you can visit Clarkenwell, the watch material shops will oblige while one waits. My informant states that magnetisation causes the coils of the hair-spring to stick together, causing the watch to gain, because in effect the spring is shortened and therefore the balance vibrates faster.

Easter in March.

FRED EASTER, I mean, of Cincinnati, a very valued correspondent. He and Alf Mann seem to be in a conspiracy to corner short wave stations. Fred says that V K 3 M E (Melbourne) is now working every Saturday from 10.00 to 11.30 G.M.T. on 31.55 metres; that a station called Prado, at Riobamba, Ecuador, is audible between 24.00 and 05.00 G.M.T., working on 38.5 metres; and that he has heard D F A (Nauen) and X D A (Mexico) testing round about 14.00 to 16.00 G.M.T., D F A on 15.3 metres and X D A on 15.9 metres.

Fred Says—

THAT Rome on 25.4 metres comes in very well at Cincinnati, but that Rabat, Morocco, has all the European stations beaten and can be heard by him on 32.2 metres at L.S. strength when Zeesen's carrier cannot even be found. Try for Rabat on 32.2 metres on Sundays from 21.00 to 23.00 G.M.T., and from 12.30 to 15.00 on 23.8 metres. Fred has a lot of queries about unidentified stations and would like to exchange notes with short-wavers living anywhere. Address: 3353, Southside Avenue, Cincinnati, Ohio, U.S.A. Thanks, Fred! All the best!

Watch Your Wiring.

AN example of the "best way not to do it" is supplied to me by H. H., a Somerset man who has a radio department in his business. He was called in to discover why a three-valver would not work properly. Apart from the home-made antediluvian set, he found that the aerial wire ran touching down the side of the house, through a 12-inch wall, across a room, and through an 18-inch wall to a second room, where it met the "earth" wire and loud speaker cords, when all were *plaited together for another 15 feet* till they reached the set, which was situated at the point where the aerial entered the room. Got the wire in a raffle, I suppose, and just had to use it, for the L.S. was attached to a wall plug from whence ran wires 60 feet up to the fifth storey and disappeared outside the house.

"Comet"—Correspondence.

GEE WHIZ! I thought we should get a nice number of letters from "Comet" admirers, but I never visualised a G.P.O. disgorgement on the scale of Niagara Falls. And still they come!

When I've got my breath back and have sorted things out a bit, I'll be able to deal with this deluge. But this week all I can say is, "Thank you all for your kind letters. They've arrived!"

ARIEL.

COMETISING THE "MAGIC" THREE



By the "P.W." RESEARCH DEPARTMENT

THE "Flexi-Coupled" version of the "Comet" Three represents so great and important a step forward in receiver design that we believe many of our readers would welcome instructions for converting earlier types of sets to the same remarkable system.

By way of an experiment we have chosen that other wonderfully popular set, the "Magic" Three, to show how the conversion may be carried out.

We hope in this way to please the largest possible section of our readers, because there seems to be more "Magic" Threes in use than any other receiver of its type. Moreover, it can be taken as an indication of the general methods to be adopted in making the conversion in the case of other receivers of the detector and one or two L.F. type.

We are taking the 1930 "Magic" for our example, because we gather that the majority of the "Magics" now in use are of this type.

It was a definite improvement on its predecessor, of course, and so the majority of owners of the earlier model converted to the 1930 design.

Few Parts Needed.

Now to make a start. First of all, you want the following new parts: a "Star-Turn" selector coil, a compression-type condenser of .002-mfd. maximum, a "P.W." dual-range coil and a three-point on-off type wave-change switch. In making our own conversion, we decided to use the very convenient special kits of the necessary new parts which are being supplied for the purpose by Messrs. Ready Radio.

We should also like to draw the attention of our readers to Messrs. Peto-Scott's offer of excellent component suitable for "Cometising" the "Magic"—details of which will be found in our advertising columns.

If you care to assemble your own parts, remember that the important ones are the two coils, and to guard against possible

An easy-to-follow account of how the many tens of thousands of "Magic" Three owners can turn their receivers into "Comets," using our latest coils.

trouble it is wise to choose those makes which have been submitted to us for test and approval.

Selector coils of the following makes have been tested and found to be in accordance with our specification: Ready Radio, Wearite, R.I., Keystone, Goltone, Magnum, and Parex. Approved dual-range coils are

other, and in the other position all are separated.

No other action will serve the purpose, and it is most essential to see that you get a switch that gives this effect and nothing else. The actual positions, by the way, are usually obtained by pushing the switch knob inwards (long waves, all contacts separated) or pulling it outwards (medium waves, all contacts brought into connection with each other).

Switches of the proper type can be obtained in the following makes, among others: Ready Radio, Keystone, Bulgin, W.B., Wearite, Magnum, Ormond, Red Diamond.

Now to make a start on the work of conversion. Tackle the panel first, and begin by removing the .00075-mfd. "Brookmans" type condenser.

Drill a new hole half an inch below, and in this mount the selector coil. Its knob will hide the old hole fairly effectively, but if you like you can fill it up quite neatly with a little of the material shoe-makers call "heel-ball."

Panel Alterations.

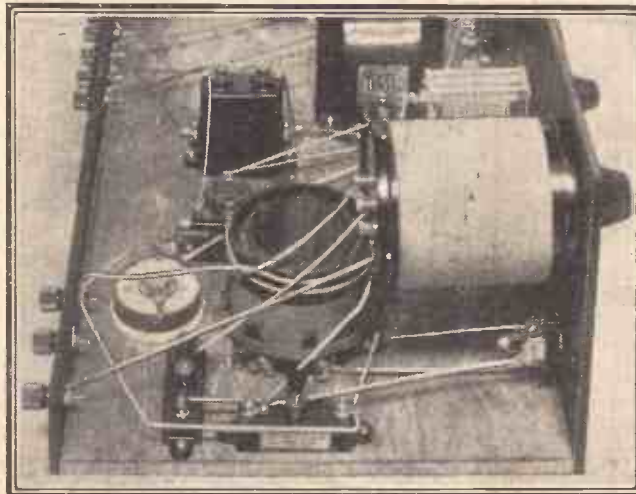
Then remove the on-off switch just below which controls the rejector circuit. In its place fix the wave-change switch, and that completes the operations on the panel.

Now turn your attention to the baseboard and remove the plug-in coil sockets, and the neutrodyne-type condenser. The coil sockets you will no longer need because you are now going to use a dual-range coil and will depend on the super-selectivity of the "Flexi-Coupling" system instead of the Brookmans Rejector.

The "neut." condenser, too, you will no longer need, because when the set has been converted it will not go down to short waves. We are assuming, you see, that the conversion will be made because you are more attracted by the convenience of wave-change switching and the super-efficiency of "Flexi-Coupling" than by short-wave work.

(Continued on next page.)

IT'S EASY TO ALTER



Here is a "Cometised" "Magic" Three, with the "P.W." Dual-Range coil in position on the baseboards, and one of the new Selector coils mounted on the panel. The additions give super selectivity and wave-change by a simple switch.

these: Ready Radio, R.I., Keystone, Formo, Tunewell, Goltone, Magnum, Parex and Wearite.

Get the Right Switch.

The correct kind of switch has three terminals or soldering tags, and this is what it should do: imagine that three wires go to the switch, one to each terminal. Then, when the switch is in one position all three wires are brought into connection with each

COMETISING THE "MAGIC" THREE

(Continued from previous page.)

It is a pity you cannot have it both ways, but to do so would complicate matters a good deal more than we imagine most people would like. Those who are really keen on short waves, however, could modify our scheme on the lines of the six-pin fitting we used in the "Interchange" Three.

Having thus cleared the decks, so to speak, proceed to mount up your dual-range coil in the position indicated in the diagram, noting where its terminals should come, and also the .002-mfd. compression-type condenser.

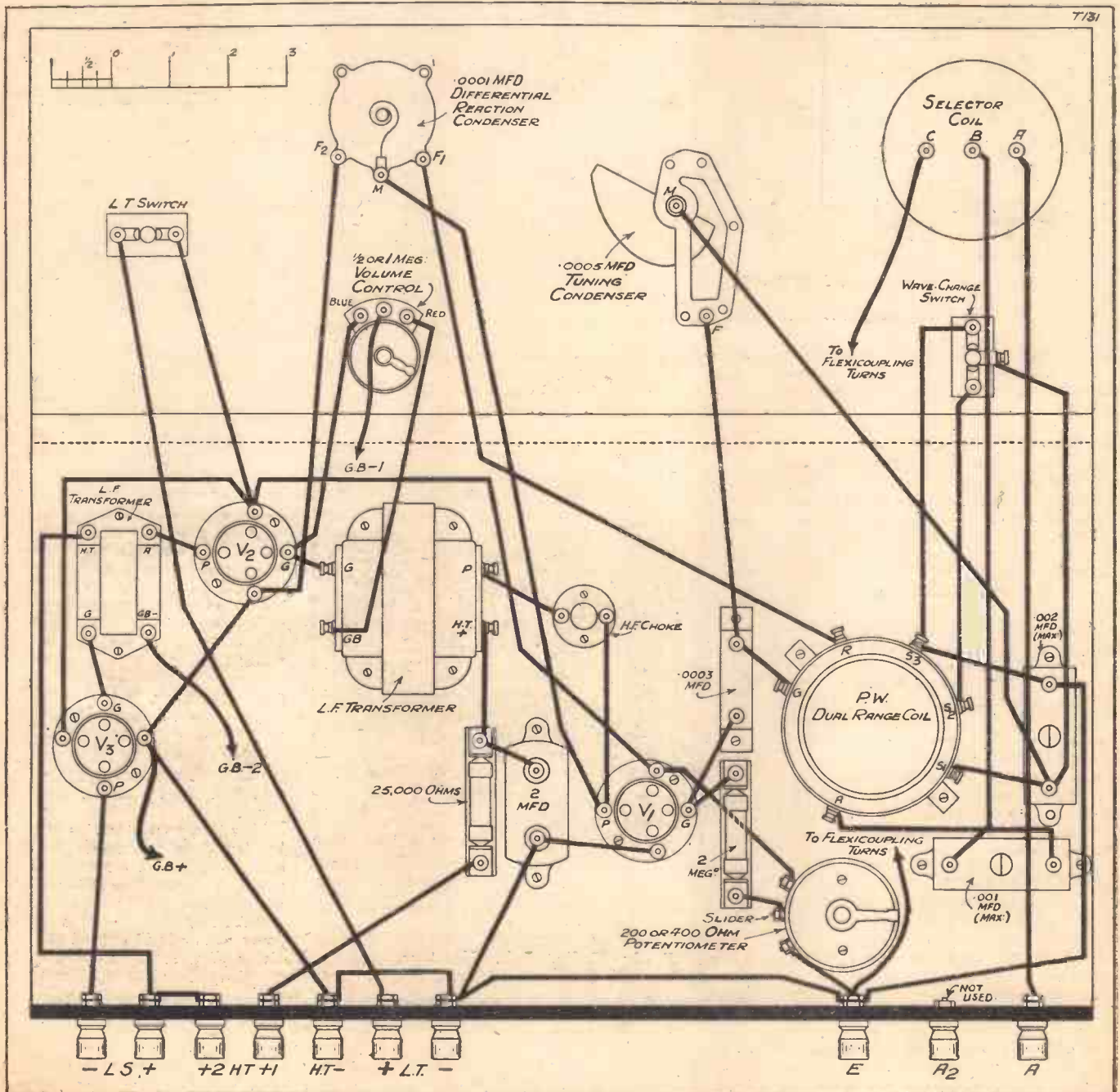
NO "TOUCHY" H.F.

An inspection of the diagram below will help you here. By the way, the receiver you see in the illustrations is not our old original one. That was dismantled some time ago, but we were fortunate enough to locate a 1930 "Magic" Three which had been built comparatively recently, and we

tried it out on this. The wiring is not perhaps up to our own laboratory standard of appearance, but it proved perfectly satisfactory in actual operation. You may perhaps be interested to see how roughly a receiver of this type may be wired up and yet work properly, provided only that good sound connections are made between the right points.

That is one of the great charms of a set of this kind, you know. There is no "touchy" H.F. stage involved, and so long as you follow the layout reasonably well, use good parts, and wire-up the right (Continued on next page.)

HOW YOUR WIRING SHOULD APPEAR WHEN ALTERED



If is important to "place" the Dual-Range Coil correctly with its terminals as shown, to facilitate short wiring. Copy this layout as closely as you can if you want the full "Comet" kick out of the set.

"COMETISING" THE "MAGIC" THREE

(Continued from previous page.)

points soundly, it doesn't matter how roughly you do it, the set is bound to work up to standard.

Now let us see about the new wiring. For

from the upper edge of the main single layer winding.

Then later, when you come to test out your converted receiver you can experiment with the actual degree of "Flexi-Coupling" and find just the right amount to suit your requirements as regards selectivity.

As Selective as You Like!

For higher selectivity, pull the flex wire turns upwards on the coil tube. For less selectivity and more volume, push them down

adapability to individual conditions is by no means the least of the special merits of "Flexi-Coupling."

By the way, there is one little point worth mentioning about the photographs which illustrate this article, after they were taken a slight further improvement was made, so the final simple wiring scheme is that shown in the large diagram on the preceding page.

Now you are ready for a proper test, in which you will discover what remarkable feats of long-distance reception and interference elimination the converted set can perform. Operating the new controls is very simple, although naturally it will take you a few moments to get the hang of them.

Make a start on the medium waves, thus: Pull wave-change knob outwards, set selector switch near the middle of its travel, and search for a station somewhere in the middle or upper part of the condenser dial, using reaction as required to find it.

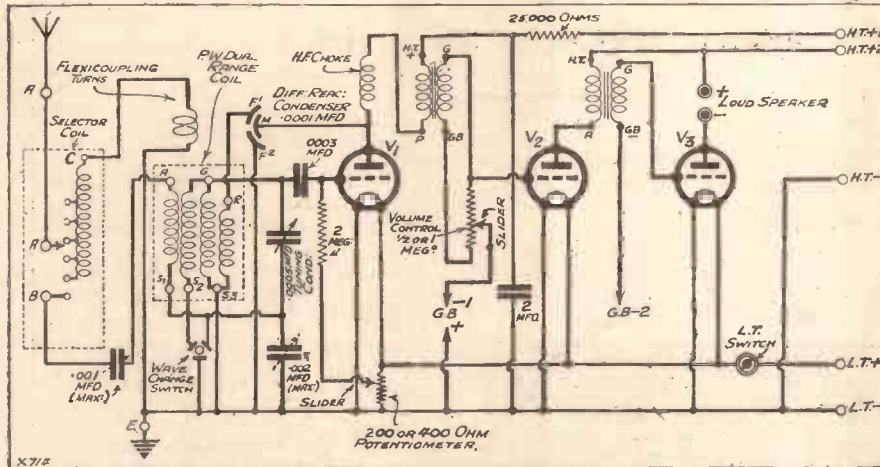
Tune it in, noticing that it is comparatively weak. Now adjust the selector to the stud giving the best volume, re-adjust reaction, and up will come the volume in an amazing fashion and interference will disappear.

For Long Waves.

All very simple, and you can tune in station after station in this way. Just find it first on the condenser dial, then adjust the selector for best volume.

To go over to long waves, turn the selector knob right round as far as it will go in a clockwise direction, i.e. to the right, and push the wave-change switch inwards. Set the .001-mfd. compression condenser to maximum, and adjust the .002-mfd. one for the best results, re-tuning to pick up your test station again each time. For greater selectivity (on long waves only)

THE CIRCUIT OF THE "COMETISED" "MAGIC"



For those who like to see the circuit here are the complete connections.

a start, remove all the leads which were left with one free end in the air by the removal of the old parts which are no longer wanted.

"Tick 'Em Off!"

That done, take the wiring diagram reproduced on another page of this article and compare it carefully, lead by lead, with what is left of the wiring in the receiver. When you find a wire in the set which agrees with the wiring diagram, tick off the corresponding line on the diagram. When you find a lead which does not agree, remove it.

When this process is completed (and it should be checked over carefully) you will be left with a partially wired receiver and a diagram on which ticked-off lines denote leads correctly in place. Now go ahead and insert all those leads shown on the diagram, but not actually in the set, i.e. just complete your wiring in the usual way.

The only part of the wiring which could not be shown clearly on the diagram is the important, "Flexi-Coupling" device, and this we must describe, although it is really very simple indeed.

Flexi-Coupling Connections.

Take a length of single rubber-covered flexible wire of the kind often used for battery leads, not the very thick sort sold for aerial leads. Bare the ends and grip one of them under the "C" terminal of the Selector Coil.

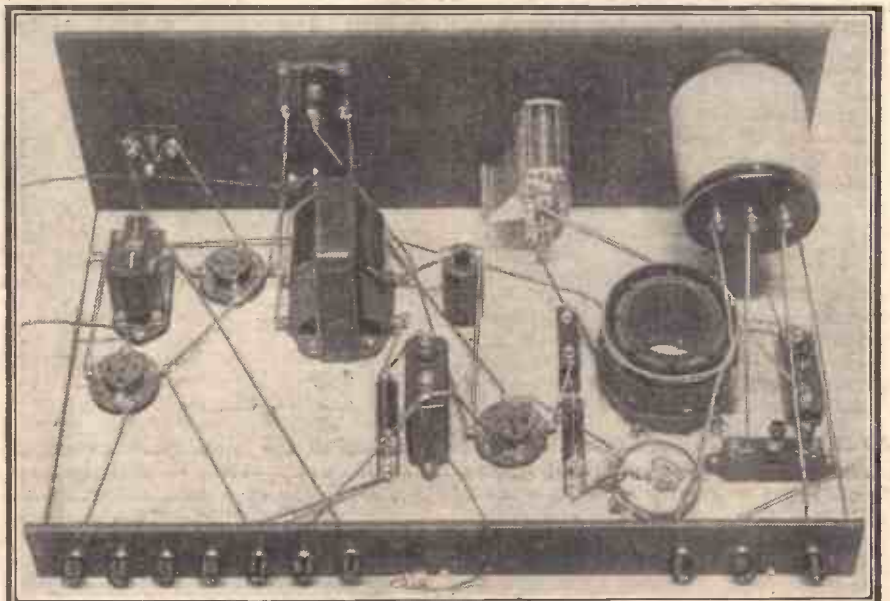
Now wind the flex twice round the dual-range coil, pulling it tight so that it will stay in place. Leave an end long enough to reach to the shank of the earth terminal of the set, and secure the bared end under the nut thereof as shown in the photographs.

Locate the "Flexi-Coupling" turns on the upper (unused) portion of the outer tube of the dual-range coil, about 1/4 in. away

actually over the main single-layer winding.

Again, for higher selectivity still, try a single turn of "Flexi-Coupling," or for less selectivity and greater volume, experiment with three turns in various positions, and so on, until you find just the amount

WITH THE NEW COILS IN POSITION



You will see that there is plenty of room for the coils. It won't take long to carry out the alterations, nor to convince you that a "Cometised" "Magic" is hot stuff!

of coupling which suits your conditions.

It all depends on how near you are to your local station and what conditions are like generally, but it is a simple matter to make these little tests. It is an interesting one, too, and you will find that this remarkable

unscrew the .001-mfd. condenser a little.

Those are all the instructions you need, and if you carry them out carefully we don't think there will be much doubt about you, being pleased with the effects of the conversion to "Comet" lines!

WHAT THEY DID AT SEMMERING

A review of the recent International Broadcasting Conference.

By THE EDITOR.

THE Semmering Conference, which concluded the other day, resulted in very little of immediate value to listeners who find Continental interference going from bad to worse. The Conference elaborated proposals to be utilised by governments in their reconsideration of the Radio Telegraph Convention of Washington (1927), which is to be revised at Madrid in 1932.

These proposals dealt with questions concerning the redistribution of wavelengths to the various wireless services and the introduction of stricter rules for the operation of various services, and a better use of the latest available technical improvements in radio science and engineering.

Government Backing Needed.

We forecast some weeks ago that little would be done at Semmering to deal at once with the present state of chaos in the ether, and perhaps the Conference cannot be blamed. After all, what is the use of making traffic regulations if they are not accepted and scrupulously obeyed?

In this country we drive on the left-hand side of the road; all obey that law. But if one taxi or 'bus-driver decided to drive against oncoming traffic and nobody had power to prevent him, the futility of the regulation would soon be apparent, providing the rebel driver lived long enough!

And so with radio: available ether channels are limited for broadcasting, and consequently strict control of their use is absolutely essential. Government authority must be obtained by the individual delegates to the Madrid Conference, otherwise their deliberations will be a mere waste of time.

The delegates at the Semmering Conference did at least one practical and useful thing: they arranged to carry out a series of tests during the next few months in which members of the union in fifteen European countries will undertake to measure the field strength at which some thirty of the principal European broadcasting stations are received in their countries, it being hoped by these experiments to obtain information which will lead to a solution of the problems of interference created by the ever-increasing power and number of broadcasting stations.

The B.B.C. Tests.

For this very important work the technical material at the Brussels checking station is to be extended and brought completely up to date.

As a result of these tests it is expected that some very valuable data will be collected for evidential purposes at the Madrid meeting.

The delegates at Semmering also studied various problems concerning the use of international telephone lines for the relaying of programmes from long distances, and appointed representatives for the forthcoming meetings of the International Consultative Committee for Long Distance

Telephony, which will take place in London and Prague shortly.

The situation with regard to political broadcasts becomes more and more tangled, and at the same time more and more stupid.

The postponement of the Mosley-Percy debate was bad enough, but when the B.B.C. refused Mr. Churchill permission to broadcast his views on India, on the ground that only Party heads are allowed to use the microphone, and then only that Party heads reply, the situation becomes farcical.

Spoon-fed Listeners.

It appears we may be trusted to listen to more or less "arranged" debates on

Liberty of speech has always been one of the most cherished privileges of a citizen of this country, and the namby-pamby policy which results in the B.B.C. refusing a man like Mr. Churchill the opportunity of broadcasting his views on a very important subject is a flagrant example of the spirit of restriction of liberty which permeates the country in these post-war days.

"Dora" is supposed to be more or less dead, but it would seem that "her" ghost still haunts Savoy Hill and Westminster.

Dora's Ghost.

Mr. Churchill's views on India may or may not be correct, but to assume that he must not be allowed to broadcast them because he is not a Party chief and, if he were, that another Party chief must be available to broadcast a reply, is to assume that listeners cannot listen to political speeches of importance because of a lack of reasonable fair-mindedness and discrimination.

You might just as well make it a rule that a "red" orator in Hyde Park must not "spout" unless there is also present at the time to give a back answer speakers of Conservative or Liberal or Socialist persuasion.

Too Treacly.

Many of the so-called political debates we have been graciously allowed to hear via Savoy Hill have been so syrup-like that it is a wonder the microphone, as well as listeners, did not have a bilious attack; and that is one of the reasons why the removal of this ban on vigorous people who have the courage of sincere convictions, would be so welcome to listeners.

We want some real red-blooded debates and political broadcasts in place of the treacly pabulum which

so far has been all that has been allowed to agitate the diaphragm of the B.B.C.'s "mike."

If listeners are to be fed only on wishy-washy stuff, the next generation stands a good chance of growing up anæmically-minded, and we are sure the B.B.C. wouldn't want that to happen.

THE POPE'S VOICE IN LONDON.



Worshippers at the Westminster Cathedral recently listened to the voice of the Pope, speaking from the Vatican Station, by means of the loudspeakers fitted in the Cathedral.

political matters of interest when the subject matter is fairly innocuous, but when a man like Mr. Churchill, who has very definite views on one of the burning questions of the hour, wants to explain his views to the public, he can only do so in the House of Commons, on public platforms, or via the medium of a newspaper article.

His views, whether right or wrong, must not be broadcast because of some petty-fogging rule about "Party heads." Obviously, listeners are being deprived of a good deal of meaty and interesting broadcast talk because the three political parties are all jealous—and scared—of each other when it comes to using the microphone, and because the B.B.C. sits on the fence and hasn't the pluck to stand up for its rights and the rights of its clients.

Fond of Good Music?

THE MARCH
MODERN WIRELESS
is a
SPECIAL RADIOGRAM NUMBER.

DON'T MISS IT!

One Shilling. Now On Sale.



TALKIES and YOUR RADIO

All about an inexpensive "snag-free" Home Talkie that, if you desire, can be used in conjunction with your radio, or which can take its place as a separate and alternative form of entertainment.

By G. V. DOWDING, Associate I.E.E.

AMONG the most uncannily fascinating things you could ever imagine are Home Talkies; miniatures of the real thing enacted before you in the peace and comfort of your own home.

The screens usually used measure about 4 ft. by 3 ft., and the pictures are every bit as bright and clear as those projected on professional silver screens. And, curiously enough, one does not find it unnatural that the necessarily smaller figures retain normal speech characteristics. As a matter of fact, it is true to say that the dramatic value is enhanced by this. I don't know why, but it certainly is.

American Enthusiasm.

As might have been expected, America is the first country really to succumb to the home talkie. Over there this new form of home entertainment is sweeping the country, and leaders of the cinematograph industry have expressed their firm convictions that it will inevitably assume an importance equal almost to that of broadcasting. Already at least six well-known manufacturing corporations are turning machines out on mass-production lines.

I view all this with a certain amount of satisfaction for it is no exaggeration to claim that my own "Radioscope" was the seed out of which all these developments have grown. There may be some readers of "P.W." who have concluded that the "Radioscope" has died the death of many other inventions. But that is far, very far from being the case.

But I'll tell you exactly what has happened. I invented and patented the "Radioscope" Home Talkie two or three years ago. Those of you who remember it will have gathered that it was a method of electrically coupling an ordinary small cinema projector (such as can be bought for six or seven pounds) to any ordinary gramophone—electric or mechanical.

All Over the World.

The "Radioscope" worked excellently, and among those who saw it demonstrated and gave it liberal praise were Capt. P. P. Eckersley and Dr. Roberts. Dr. Roberts, indeed, was so confident of the idea that he undertook its commercial development.

And as the months passed, Dr. Roberts became more enthusiastic.

He kept on improving it until it completely left off being a Dowding Home Talkie

and grew into a Roberts Home Talkie. There is nothing left of my original invention except the spirit of the bare idea—the coupling of sound and speech through existing simple apparatus!

Dr. Roberts has, of course, spent a large amount of money in the development of the scheme, and there are now no less than six issued patents on it (as well as several others in process) for this country alone. Issued patents have also been granted in

practically every other country in the world, including the U.S.A., Canada, Australia, New Zealand, India, South Africa, Spain, France, Germany, Italy, Holland and Belgium.

Free From Snags.

As you can no doubt guess, quite a fair proportion of the two years I have referred to have been spent in the preparation and pursuance of all these patents.

And Dr. Roberts has received numerous applications for manufacturing licences from all parts of the world.

Now before I discuss the actual apparatus I must mention that Dr. Roberts is conservative, and has a penchant for locating minute snags—snags many of us would hardly bother about, but which he will spend hours on endeavouring to remove.

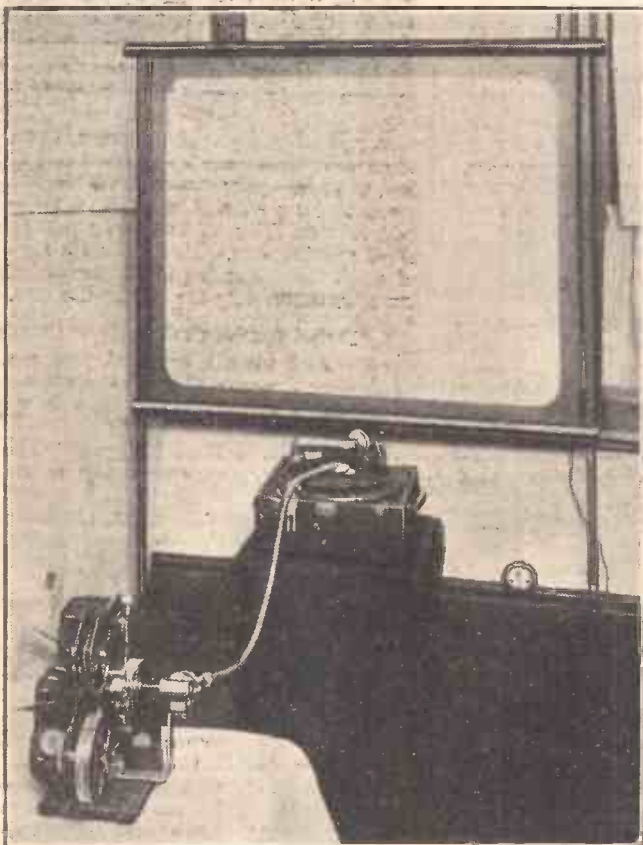
And in the development of a scheme such as his Home Talkie such characteristics are invaluable.

Unrivalled.

There is plenty of practical proof of his enthusiasm, scientific knowledge, wide experience and powers of concentration in his wonderful little device. Though I say so to the detriment of my own invention, I consider it the ultimate in simplicity and technical efficiency. I can visualise nothing that could possibly rival it.

But I'll tell you all about it, and you will then be able to see for yourselves what this

WONDERFULLY FLEXIBLE SYSTEM



Here you see the complete home talkie outfit. An ordinary small portable gramophone can be used and will give astonishingly realistic results. Or you can use a pick-up and have a loud speaker behind or close to the screen. In the latter case the projector and gramophone can be placed side by side and a short synchronising link used, as illustrated in a photo on the next page.

(Continued on next page.)

TALKIES AND YOUR RADIO

(Continued from previous page.)

thing is that causes me to writhe at the comparative clumsiness of my original arrangement!

In the first place, I must point out that the several other systems of Home Talkies in existence comprise moderately complicated outfits, generally consisting of combined radio-gram projectors in expensive cabinets and ranging in price around about one hundred guineas. And there is invariably a turntable driven by the projector itself with a consequent great liability for the speed to vary, and that means disagreeable fluctuations in tone.

Simplest, But Best.

But the new invention (I can call it that, for it has only just reached its present stage of complete perfection) comprises an entirely new principle and involves a simple form of mechanical synchronising for coupling any ordinary home projector with any ordinary gramophone, from the simplest mechanical type to the most expensive of the electricals.

But although it is undoubtedly the simplest Home Talkie in the world, no other one can give better results, and there are few, if any, to equal it. This is all totally irrespective of its price.

The pictures are, in fact, as good as those which the projector can give, and the tone and clearness of the speech and music equally represent the optimum of which the gramophone is capable. Nothing at all is lost at either side; actually, there is often a gain due to the speed stabilising effects of

the synchroniser. This is particularly noticeable when a cheap, portable gramophone is used.

The synchroniser which will, I suppose, cost absurdly little to buy, for it is the perfect mass-production job, is a flexible coupling that will be available in various lengths. There will be short ones if you want to couple a nearby electric gramophone or long ones if you wish to couple with a gramophone placed near to, or behind the screen.

Any Projector—Any Gramophone.

At each end are the adaptors, and these enable the coupling between any little projector and gramophone in a matter of seconds. One of the main secrets is the use of a special turntable device for placing on the gramophone. The master patents cover the only practical ways of connecting to an existing gramophone. The mechanics of the thing are simplicity itself. A balancing and retarding action operates through a straightforward worm-gearing. In ordinary language that means the one end of the coupling is free to move only with the rotation of a worm. You see the idea? But in case you think the invention is one of those that are too beautifully simple to be practical, you can take it from me that some hundreds of gear wheels were cut before exactly the right pitches of threads were arrived at.

When the adaptors at each end of the link have been screwed in place, you merely have to switch on the projector, and off you go. And to stop it you switch off. There are no adjustments of speed to make—your gramophone already does that for you, and there is not the slightest possibility of the thing getting out of synchronism. You can even stop and start the apparatus in the middle of films without affecting the synchronisation.

Perfect Synchronisation.

And when I say that you can alter the speed of either the gramophone or the projector without making any difference, I know you will find it hard to believe—but it is so. Why, should you at the beginning, set the film or record only approximately, you can bring the two into synchronism while the gear is actually running.

And all this, remember, with an outfit costing but a tenth or twentieth of most of those Home Talkies that are selling widely in the United States!

I am not in a position to be able to say exactly how Dr. Roberts intends to shepherd his Home Talkie on to the market, but I do hope he won't be lured over to the United States

so that it reaches this country across the Atlantic. That would be a great pity.

He has been having it exhibited at the British Industries Fair to the amazement of the most critical technical, musical and artistic people. Many have said that the synchronisation and tone are better than are given by full-sized apparatus in London cinemas!

And all this is obtainable with gear that, given a gramophone (with or without a pick-up driven through your radio outfit) should cost less than most three-valvers.

USING AN ORDINARY PORTABLE GRAMOPHONE



This photo shows a portable gramophone synchronised with a small, inexpensive home cinema machine. Note the simplicity of the scheme. The record can be changed as quickly as in the ordinary way.

For those who don't happen to realise it, although it is estimated that over one hundred thousand home projectors are already in use in this country alone, the little projectors use non-inflammable film, and are quite automatic in operation.

You set them running and they will carry on without the slightest attention until the film is completed. You don't have to apply any technical skill, you can even go out of the room and come back later to switch off at the appropriate time. Generally, of course, you join the audience.

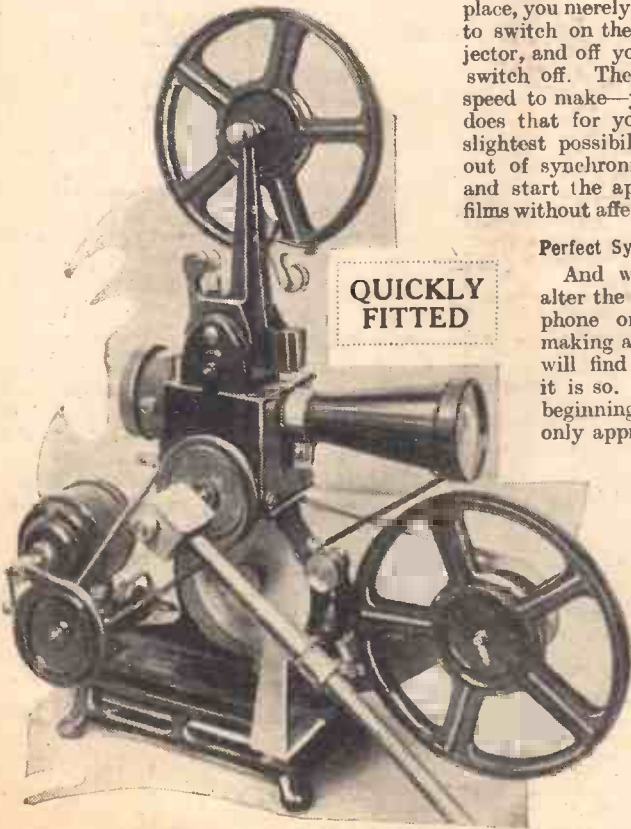
Self-Governing.

Dr. Roberts was demonstrating his Home Talkie to a few friends a little while back when he was summoned to the telephone in an adjoining room. They were greatly surprised when, with an apology, he left to attend to the call without so much as glancing at the miniature talkie drama that was in progress.

They needn't have been surprised, for there is no danger in leaving the apparatus to itself—over-running or anything else likely to cause trouble, is quite impossible.

In conclusion, I would like to make it clear that I have written this article so that "P.W." readers shall know that Dr. Roberts has brought the Home Talkie to its final stage of perfection.

It only remains for me to add that the necessary films and records will be available in due course for general circulation at prices within the reach of all.



QUICKLY FITTED

A close-up of another arrangement of the synchronising link. The device can be fitted (with the fingers) in one minute.

CAPT. ECKERSLEY'S QUERY CORNER



Some questions and answers of general radio interest that will help you in your radio reception.

SELECTIVITY AND THE S.G. VALVE—WHY LONG WAVES ARE “FLAT”—IS WIRED WIRELESS AN ADVANTAGE?—SOME STRONG OBJECTIONS.

Under the above title, week by week, our Chief Radio Consultant comments upon radio queries submitted by “P.W.” readers. Don’t address your questions to Captain Eckersley, however, a selection of those received by the Query Department in the ordinary way will be answered by him.

Selectivity and the S.G. Valve.

L. J. L. (Middlesbrough).—“It is, I believe, fairly generally admitted that selectivity with screen-grid H.F. amplification is not as high in practice as purely theoretical considerations would lead one to expect. My own experience with screen-grid valves used with circuits designed for high sensitivity is that selectivity is very inferior to that which I used to obtain with neutralised three-electrode valves.

“Could not this state of affairs be remedied to a certain extent by employing different constants in the circuits associated with screen-grid valves? For instance, why not substitute the almost universal .0005 mfd. condenser for one of .001 mfd. which are still available from a few makers?”

“The higher C/L ratio which would thus be obtained ought to improve selectivity when used in association with screen-grid valves. Is there any other objection to the expedient?”

You raise a point in your question of supreme importance and one which involves a rather long discussion of the whole theory of amplification and selectivity.

Contrary to generally accepted theory it is not so much a question of the $\frac{C}{L}$ ratio but rather of the ratio of inductance to resistance which in the first place determines the selectivity of a circuit associated or not associated with the valve.

Why Long Waves are “Flat.”

For selectivity the L/R ratio has got to be large compared with the side-band frequency. Furthermore, when a circuit is associated with a valve, and if, as in the case of a screen-grid valve, that circuit should present a very high impedance.

With a given bulk allowable for the inductance, we must aim at keeping the resistance small. This will give both selectivity and sensitivity.

Obviously the high-frequency resistance is proportional to the D.C. resistance, other things being equal, but owing to skin effect this is by no means a simple relationship. My only point in saying this is to indicate that as thick a wire as possible is desirable.

A larger condenser associates with a smaller inductance coil, and in practice this very often results in a better ratio of L/R. One of the greatest difficulties, however, is that the ratio L/R changes with frequency,

being worse at the higher frequencies if a fixed inductance is tuned by a variable condenser.

This is why selectivity on the standard design of sets is so much worse at the higher frequencies.

With regard to the circuit associated with a valve you must understand that the output of the anode circuit is proportional to the impedance in the anode circuit, if that impedance does not exceed a certain optimum value.

With a screen-grid valve and common practice, it is seldom that the closed circuit in the anode attains anything approaching

FINISHING A PANEL



The sandpaper block method of smoothing rough edges from a panel is well known, but not everybody remembers to protect the surface from the vice with newspaper, as shown.

the optimum value, and therefore the output of the valve is proportional to the impedance of that circuit, which should vary largely with frequency.

Thus a screen-grid valve should give, *per se*, a greater selectivity and a sensitivity, which changes with wave-length.

We have not, however, in this discussion dealt with the question of reaction, which with a three-electrode valve is apt to be smoother and more controllable, and will give a much better value of L/R. With a screen-grid valve reaction is apt to be described with many and potent adjectives, and very often to get coherence and good quality, magnification may be quite small compared with that which it would be theoretically.

Thus, in sum, do not worry so much about C/L, but always think in terms of L/R. It is the determining factor, both in selectivity and sensitivity.

Is Wired Wireless an Advantage?

J. M. (Bristol).—“It is, I believe, generally accepted that the relaying of broadcast programmes over long distances via landlines is detrimental to the quality of the final broadcast.

“If this is the case, would it not be possible to overcome the defects introduced by landlines by utilising what is, I believe, called ‘wired wireless’? That is to say, instead of relaying the programmes as such, sending them along the wires as modulations of an H.F. ‘carrier.’”

You must understand that the distortion incident to passing so-called low-frequencies (i.e. 50 to 6,000 or so cycles/second) over telephone land lines is partly due to the fact that the land line attenuates the higher frequencies more than the lower, and hence there is a distortion of the frequency characteristic.

This can be put right to some extent by so-called correctors, but if the land line cut-off of the high frequencies is so pronounced that none of the 18,000-19,000 (say) frequencies arrive at the far end then obviously you cannot correct.

Some Strong Objections.

The point I wish to make here is that the high frequencies get more and more cut off and may disappear altogether. Wired wireless depends upon sending relatively very high frequencies over the line.

If this can be done then wired wireless has many advantages, particularly that the width of spectrum of frequencies having to be transmitted is relatively narrow. But if these, high frequencies cannot be pushed through the line at all, then obviously wired wireless cannot be used.

With cable lines it is quite impossible to do wired wireless, with overhead lines the attenuation of the high frequencies used is very great, and frequencies represented by wave-lengths of tens of thousands of metres have to be used.

Unfortunately, the open wires pick up disturbances from high-powered long-wave wireless stations and so the use of wired wireless is not practicable for sending broadcast programmes over long distances by land lines.

LATEST BROADCASTING NEWS.

SHOULD THE AMATEURS BROADCAST ?

THOSE SUNDAY PROGRAMMES
—POLITICAL BROADCASTING
—MABEL CONSTANDUROS
—DANCE MUSIC, Etc., Etc.

THE B.B.C. is considering the vexed problem of whether a body in its position should admit and encourage the performance at the microphone of amateur artistic talent. The organisations of professional musicians have been strongly representing that there should be no admission of amateurs while the state of professionals is so precarious as it is at present. No final decision has been taken but there is a strong probability that the B.B.C. will revise its policy of general toleration to the advantage of the "pros."

Those Sunday Programmes.

After much cogitation, Savoy Hill has decided not to do very much in the direction of reforming Sunday programmes. There has been persistent agitation for changes that would involve a reversal of established policy on religion. It is gathered that things will be left very much as they are at least for this year.

"POPULAR WIRELESS" HAS AN UNRIVALLED BROADCASTING NEWS SERVICE AND IS ABLE TO PRESENT TO ITS READERS ALL WORTH-WHILE NEWS AND VIEWS REGARDING B.B.C. ACTIVITIES.

Political Broadcasting.

The incidents in connection with the proposals that Sir Oswald Mosley and Mr. Churchill should broadcast, have raised the whole subject of the limits which should be placed on politics over the British ether. The B.B.C. is not disposed to take any chances over this sort of programme material, for it is argued that its enthusiastic acceptability to the listening public is by no means certain.

Mabel Constanduros' 250th Broadcast.

Mabel Constanduros, who recently celebrated her 250th appearance before the microphone, has written a book of lyrics for a new revue entitled "Mrs. Buggins Obliges," which Gordon McConnel is producing for London Regional listeners on Friday, March 13th, and for National listeners on the following evening. Special music for the show is being written by Stanford Robinson.

Dramatic Programmes.

Among the dramatic programmes to be given in the London Studios during April are A. E. W. Mason's "The House of the Arrow," and Clemence Dane's "Will Shakespeare." Even later, at dates to be finally fixed in "the Merry Month" are John Galsworthy's "The Forest," "The Mary Celeste" by L du Garde Peach, and "Uncle's Dream," by Tehekov. G. K. Chesterton's "The Napoleon of Notting Hill," will be presented in June.

Good Friday Plans.

British stations, as usual, will close down at 10 p.m. on Good Friday evening, April 3rd, after transmitting programmes which, as Savoy Hill have said so many times, will be "appropriate to the occasion." During the evening concert "Parsifal" music will be relayed from Queen's Hall.

"A.J." Again.

"Well I'm darned!" will be said in a million homes some time next month when A. J. Alan tells his latest story over the microphone, this time about his weird experiences in a Chelsea Studio. Mr. Alan does not figure in the programmes very often—not half so frequently as some of us might wish—but he is well worth the place he always gets completely to himself.

Impressions of Famous People.

More impressions of famous people, prepared by Herbert Farjeon on



NEXT WEEK!

Read all about
**MAINS POWER FOR
YOUR
"COMET"**
also
**THE
"COMET" TWO**

—a younger brother of the famous "Comet" Three, with wonderful capabilities.

COMING SOON!
**HOW TO FIND THOSE
FOREIGNERS**
also more of our series
**AT HOME WITH
RADIO STARS.**

the lines of his recent weekly theatrical cartoons, will be given in the London studios during the next few weeks by Laurence Anderson. Among those included in the new series, the first of which is down for Monday, March 23rd, are Bernard Shaw, Ivor Novello, Matheson Lang, Martin Harvey, Henry Ainley, Leslie Henson, and George Grossmith. This should be a good series.

British Dance Music.

Those who imagine that all the really popular syncopated songs come from America will be agreeably surprised if they listen on Friday, March 20th, when several British composers will play some of their own tunes before the microphone. Among those who are expected to take part are

Noel Gay (who composed "The King's Horses," the royalties from which will bring him several thousands of pounds), Harry Pepper, Billy Milton, George Ponsford and Billy Thorburn.

"Nine-Thirty Novel-
ties" at Birmingham.

Birmingham has a great reputation among all listeners to the London and Midland Regional programmes for the high quality of its light entertainments, as produced (and quite often completely written and composed) by Mr. Charles Brewer—with the able assistance of Mr. Percy Edgar. Their series of entertainments, called "Nine-Thirty Novel-
ties," will begin on Friday, March 20th.

FOR THE LISTENER

By "PHILEMON."

Other people's views are not always very interesting, but our popular contributor certainly knocks the nail on the head more often than most critics of the broadcast programmes.

Yesterday and To-day.

SIR JAMES CRICHTON-BROWNE, whom the announcer dubbed our oldest broadcaster, with a voice so vigorous that one could scarcely believe him to be ninety years of age, and "still going strong," told us how he made a journey in his youth from Dumfries by stage-coach.

A few hours earlier, Sir Malcolm Campbell had told us how he had driven a car at the speed of 246 miles an hour on Daytona Beach. Whatever else has gone down in the world in the last sixty or seventy years, speed has certainly gone up!

The other day I came back from Plymouth to my home, about 185 miles in five and a half hours, and was frightened to death all the way! Sir Malcolm would have done it in bee-line in forty-five minutes!

Rock Bottom.

The series of gramophone records of folksongs in many lands was very interesting. These are indeed the "foundations of music."

The records were of actual peasants singing the songs—in Rumania, Czechoslovakia, and so on. One old woman of eighty had an amazingly strong voice for her age. A lot of it sounded weird stuff; but there were many lovely tunes.

I wonder why it is that so much of this primitive music is melancholy? I like the cheery ones—"Blow Away the Morning Dew" for instance.

Topical Talks.

I always switch on for the Topical Talks, even if sometimes I switch off again
(Continued on page 1211.)

AT HOME WITH RADIO STARS



An interesting and exclusive pen-picture of the greatest of English operatic bassos.

10. NORMAN ALLIN.

EXCEPT that he lacks a Mephistophelean curve to his eyebrows, a cruel tongue and a devilish sparkle of the eye which jeered at Marguerita's misfortunes, Norman Allin is as one would picture him, big, bluff, genial. That was the impression I formed before I had said even as much as "Good afternoon, Mr. Allin."

Had he not been a first-class singer, he would, I think, have made a first-class farmer. There is something wonderfully solid and substantial about him. One cannot picture him sitting on an office stool or carrying a commercial traveller's case of samples.

No, it had to be farming or singing. And since he was born with a gift for music and a voice which later developed into that splendid bass we all know and admire so well, it was inevitably singing that he adopted.

Man of Simple Tastes.

I think the greatest charm of Norman Allin's personality is the simplicity of his tastes. He lives in a quiet, unobtrusive road off Wandsworth Common, and since his profession compels him to London, he asks nothing more than that.

There is nothing loud or luxurious about his home; it is as simple, as tasteful, and as well ordered as himself. He is married, and has two small schoolgirl daughters, Jean and Kathleen.

Ordinary, you think? Of course it is. Norman Allin, with the exception of a beautiful voice, is an ordinary man, and therefore, a very human man.

He confessed to me that were it possible for him to live in the country, he would undoubtedly do so. His ambition is a country cottage, set in the midst of fields and trees and flowers. As it is, he must needs content himself with indulging in country rambles.

No Special Technique.

The lanes and by-ways of Dorking, Leith Hill, and Leatherhead know him well. He is fond, also, of travelling abroad, and only last year went for a ten-days' walking tour round Fontainebleau in company with another magically musical personality, Sir Hamilton Harty.

I asked Mr. Allin the inevitable question concerning microphone technique. I pointed out to him how great was the diversity of opinion amongst radio performers on the subject.

"As a straight singer," he told me. "I have never studied a special form of

technique for broadcasting work. I have always sung in the studios as I do on the stage or concert platform.

It seems to me, that if one has to make conscious efforts to adapt oneself to the real or unreal requirements of the microphone, one's singing can never be natural, and therefore not of the best. I sing to the microphone as if it were a live thing, a flesh and blood audience."

Supporter of National Opera.

I attach no little importance to Mr. Allin's remarks, for he is one of the oldest and most successful radio singers. He commenced broadcasting in the early Marconi House days, and for the past three or four years has done regular service at Savoy Hill.

We heard him years ago from Covent Garden when the B.B.C. first undertook the relaying of stage performances; we have heard him as a concert singer from the studios, and as a studio opera singer, in Percy Pitt's series of performances.

He was born at Ashton-under-Lyme, and as a young man did concert work in his home district. In 1916, he came to London to join Sir Thomas Beecham's Opera Company, then performing at the Aldwych. Later, he became a member of the British National Opera Company, and served on its committee until it was finally disbanded in 1929. It is only

NORMAN ALLIN



"I quite like dance music as a change."

repeating history to say that during that time he sang practically every bass part worth singing in every opera that was worth producing.

Naturally enough, Mr. Allin is a keen supporter of the National League of Opera scheme sponsored by Sir Thomas Beecham.

Mr. Allin's hobbies are a very just reflection of his personality, and speak for themselves. He reads a good deal, but has no time for fiction. He likes biographies, books of travel—I noticed a volume on the table "To Venice and Back in a Two-Seater"—Wordsworth, W. H. Davis, Hardy, and writers of the same classical style. A favourite is the immortal story of Scott's Expedition to the South Pole.

Enthusiastic Carpenter.

He indulges in gardening "a little," but like most professional people, cannot spare the time to make a regular hobby of it. Finally, he is an enthusiastic carpenter.

One room of his house is fitted up as a workshop, and there he can hammer, and chop, and saw to his heart's content. One can imagine him humming the "Anvil Chorus" from *Trovatore* to himself, and driving in a nail with each supposed clang of the anvil.

The lounge of the Allin household is faintly reminiscent of the Chinese Studio at Savoy Hill, due, I think, to a gramophone in oriental lacquer work in one corner, and a number of small oriental prints on the walls.

By the window there is a magnificent all-electric five-valve wireless set with a moving-coil speaker. Mr. Allin switched it on, and after a second or two, a familiar, husky, breathless voice spoke to us:

"This is Jack Payne speaking. Our first number this evening will be a little fox-trot entitled, 'My Baby Just Cares for Me.'"

Not a Highbrow.

I am no highbrow, but I was forced to smile. It was difficult to think of the operatic Norman Allin listening to Jack Payne. Mr. Allin smiled, too, as he answered my question: "Oh, yes. I quite like dance music as a change."

I glanced towards some autographed photos on the walls—Sir Hamilton Harty, John Barbarolli, Melba, and Sir Henry Wood. And before me was Norman Allin, England's greatest operatic bass, listening solemnly to the soft crooning of our own Jack Payne in a sentimental fox-trot:

"My babee just cares for me—ee."
Well, well.

FROM THE TECHNICAL EDITOR'S NOTE BOOK.

Tested and Found—?



KONE DOPE LOUD SPEAKER.

THE Kone Dope Company recently sent us one of their new speakers. It is of the cabinet type and rather curiously coloured in grey, but though "different" it is far from being unhandsome, rather, shall we say, it is *distinctive*. Anyway, we understand it is available in other colour schemes as well. The loud speaker incorporates a single linen diaphragm, and an "eight pole double magnet unit." The price is 45s.

It is a good little speaker, and is sensitive and has good definition. There is also quite a good amount of bass, much more than you would have expected from the price. By the way, have you noticed how there is a tendency for the bass to "lift" as with price? However, this Kone Dope speaker is certainly one that I should advise "P.W." readers whose pockets are not too well lined to go a little out of their way to hear.

NEW TUNGSRAM VALVES.

Tungsramp Electric Lamp Works have placed a new A.C. power valve in production. It is called the P430, and is designed for 4-volt A.C. working, and takes just under 3 amps.

With an impedance of 2,000 ohms it has an amplification factor of 5, thus accomplishing a mutual conductance of 2.5. The limitations of anode volts are 150 to 250. It is stated that this valve has been developed for those who need a power valve not

requiring a high anode voltage but which yet can give a good output.

It certainly does this, using the full 250 volts on the anode and with a grid bias of 30 or so volts you get all the output you need for working a large moving-coil loud speaker. That is, of course, providing the valve is given the necessary input. The samples of this latest Tungsramp sent me line up to their specification and show no signs whatever of softness, a malady that is met with not too infrequently in A.C. types. The P.430 is undoubtedly a good valve.

AN H.T. MAINS UNIT.

Whiteleys, the famous Universal Providers, of Westbourne Grove, recently sent me one of their H.T. mains units and battery chargers. It is made for Whiteleys by a

Manufacturers and traders are invited to submit radio apparatus of any kind for review purposes. All examinations and tests are carried out in the "P.W." Technical Department, with the strictest of impartiality, under the personal supervision of the Technical Editor.

We should like to point out that we prefer to receive production samples picked from stock, and that we cannot guarantee their safe return undamaged, as it is our practice thoroughly to dissect much of the gear in the course of our investigations!

And readers should note that the subsequent reports appearing on this page are intended as guides to buyers, and are therefore framed up in a readily readable manner free from technicalities unnecessary for that immediate purpose.

firm of "famous battery manufacturers," as the descriptive leaflet says, and I think I know who that famous manufacturer is.

The Whiteley unit has been specially designed to take the place of an H.T. battery in portable sets, although it will, of course, work with ordinary receivers as well. It incorporates a Westinghouse metal rectifier and is suitable for A.C. mains supplies from 200 to 250 volts. There are three H.T. positive outputs, and these give 0-90 volts (variable) 60-80 and a (maximum) of up to about 120 volts.

The price of the unit is £4 10s., and it is obtainable on an easy payment basis.

On test, we found the unit perfectly satisfactory, the smoothing being good and the separation adequate for all normal purposes. It is a neatly made article robustly constructed in a solid metal case.

PHILIPS MOVING-COIL SPEAKER.

Philips Lamps, Ltd., announce that they are now marketing, as a single unit, the new permanent magnet moving-coil speaker as fitted in the Philips type 2601 Console Receiver.

"THE MULLARD MAGAZINE."

This is a monthly periodical, issued by the Mullard Social and Athletic Club, price 3d., and it is one of the brightest and best of its kind that has come my way. It is printed on excellent paper, and the numerous photographs are a tribute alike to the photographers and printers concerned. I notice Mullard runs a very hot footer team. It nailed home one victory to the tune of 17 goals to nil!

THE "DOUBLE-TWO."

There are some of us who may tend to be a trifle amused at times by the terrific enthusiasm of Hustler, Simpson and Webb. But that their methods are effective is absolutely certain for their famous "Double Two" receiver is selling "like hot cakes."

And I must say right away that I consider the little outfit is an excellent proposition.

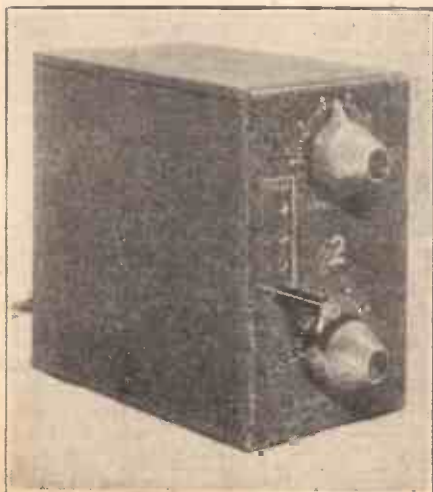
It is perfectly sound, and no one who knows how to judge a set has any right to cavil at the claims made for this particular product.

I've had a "Double Two" on test, and find it powerful and selective, and capable of giving really first-class results—results out of all proportion with its price.

In my opinion, it deserves its great success, and is an ingenious design well made up and nicely finished.

USEFUL POCKET BOOK.

The 1931 edition of the Practical Electrician's Pocket Book, which is published by Electrical Trading & Electricity, price 2s. 10d., post free, comprises some 600 pages packed with interesting and useful data relative to all aspects of practical electrical work. From the radio amateur's point of view, one of the most interesting sections is that giving power-station data for every town of importance.



This is the "Double Two" Receiver.



The interior of that interesting little proposition—the "Double Two."



12/6

The **R.I.** P.W. & M.W.
DUAL RANGE COIL

Guaranteed Faultless

Specified for best results in the "Comet" 3 and other "P.W." and "M.W." circuits.

ABSOLUTE ACCURACY

The R.I. Dual Range Coil is guaranteed to be in exact accord with the designers' specification.

INFALLIBLE TESTS—YOUR SAFEGUARD

Each coil is tested on the wavemeter and inductance bridge—also it is subjected to a final and supreme test made in a circuit specified by the authors.



THE NEW R.I. FLEXI-COUPLER

Constructors are advised to order the perfected R.I. model NOW—it will be shortly available. Like the R.I. Dual Range Coil it will be the guaranteed best job—tested to a degree of accuracy that will ensure greatest satisfaction. It is built entirely of Bakelite and embodies an engraved scale and indicator, showing the exact position of the tappings. **12/6**

BUY THE BEST—THEY COST NO MORE



SPECIFIED BY "P.W." JUSTIFIED BY RESULTS

The many testimonials from satisfied constructors of the "Comet" Three who have assembled the set with R.I. Components are the greatest justification of the recommendation of the authors of the circuit.

BUILD THE CIRCUIT WITH R.I. COMPONENTS AND MAKE A GOOD JOB OF IT.



The **HYPERMITE**

Gives the generous tone of deep bass and brilliant treble to reproduction. The most efficient transformer in existence for weight and size. Indispensable for efficiency in compact set assembly. Primary inductance **OVER 50 HENRIES** Ratio $3\frac{1}{2}$ to 1. Weight **7 ozs.** **12/6**

New G.P. **TRANSFORMER**

An improved model of the famous original G.P. Transformer, and the lowest priced transformer in existence with such a high primary inductance. Ratio $3\frac{1}{2}$ to 1. Primary inductance 35-40 henries. Weight **18 ozs.**



10/6



New **G.P. CHOKE**

For output filter smoothing or U.F. coupling (maximum D.C. 60 ma.). A small, general purpose choke for portables and other receivers where space is limited. D.C. Resistance 400 ohms. Inductance 25 henries. Maximum D.C. 30-60 milliamps. Size 2 x 2 1/2 x 2 1/2 ins. high. **12/6**

R.I. components are best yet cost no more. A copy of the latest catalogue just published will be the most valuable radio component reference you can obtain—it is free.



SENSATIONAL DISCLOSURE FOLLOWS RESEARCH ENGINEER'S DISCOVERY. LOW INSULATION OF CONDENSERS IS THE SOURCE OF POWER RUNNING TO WASTE.

Many years of patient research have been rewarded by a discovery which introduces an entirely new standard of Electrical Efficiency in Mains Condensers. It has been the aim of condenser engineers for years past to produce a condenser having a high test and working voltage, a high insulation value, and long life, at a low cost. The Formo Co are confident that their latest product will pass the most searching tests and meet with entire approval.

The new Formo condensers are a triumph of manufacturing enterprise. A newly discovered vacuum process makes leakage infinitesimal, whilst working voltages have been greatly increased—and at no additional cost!

Formo Condensers are tested by the sudden application of the test voltage, and not, as is usual, through a non-inductive series resistance. In this way the condensers receive a surge test in addition to the steady application of the test voltage.

The insulation resistance of a condenser is of paramount importance. A condenser having a low insulation value is analogous to a storage tank that leaks. The new Formo range is obtainable from all radio dealers. Fit one and get clearer, better reception.



Wonderful New High Insulation Value
OF

Cap.	Height	Width	Length	Price
1.0	2½ in.	1 in.	1 in.	2/6
2.0	2½ in.	1½ in.	1½ in.	3/3
4.0	2½ in.	1½ in.	3 in.	5/6

Full range of capacities.



**NEW-VAC
PROCESS**

MAINS CONDENSERS

Sets a standard of performance never before achieved.

Arthur Preen & Co., Ltd.
GOLDEN SQUARE, PICCADILLY CIRCUS,
LONDON, W.1.
FACTORY—CROWN WORKS, SOUTHAMPTON.

Insulation Resistance is the real guide to condenser quality.

"ARIEL" LOOKS AHEAD

(Continued from previous page)

because its manufacturers broadcast divine music. Such is human ingratitude!

No, radio advertising bulks but little in my vision of the future, and I think that it will be confined mainly to the labour market and to announcements of "sales" for the information of ladies dwelling in the suburbs and country—for I plan no striking changes in the feminine make-up during the next thousand years.

We may look forward to a 1951 in which the domestic radio set will be as familiar and indispensable a fitment as the cooking-stove. Loud speakers will be present in kitchen, dining-room, bedroom, and nursery, probably being built into the wall or ceiling; the wall switch for radio will be as familiar as that of the electric lighting and heating knobs.

The receiver will have ceased to be a thing of beauty, made to match the furniture; it will probably be accommodated near the electric meter and controlled solely by a switching arrangement operated from the kitchen.

War in the Ether.

"Mary, tell cook to switch station 4 B into the master's study and 3 C into the front bedroom!"

The most striking, inevitable and necessary development will be in connection with the means adopted for accommodating all the wave-lengths comfortably in the ether.

War in the ether, like war anywhere, settles nothing of importance, and there will positively have to be the greatest possible goodwill amongst the peoples and governments if broadcasting is to be possible in 1951. Receivers of unheard-of selectivity will be devised, the Stenode Radiostat being the pioneer.

An international board of control will sit permanently at Berne or The Hague, I suppose, for the purpose of regulating the allocation of frequencies, the percentage of modulation, the power and other vital matters.

It will operate impartially for the greatest good of the greatest number; its decisions

—RAPIDLY SPREADS—



Here you see the growth of the flaw into the body of the metal.

will be final, and offenders against its regulations will receive short shrift. This board will also act as a censoring body, and "objectionable matter" will be defined by international conference.

Eight years of broadcasting have made their mark on our minds, and most of us have had our mental horizon far extended, not only by "talks" and lectures—perhaps

least of all by these—but by the contacts which we have made with other minds, some of which were manifested in the form of music and poetry. We are all better for broadcasting; life has been made more interesting because more of its many sides have been revealed to us.

The sick, the blind, the poor and the lonely have received a miracle; the bored have received a stimulus and the insular are now delightedly aware of the great buzzing world beyond the Dover Straits. So much

THE FIRST FLAW—



Some people use single-strand wire (often 22 S.W.G. copper) for aeriels. The photos on this page show the history, in microphotographs, of a flaw in such a wire due to corrosion and mechanical strain. Above, the first real sign is shown.

in eight years! What will twenty more do for us and the coming generation?

I do not think that broadcasting is the best method of disseminating systematic educational instruction. The text book, the notebook, the midnight oil and the presence of a teacher are, in my opinion, still the best tools for acquiring book knowledge.

Therefore, I do not believe that "radio universities" will play much part in future education. But twenty years of broadcasting will show as a result a generation of broad-minded people, which I think will compensate for the fact that they will not do so much original thinking as even we do to-day.

But the race is changing and the older virtues may not be so necessary as formerly. For instance, work is good stuff; it makes a man a man and keeps him sane and healthy.

Power by Radio.

Yet unnecessary work is an evil and the apparent destiny of man is to make the forces and the properties of nature work for him, just as formerly he made his ox, his ass, and his slave. Broadcasting will give our children some of the mental equipment they require for their problems, quicker than they could dig it out of books, thus leaving them more time for the study which they must do in the sweat of their brow.

I doubt whether electrical power will be distributed by radio means in the next twenty years—or ever! Increasing attention is being given to the remote control of machinery by radio, but I suggest that telearchies have no future except for the operation of fixed plant.

I have no faith in the visions of some folk of ships and aircraft being run by power drawn from electromagnetic waves. Still less do I believe in the possibility of eliminating the guiding human element from navigation, in air or on the sea, notwithstanding the radio-controlled evolutions of H.M.S. Centurion. Even prophets ought not to be merely fantastic. The broadcasting of

odours is a fairy-tale for sensational newspaper articles.

Great advances will be made in wireless telephony and in 1951 it will be possible for you to sit in your house and speak by telephone to almost all parts of the world where there are telephone systems, to air-liners in flight, and to the sea liners as they traverse the ocean.

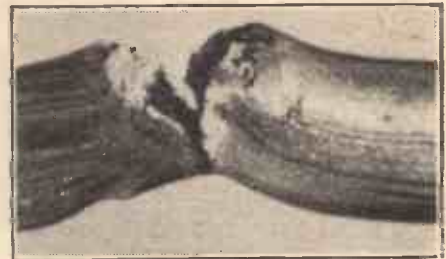
Foreign travel will no longer keep lovers apart, or debtors and creditors, or criminals and police. You may take the wings of the morning and fly to the uttermost parts of the earth—but the telephone-girl will still say, "Sorry you've been tri-r-oubled!" A ghastly prediction!

Sending Pictures.

Wireless telegraphy, the world's new toy, will reign supreme in the realm of long-distance telegraphic communications, but the Morse code will begin to go into disuse because of the more general use of facsimile transmission. It is to-day possible to send a message from London or Berlin to North or South America, in your own handwriting.

In 1951, unless I am much mistaken, your telegram will be delivered to you, not as the clerk in the local telegraph office writes it, but as your correspondent writes it. It will be sent through the ether as a picture, not painfully letter by letter as dots and dashes. Your Christmas cards will be delivered to

—AND FINALLY BREAKS!



Finally, there is left only a tiny thickness of good metal, which snaps and—your aerial is down! Moral: If you will use single-strand aerial wire, give it the once-over every now and then!

your friends, if you wish, as reproductions of one card which you will file as a message at the telegraph office.

There, I think, my forecast ends, but I will add that I expect to be as impecunious in 1951 as I generally am nowadays—and very little wiser; but I hope that I shall be still writing, hoping, and enjoying my "vittles" and drink. And the same to you!

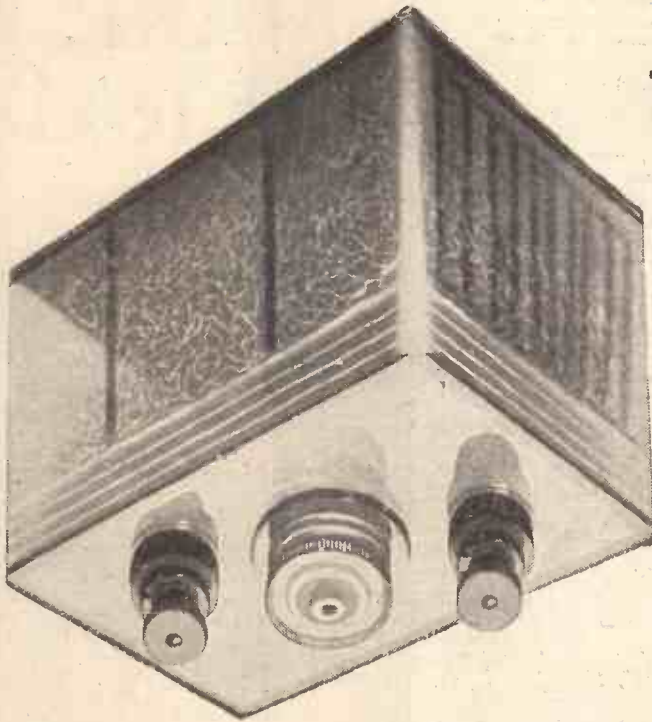
HERE AND THERE

It is about one hundred years since Faraday announced the discovery of electro-magnetic laws, the actual date being November 24th, 1831.

The first wireless message to be telegraphed across the Atlantic was transmitted on December 17th, 1902.

Although an H.F. unit can usually be added successfully to a receiver which does not employ an H.F. stage, it is not so easy to add it to an H.F. set.

When good loud-speaker reception is the object, measuring instruments for carefully checking battery voltages, etc., become virtually necessities.



THE FULLER "NON-SPILL"

puts
perfection
into
portables

The secret of the success of Fuller "Non-Spill" batteries lies in the employment of jelly acid with micro-porous plates. Every Fuller "Non-Spill" has micro-porous pasted plates. These unique plates are finer and smoother in texture than the ordinary type, but much stronger in wear. Never crumble or break down. The separators in the 'Sparta' "Non-Spill" are indestructible and there are large non-spill vents.

Fuller 'Sparta' 2-volt "Non-Spill" Accumulator for Portable Receivers, Type JAP II. Price 13/6. Capacity 22 amp. hours. Overall size $4\frac{5}{8}$ " x $3\frac{1}{16}$ " x $3\frac{1}{2}$ ". Code JEXNA. Other sizes from 11/6 upwards.

There are 15 different types in all sizes and capacities and suitable for all popular suitcase and transportable receivers. Write for List Index No. 269.

FULLER SUPER BATTERIES

Obtainable through Fuller Service Agents or any reputable dealer.

L. T. BATTERIES.

Mammoth plates for modern valves; micro-porous paste; patent double grease-cup terminals; patent non-slip metal carrying handle; L.D.G. 2v. 60 a.h. 9s. 6d.



FOR MULTI-VALVE SETS.

Accumulators for comparatively heavy discharges. Moulded glass containers. Micro-porous pasted plates. Patent double grease-cup terminals. SWG7. 30 A.H. capacity. 11/-



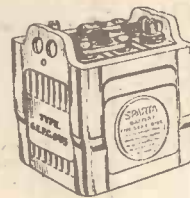
H. T. DRY BATTERIES.

The Fuller W.O.P. 100 is supreme. It gives portables the power they need — guaranteeing up to 20 milliamps, 100 volts (reads 108) 10" x 5" x 3". 15/-.



CAR BATTERIES.

Patent Rubber U Plate Protectors prevent plates touching. Patent double grease-cup terminals eliminate risk of acid creep. A type for every car. Ask for lists 104a and 105a.



THE "Comet" is still speeding on its way. Last week we advanced a step farther by showing how L.F. control could be carried out, and now, for the sake of those who would like to reproduce gramophone records electrically, we are describing the necessary alterations to enable you to turn the set into a radio-gram.

But—and this is the beauty of the remarkable set—you need not add this extra refinement if you do not want to. You can postpone its inclusion till a later date should you be so inclined, or of course, you

COMPONENTS REQUIRED.

- 1 Volume control, 1/2- or 1-meg. (Varley, or Sovereign, Igranle, R.I., Gambrell, Wearite, Magnum, etc.).
 - 1 "Single circuit open" Jack and plug (Bulgin, or Lotus, Igranle, Ormond, etc.).
 - 1 Single-pole change-over switch with small bracket for baseboard mounting and extension rod about 3 1/2 in. long (Bulgin, or Wearite, etc.).
- Flex, wire, G.B. plug, etc.

can disregard it altogether without in any way upsetting the operation of the set as a radio receiver, though you will miss a great deal by this latter.

The alterations are easy, and the wiring-up of the few extra parts required is simplicity itself. Moreover, the addition considerably increases the usefulness of this wonderful little set.

The Programme Problem.

Consider the matter before you make up your mind one way or the other. You already have a set which is capable of pulling in station after station, across miles of sea or continent. France, Germany, Scandinavia, Austria, Russia, Italy, Spain and many other countries are well within the powers of the "Comet."

In addition, the receiver will give power-

ful and pure reproduction of the local station, controllable in volume to a nicety by means of the aerial series condenser, and by the volume control which we fitted last week. So there ought to be no lack of programmes to the owner of a "Comet."

But no matter how wonderful a receiver may be, no matter how well it may fetch in foreigners, nor how pure its reproduction of the British stations, it cannot choose the items of the programme for you. There are therefore occasions when you can range round the various British alternatives and even tour the Continent without finding an item which really meets with your approval.

With a radio set pure and simple there is nothing for it but to close down, but if you have a pick-up and a radio-gram switch on the receiver, you can go to your pile of records and pick out something that will exactly suit the occasion. You have your own programme, every whit as good in reproduction as the radio programme, and exactly to your taste.

Choose Your Own.

There are many times when it is a great advantage to be able to turn to the gramophone and forget the radio set. You may look through the programme and find there is nothing particularly interesting, but you can always have entertainment if you own a radio-gram.

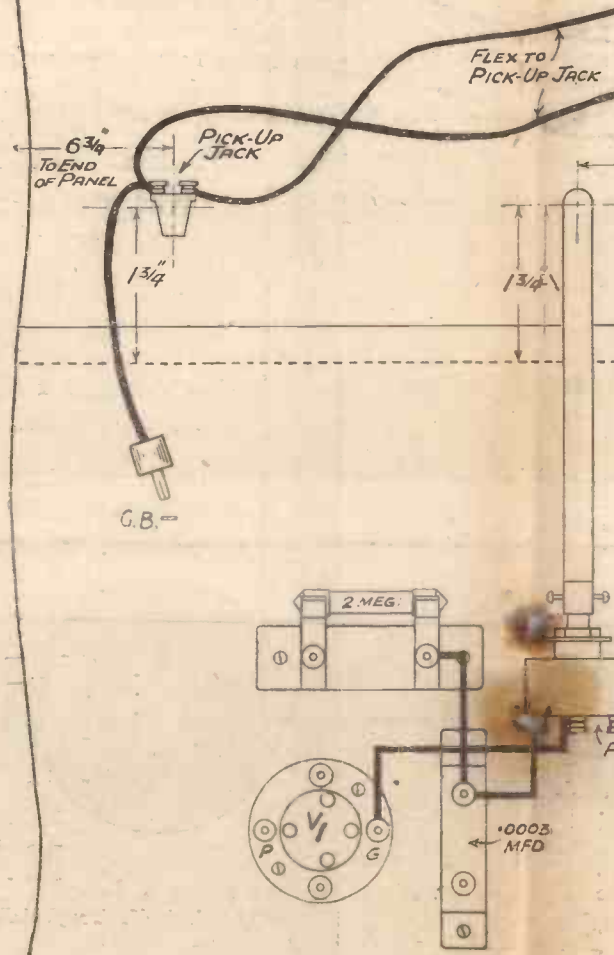
The B.B.C. and other broadcast companies cannot possibly turn out programmes guaranteed to suit everybody all the time. But you can suit yourself all the time by means of gramophone records interspersed with the radio programmes.

You may, for instance, be listening to a vaudeville programme, and after Jack Payne has given a number or Leonard Henry has had a go, you may find that an item follows that does not suit you at all. It seems a pity to break the continuity of the programme by switching off and waiting a little later for an item which appeals to you, so you turn to your gramophone

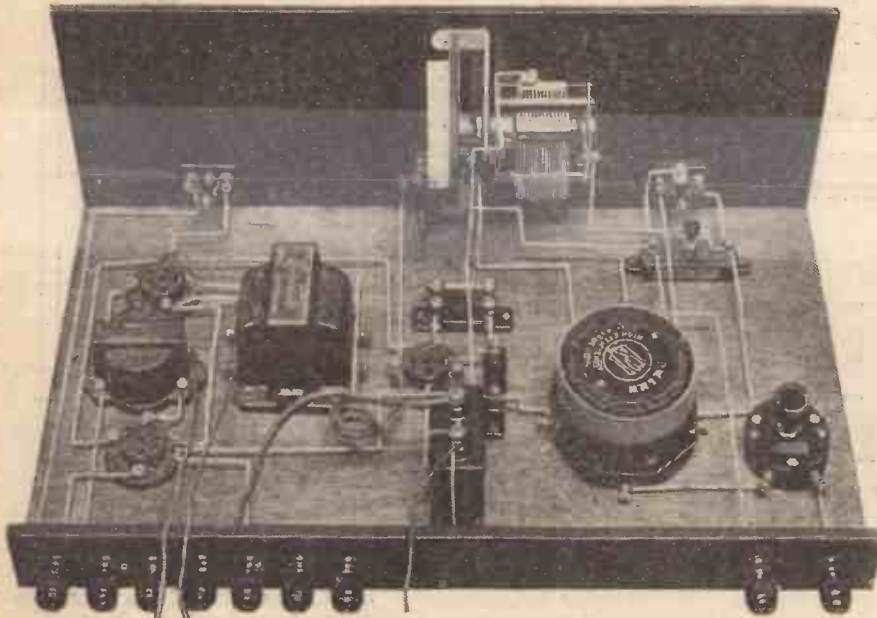
MAKE YOUR "COMET" A RADIO-GRAM

By THE "P.W." RESEARCH & CONSTRUCTION DEPARTMENT.

A further step towards perfection is made this week in the conversion of the famous "Comet" to a radio-gram receiver. This means that you can always have music of exactly the kind you want, and are not dependent on the broadcast programmes.



HOW THE "COMET" STARTED OFF—



This is the original "Comet," as described in our February 14th issue. Compare this with the deluxe version shown on the right.



records, put a couple of these on; and in this way build up a show which really does conform to your taste.

There is no doubt that the use of a pick-up adds to the usefulness of your receiver by at least 100 per cent. But you will want to know what you have got to do to enable your present "Comet" to give you electrical reproduction.

In the first place, you have got to get a pick-up. These vary in price from about £1 to £3. There are plenty of them on the market, and when you have heard two or three demonstrated you can choose the one which appeals to you most.

In addition, there is the small list of components which we give on the preceding page. The volume control, a radio-gram change-over switch, with extension handle and baseboard brackets, and a pick-up jack. Nothing in it, is there?

Very Easy to Alter.

If you look at the wiring diagram you will also see there is nothing difficult in the wiring alterations either. The volume control is mounted to the left of the tuning condenser, looking at the front of the panel, between the tuning condenser and the "Star Turn" coil. The pick-up jack is mounted to the right of the differential reaction control and the switch for changing over from radio to gramophone and vice versa, to the left of this control.

By means of the extension rod on the pick-up switch, one is enabled to get very short grid wiring. This is of very great advantage, as it enables radio-gram switching to be carried out without any loss of efficiency on the radio side, a state of affairs which is not always possible unless the switch is mounted in the fashion shown in the "Comet."

As you will see from the photographs and the wiring diagram, the switch is mounted close to the detector valve holder, and the lead which previously went from the grid leak and grid condenser to the detector valve, is broken. The grid leak and the grid condenser are still joined

together, but instead of the lead from them going to the detector valve, they go to the left-hand terminal of the switch, looking at it from the back.

Now, there are two ways in which the three terminals on this switch can be oriented so that when you look down on them from above they appear to be in a line (see wiring diagram). You will see from the switch we actually used in the original "Comet," that there are three terminals, the centre one of which is not in line with the other two. It is very much above them, and when you look at the switch from the

A WONDERFUL SET!

THE "COMET" NOW GIVES YOU

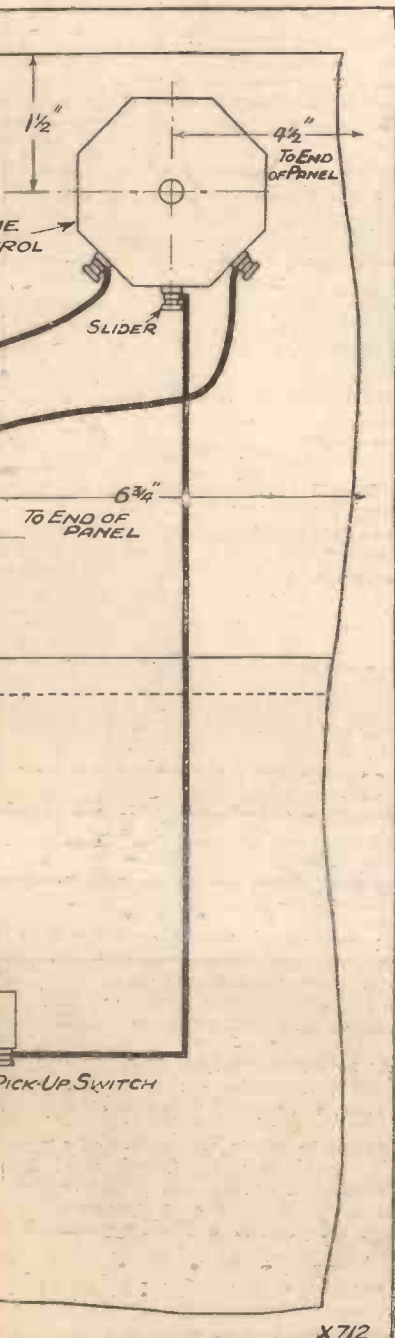
- PERFECT WAVE-CHANGING**
- SUPER-SELECTIVITY**
- ULTRA-SENSITIVITY**
- SCIENTIFIC VOLUME CONTROL**
- LOW-LOSS RADIO-GRAM SWITCHING**
- SUPERLATIVE REPRODUCTION.**

back, that is how we want you to place it, with the two terminals which form the base of a triangle, so to speak, at the bottom, and the apex of the triangle at the top.

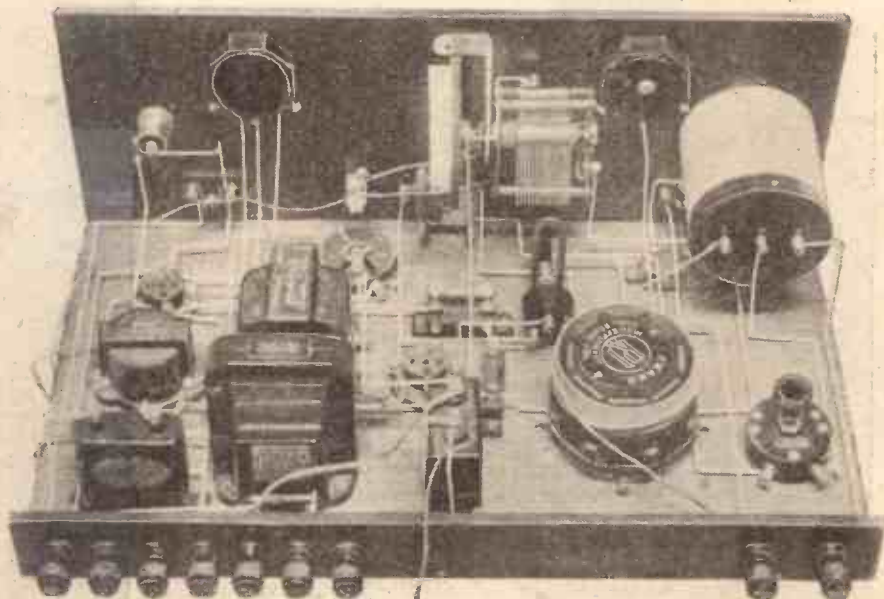
A Point About Placing.

If you place the "apex" at the bottom you will get the switch working the wrong way, and instead of turning it to the right for radio and left for gramophone, you will have to turn it to the left for radio and right for gramophone. It is a small point, but you might as well know exactly where to expect your radio programme and where the pick-up.

Reverting to the connections, therefore you wire the left-hand terminal (which is *(Continued on next page.)*)



—AND HOW IT LOOKS AT PRESENT



The latest additions to the "Comet" place this fine set still further on the road to perfection. It is a receiver that will satisfy the needs of the most exacting radio enthusiast.

MAKE YOUR "COMET" A RADIO-GRAM

(Continued from previous page.)

at the bottom) to the grid leak and grid condenser, breaking the lead which previously went to grid, and then take the grid of the valve to the top terminal—that is, the middle one looking down on them from above.

The remaining terminal goes to the slider of the volume control, as you will see from the wiring diagram.

V.C. Connections.

The volume control we will assume has been placed with its terminals at the bottom, as shown. They are connected to the two outside terminals across the pick-up jack, but you want to be careful which way round you place these leads, so that you increase volume when you turn the knob to the right, reducing it when you turn to the left.

Therefore, looking at the back of panel, the right-hand terminal of the volume control goes to the side of the pick-up jack which goes to grid bias, the left-hand terminal on the control going to the other side of the pick-up jack. The centre terminal of the volume control we have already taken to the right-hand terminal on the switch.

Preventing Overloading.

That is all there is to it. You connect your pick-up to the plug which goes in the jack, and when you want radio-gram you plug in this jack (or you can leave it plugged in all the time if you so wish it), turn the switch over to the left and play your record in the usual way. When you have finished you turn the radio-gram switch over to the right and your broadcast comes in immediately.

There is no fiddling about with tuning to be done. The volume control on the left of the tuning dial controls the initial volume applied from the pick-up to the first valve, and so you do not get overloading anywhere and the other volume control on

This is not nearly such a good scheme, for if you get a very sensitive pick-up you have a danger on particularly loud passages of overloading the detector valve. If this is overloaded then you have got no hope of stopping distortion by wangling the other

THE BRAIN OF THE BROADCASTER



A great deal of the control of Königswusterhausen is carried out in the switch-room shown above where the power control plant is situated.

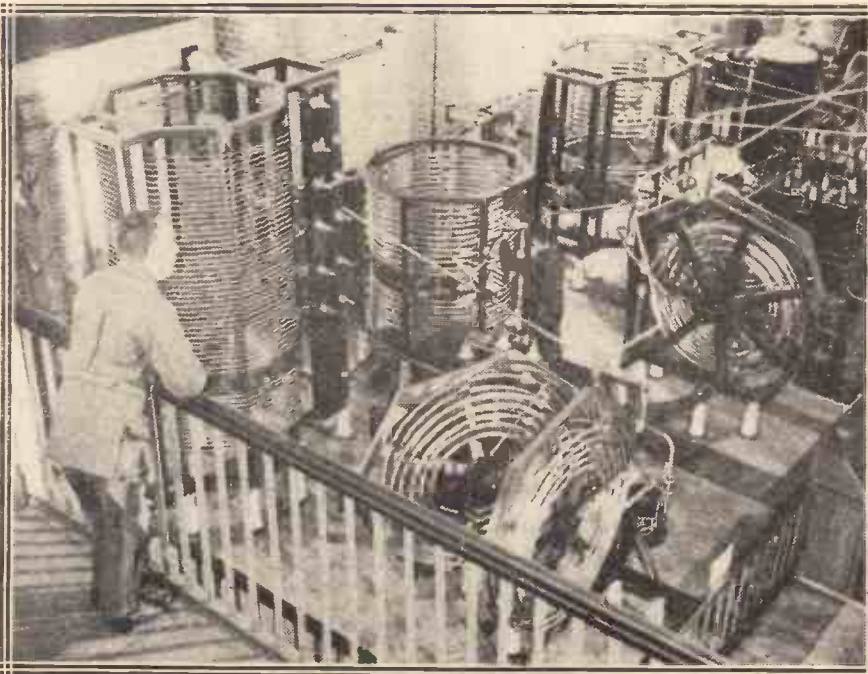
the set can be left just as it was for radio, so you will know where the adjustment is when you go back to your broadcast programme.

Very simple, isn't it? You may wonder why there are two volume controls instead of employing one only for radio and pick-up

volume control. So the control across the pick-up is really essential.

You will find operating the radio-gram "Comet" is a very simple business, and it provides a delightfully easy and efficient method of obtaining exactly the type of programme one wishes.

TUNING A GIANT TRANSMITTER



▲ corner of the huge "inductance hall" at Königswusterhausen, one of Europe's largest radio giants.

RADIO BITS & PIECES

A voltage test of an H.T. or L.T. battery when it is not delivering current to the set is apt to be very misleading, so that maintenance tests should always be done when the set is working.

In sets which do not employ differential reaction it is sometimes an advantage to connect a .0001, .0002 or .0003 condenser (fixed) between the filament and plate of the detector. Obviously it must be of good quality.

As a general rule large metal surfaces such as shields, brackets, etc., should be connected to earth, as a stability precaution.

Although dust in the grooves of a gramophone record is not always a possible cause of needle scratch it is not always a good plan to dust the record with a brush, as sometimes this electrifies the particles and strongly attracts the dust.

Although two stages of L.F. amplification can usually be worked fairly easily after a pick-up, there is often great difficulty with three stages unless these are very adequately decoupled.

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The NEW MAGNETISM

By J. C. Jevons

THOSE who have seen and heard the recent cinema film in which Sir Oliver Lodge describes the remarkable properties of the new cobalt-steel magnets will remember his characteristic comment that "magnetism is merely a word used by scientists to cloak their ignorance."

It is unfortunately only too true that we know nothing whatever of the absolute or fundamental nature either of magnetism or electricity. Luckily, however, this does not prevent us from making good use of their known properties. Nor does it discourage us from seeking for further new properties in the hope that they too can be utilised to good purpose.

The Importance of Magnetism.

Magnetism, in particular, offers a very promising field of research at the present time. For some reason there is a general tendency to regard it as a sort of "maiden aunt" among the sciences—old-fashioned and of little interest apart from its association with electricity.

Nothing could be further from the truth. In fact, at least two important developments in modern radio practice are due entirely to recent discoveries in the field of magnetism. In the first place we have the introduction of nickel-iron-cored transformers for low-frequency amplifiers, and in the second place the use of "permanent" magnets made of cobalt-steel for moving-coil loud-speakers.

The magnetic properties of iron are profoundly affected both by the presence of various "foreign" substances in the metal, and by change of temperature. Take, for instance, the difference between the magnetic behaviour of soft iron and annealed steel, which after all is only soft iron mixed with carbon and other "impurities" and subjected to a particular form of heat treatment.

Nickel-Iron Materials.

Still more remarkable are the changes that can be produced by mixing iron with different proportions of nickel or cobalt. For example nickel-steel, which contains about 25 per cent of nickel, has practically no magnetic properties at all, although both steel and nickel are normally magnetic metals.

On the other hand, simply by changing the proportions of nickel and iron, a number of different alloys can be produced which possess extraordinary magnetic permeability.

In this article you are given a fascinating insight into the modern magic of magnetic mysteries.

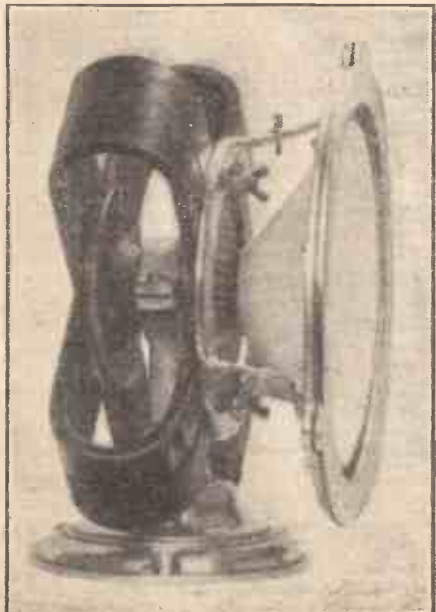
Among these the most important, for the wireless constructor, is the particular series known as Permalloy, Mumetal, etc., all of which produce an intense magnetic flux in response to a comparatively-feeble exciting-current.

The first of this series—Permalloy—was discovered some years ago by G. W. Elmer of the Bell Telephone laboratories. It consists of a mixture of four parts of nickel with one of iron, the mixture being subjected in the course of preparation to a particular and complicated process of heating and cooling.

More recently a similar combination of nickel and iron—known as Permalloy C—has been discovered which has even greater permeability. In addition, it requires a less elaborate form of heat treatment during manufacture.

The permeability of ordinary Permalloy is between six and seven times that of the

FOR SPEAKER MAGNETS



One practical result of modern research into the science of magnetism is to be seen in the special magnets employed in permanent-magnet moving-coil speakers.

best silicon steel. Roughly speaking a choke or transformer fitted with a core of Permalloy is equivalent to one three times its weight and bulk having a silicon-steel core.

This represents a considerable saving where questions of size and weight must be carefully studied, as in the case of portable and transportable sets. For instance, one well-known firm makes a transformer weighing only 7 oz. having a primary inductance as high as 50 henries, and step-up ratio of 2½ to 1.

A Few of the Advantages.

"High- μ " cores are particularly suitable for L.F. transformers, where the main object in view is to give an effective step-up in voltage.

Since fewer primary turns are required to create a given flux density in the core, the self-capacity of the windings is correspondingly reduced, and there is less tendency to by-pass the higher notes. Also since the ratio of secondary to primary windings can be increased, for a given size of transformer, a higher step-up amplification is obtainable.

Another remarkable magnetic alloy is that known as cobalt-steel, which consists of a mixture of iron with cobalt, the latter being a silver-white metal harder than either nickel or iron. The outstanding property of cobalt-steel is the power of retaining an intense magnetic flux indefinitely.

Magnets of Colossal Strength.

So strong is this field that when Sir Oliver Lodge, in his screen picture, drops a bar magnet about five inches long and as thick as his little finger down on to a second bar of similar size, the first bar rebounds and remains suspended, apparently in empty space. The force of repulsion between the two is obviously stronger than the gravitational pull on the suspended metal bar.

This intense magnetic flux is permanently fixed in the alloy. It does not "evaporate" either under mechanical vibration or with change of temperature. For this reason it is now being fitted to moving-coil speakers.

In the ordinary way it is necessary to supply from 20 to 30 watts of energy, either from a special battery or from the mains, so long as the speaker is in operation. With a cobalt-steel magnet all this is saved.

The permanent magnet is made in several sections, which are not bolted together, but are held fixedly in position by their own mutual attraction. In fact it requires a straight pull of over a ton to remove a "keeper" once it has been placed over the poles of the magnet.

STATIONS WORTH HEARING

Long-distance listening is full of charm for the man who has a good set, and here are some further notes on stations you should look out for. Now then, all you "Comet" owners, what about it? How many of the transmitters mentioned can you get?

By R. W. H.

CONDITIONS are still a little patchy, and one never quite knows what to expect until the set has been turned on and a few stations tuned in. Sometimes excellent reception on all wave-lengths is found; at others atmospherics or fading, or both cause the long-distance enthusiast to make remarks which keep the recording angel's pen busy.

To my mind it is just these rather uncertain periods which give long-distance work so much of its charm. If D.X. work were always dead easy we probably should not bother nearly so much about it, for it would become too mechanical.

Heard any Americans?

There is a great deal in the outlook of the old Greek philosopher who used deliberately to make himself ill in order to experience the profound joy of getting well again. So with wireless; there are few more enjoyable experiences than to find a really first-rate evening after a succession of indifferent or bad ones.

American reception has been below par, on the whole, owing to the presence of atmospherics. This is only a passing phase, and it will soon be better than ever it was.

Readers may find it difficult to obtain information about American stations, for even the U.S.A. wireless papers seldom publish lists nowadays; and if they do, these do not convey a great deal of information owing to the huge number of stations that they contain. A short list of the most powerful and best received stations, with their wave-lengths and output ratings may, therefore, be useful. Here they are:

WEAF	..	455 m.,	50 kw.
WLW	..	429 m.,	50 kw.
WGN	..	417 m.,	25 kw.
WJZ	..	395 m.,	50 kw.
WGY	..	380 m.,	50 kw.
WABC	..	349 m.,	50 kw.
WENR	..	345 m.,	50 kw.
KDKA	..	306 m.,	50 kw.
WBZ	..	303 m.,	15 kw.
KNY	..	286 m.,	50 kw.
WTIC	..	283 m.,	50 kw.
WTAM	..	280 m.,	50 kw.
KMOX	..	275 m.,	50 kw.
WPG	..	273 m.,	5 kw.
WRVA	..	270 m.,	5 kw.
WHAM	..	261 m.,	5 kw.
WCAU	..	256 m.,	10 kw.
KOB	..	254 m.,	20 kw.

SEVERAL interesting logs of stations heard, sent me by readers during the past week, confirm my suspicion that "all's well above 40." On the other hand, "below 40" is not as bad as it has been, and quite a lot can be bagged if one picks the right day and the right time. For promiscuous searching, however, the region "above 40" has it.

"Picking up" Boats.

A reader from Milford Haven has received some useful stations between 16 and 40 metres, including the "Bremen," and an American boat near Athens talking to Boston, Mass. He also mentions some French telephony near 27 metres. This looks to me like Saigon, Indo-China, "R. H. C." Perhaps if you hear it again you will be able to identify it.

"C. N. R." of Leeds, qualifies for the "H.A.C." Club with a very useful list of stations from all six continents. No, "C. N. R.", there is no subscription, no officers, and no meetings!

"P. G. H." and others ask whether there is a magazine on sale devoted entirely to the needs of either the fully-fledged or would-be amateur transmitter. To this I can only reply that there are "QST", the A.R.R.L. Official Organ, and "The Bulletin," the less pretentious counterpart published by the R.S.G.B. The entire contents of both journals are written by amateurs for amateurs and about amateurs, and, though

SHORT-WAVE NOTES

Here are some useful remarks on happenings down on the short waves by W. L. S., a very well-known amateur transmitter and a leading expert on the subject.

not dealing with transmission only, are practically confined to short-wave work.

In view of an extra large batch of technical queries on short-wave subjects that I have on hand, I propose shortly to deal with them in a separate article. Most of them are of really general interest, and a general airing of grievances and difficulties found by readers is sure to be helpful to others.

So for the present I will keep more to generalities.

"Local Interference."

The vexed question of mains interference, particularly on short waves, is becoming serious. I refer to the picking up of external sources of noise, normally not too severe on a battery-operated set, but appalling on a mains-driven receiver.

Presumably, one thinks, this is curable by the insertion of H.F. chokes in the mains; but is it? No, not a bit of it! One parti-

You will notice that quite low-powered stations are given for some of the shorter wave-lengths, but experience shows that these are coming over well at the moment.

In Europe conditions are not too bad, if one makes allowances for the off nights, when fading and atmospherics are a handicap. For some time D.X. men have felt that the power of Brussels No. 1 was a great deal more than the 15 kilowatts to which he has owned. It appears that he is now using the best part of 75 kilowatts, which accounts for the wonderful signal strength.

The Brussels Twins.

What a pity it is, though, that both he and his twin, Brussels No. 2, put so much generator noise out into the ether. Both these are completely reliable stations, and others which furnish genuine alternative programmes on most evenings are Langenberg, Toulouse, Frankfurt, Heilsberg, Bratislava, Rome, Stockholm, Katowice, Gothenburg and Strasbourg.

Strasbourg would be superlatively good were it not for the fact that he is going through one of those periods of fading from which stations sometimes suffer in their infancy. Let us hope that the station engineers will be able to make alterations in the aerial which will improve matters.

A Powerful "Baby."

A station well worth your attention, if you have not tried for him lately, is Munich on 533 metres, whose programmes are relayed by Nuremberg on 239 metres. In the past the relay station has generally provided the greater signal strength, but the parent station is now improving rapidly. Anyhow, you have two strings to your bow and if you cannot get the programmes from one station you should be able to receive them from the other.

cularly bad-tempered vacuum cleaner in my neighbourhood drives me to desperation when I am using an H.T. unit on the short-waver, while it is hardly audible if I shift the set away from the mains and run it from dry batteries.

A Mains Filter.

As yet the only successful cure I have found is the use of two fairly large condensers across the mains. Two 5-mfd. condensers in series with the centre-point earthed appear to be effective, although the noise is not wiped right out. Remember, though, to use condensers that will stand 200 volts A.C. Although they are in series, it is as well to be on the safe side.

Probably a scientifically-designed filter in series with the mains would help still more, but no filter of the "brute-force" type that I have tried has been more successful than the two condensers.

I have had an opportunity just lately of proving the effectiveness of some of the American methods of silencing these troubles at the "transmitting" end. To be exact, I listened on a short-wave receiver inside an American saloon car equipped with coil ignition and having the engine turning at about 800 revs. at the time.

This particular engine is equipped with a "muffler" as standard, and very efficient it is. I blench to think of the row that one would pick up inside and "undamped" car of the same-make.

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1 ReadiRad "P.W." dual-range coil ..	12 6
3 Telsen valve holders ..	3 0
1 ReadiRad .0003-mfd. fixed condenser ..	3 10
1 T.C.C. 2-mfd. condenser ..	10 10
1 ReadiRad 2-meg. grid leak and holder ..	1 4
2 L.F. Transformers: Telsen "Radiogram" ..	12 6
and Igranic "Midget" ..	10 6
1 ReadiRad 10,000-ohms spag-hetti resistance ..	1 0
1 ReadiRad 25,000-ohms spag-hetti resistance ..	1 6
1 Lewcos .001-mfd. maximum compression type adjustable condenser ..	2 6
1 Formo .002-mfd. maximum compression type adjustable condenser ..	2 3
1 ReadiRad drilled terminal strip, 18 in. x 2 in. ..	1 9
1 ReadiRad sheet of copper foil, 18 in. x 10 in. ..	1 6
9 Belling-Lee terminals Type 'R'	2 3
3 Belling-Lee G.B. plugs ..	6
1 Packet of Jifilinx, for "wiring-up" ..	2 6
	£4 5 0

Additional Components for "Comet" L.F. Control.

1 Varley 1/2 meg. Volume Control	£ s. d. 6 0
1 Atlas L.F. Choke	1 10
1 T.C.C. 2-mfd. Fixed Condenser	3 10
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1 ReadiRad 1931 "Star-Turn" Coil	s. d. 12 6
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1 Bulgin Signal Lamp (D.9)	2 6
1 Low Consumption Bulb 2, 4 or 6 volts (when ordering please state which voltage is required)	6
	18 3

Additional Components for "Comet" Radio-Gram.

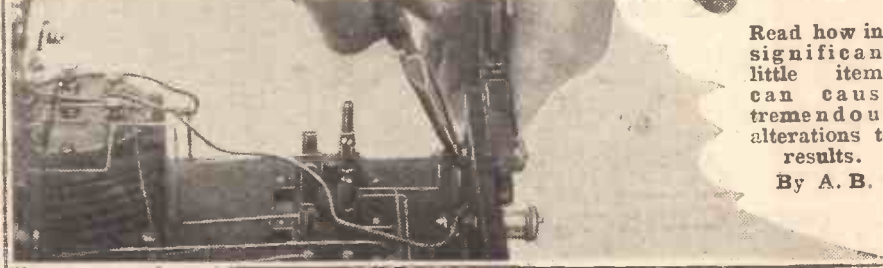
1 Igranic Megostat 3 megohm.	s. d. 6 0
1 Bulgin J.3. Single Circuit open Jack	1 3
1 Bulgin P.15. Jack Plug	1 6
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MINOR FAULTS AND MAJOR TROUBLES



Read how insignificant little items can cause tremendous alterations to results.

By A. B.

A FEW weeks ago I was asked to investigate a rather unusual trouble in a radio outfit.

It appeared that the owner had decided to give his aerial a good overhaul, and accordingly he had lowered it, fitted new ropes, cleaned the insulators and the switch, and replaced everything.

The same evening he switched the set on expecting to find results improved. Judge, then, of his surprise when he found that far from improving matters his efforts had resulted in making reception decidedly worse than it had ever previously been.

Tricky to Handle.

The set was most tricky to handle, the tuning was all upset, and there was hardly any volume. In fact, it took him all his time to tune in the local station—in this case Brookmans Park—and then results were very poor indeed.

There happened to be an indoor aerial in the attic which had been left there by a previous tenant. A lead was hurriedly attached to this, and connected up to the set, which immediately behaved perfectly, several stations being tuned in at good strength.

Now, this was against all radio practice; certainly a good indoor aerial will beat a bad outdoor one, but when the latter has just been carefully overhauled and the former is an old (and not very good) one something must be very wrong. A new wire was tried but with no better results, and finally it was decided to seek advice on the matter.

Contacts "Too Clean."

On my arrival at the house I examined the aerial which was a well-erected example of the inverted L-type, and found it to be well insulated and not screened in any way; in fact, it was in perfect order so far as one could judge from appearances. But the switch took my attention. It looked almost too clean, if that state of affairs is possible.

Inquiry elicited the fact that the owner had read an advertisement for a patent lacquer that could be brushed over polished metal articles and which prevented them tarnishing. Thinking this would save a lot of cleaning, he had purchased some, and had brushed it over the switch after he had cleaned it.

The thin film of lacquer acted as an insulator, and reception was only made

possible at all by the switch contacts acting as a fixed condenser of very small capacity. The moral is obvious.

Another source of trouble which I was called in to investigate was caused by the constructor not adhering to the published design from which he made up the receiver, which, in this case, was a four-valver of the 1 H.F., Det. and 2 L.F. type. There was plenty of volume, and stations rolled in all round the dials, but quality was simply awful, both speech and music being distorted almost out of recognition.

One look at the receiver was sufficient to diagnose the trouble. It was a matter of grid bias. It appeared that when the set was completed and the connections to the various

trouble. This particular constructor told me that he didn't think a little thing like that would have mattered.

If you want perfect results, please adhere to published designs in every detail. These things have been worked out for you by experts, and they don't include unnecessary gadgets.

And now I will describe a bit of trouble that was of a rather unusual nature. The receiver was built by a home constructor, and was excellently put together.

In order to simplify the wiring a brass strip was bolted to the lower edge of the panel, and all earth leads were soldered to this strip. When the set was completed and was tried out not a sound could be obtained from it.

A Peculiar Fault.

The variable condenser was fitted with an Ormond slow-motion dial, and anyone who has handled one of these excellent dials will know that the frosted metal front is fitted with a small terminal which can be attached to the earth terminal of the set, making the front dial into an efficient hand-capacity shield.

Now, the constructor of this set had taken it for granted that there was metallic contact between the dial and the grip that holds the spindle of the condenser. Actually, there was not; the dial of the Ormond slow-motion dial and the grip in its centre are insulated from each other by a bush.

Here is another case. A constructor had made a cabinet loud speaker from a design published, and after he had made it, it struck him that there was sufficient room inside the cabinet for the set as well as the speaker.

To attain this end he had to build the set on a panel that stood with its narrow side top and bottom. What is usually the baseboard was now vertical at one side of the panel, carrying, amongst other things, the two L.F. transformers.

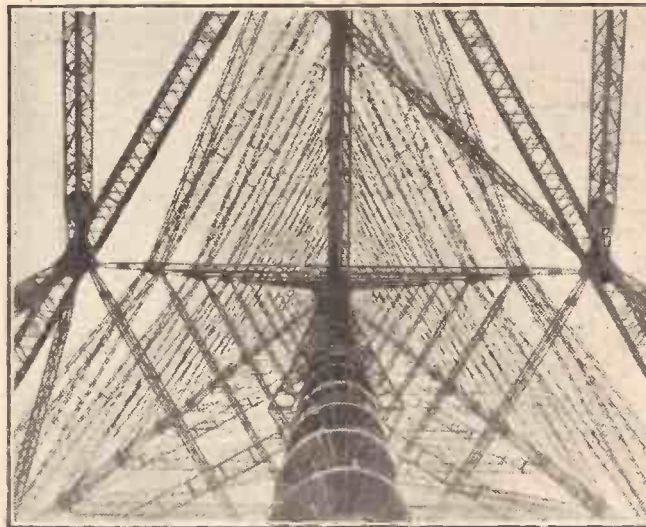
Interaction.

The second transformer was practically next to the loud-speaker unit, which was one of the four-pole balanced-armature type driving a 10-in. cone. On switching the set on a terrible howl developed, and nothing he could do would stop it.

I personally spent the best part of two hours trying to stop it, but with no result until I touched the terminal on the cone unit which was attached to the anode of the power valve when the howl became a scream.

I suspected magnetic interaction between the loud-speaker windings and those of the second L.F. transformer, and I reversed the connections to the unit when, to the astonishment of my friend, the howl disappeared and the set behaved perfectly.

INSIDE A GIANT RADIO MAST



This is the view one gets when looking upwards while climbing the spiral staircase inside the tremendously high mast at Königswusterhausen.

terminals were being made it was discovered that there was one wander-plug short.

So the two negative grid-bias terminals were joined together and a common negative lead was used. The result of this was that when the first L.F. valve was correctly biased the power valve was under-biased, and when the power valve was adequately biased the first L.F. valve was considerably over-biased.

A separate lead and plug cured this

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EDISWAN



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The constructional articles which appear from time to time in this journal are the outcome of research and experimental work carried out with a view to improving the technique of wireless reception. As much of the information given in the columns of this paper concerns the most recent developments in the radio world, some of the arrangements and specialities described may be the subject of Letters Patent, and the amateur and the trader would be well advised to obtain permission of the patentees to use the patents before doing so.

QUESTIONS AND ANSWERS

FINDING A FAULT.

W. R. A. (Leicester).—"I am a little bit up against it because my two-valve set has suddenly gone wrong with nothing touched and nothing done to it at all.

"It had been working perfectly the previous day, and not even the accumulator was changed. Yet when we switched it on it was silent.

"I do not want to ask my friend, because I have been so proud of the fact that although he knows a good deal about wireless and I know nothing, my set is just as good as his! But unless you can tell me what to look for I shall certainly have to get him to 'give it the once over,' for although we sometimes seem to get too much wireless in the house, it's not the sort of thing you can do without when once you have had it."

Probably it is only some small thing that has gone wrong, and a careful inspection of the set should show you where the fault lies. Are you sure that it really is the set and not the loud speaker (or 'phones, if you use them)?

A fault here, of course, would have the effect of "muzzling" the set, so make sure of that first.

Next you should examine the aerial and earth connections outside.

If someone has thrown a wire over the aerial, or your aerial is touching the roof, or a water pipe, or if the lead has become disconnected or broken, this will have the effect of cutting off the broadcasting.

Another thing to watch for is the earth lead, which may be broken underground, so have a good look at this as well while you are about it.

If you cannot find any trace of a broken wire the only likely cause is a broken connection, possibly inside the set, or a faulty contact somewhere.

The incorrect connection of the batteries may, of course, cause silence, but if you say the set was not touched this is improbable in your own case. Nevertheless, a misplaced or broken battery lead is always a thing to bear in mind.

If you suspect any broken wire try the trick of gently investigating them with the finger, because noises will be set up in the 'phones or speaker as the contact is made or broken. Do not forget that with a valve set great care must be taken not to allow the

(Continued on page 1202.)

HOW IS THE SET GOING NOW?

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

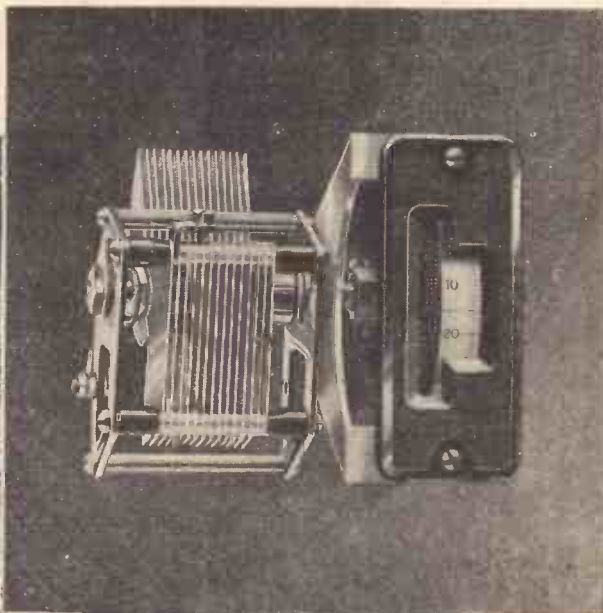
Whatever your radio problem may be, remember that the Technical Query Department is thoroughly equipped to assist our readers, and offers an unrivalled service.

Full details, including scale of charges, can be obtained direct from the Technical Query Dept., POPULAR WIRELESS, The Fleetway House, Farringdon Street, London, E.C.4.

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

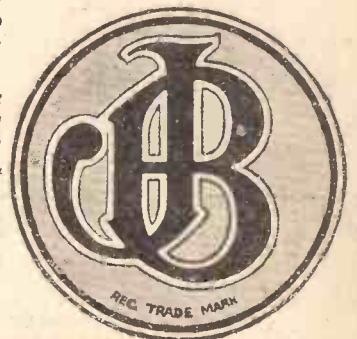
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"P.W." designers wanted the very best of tuning units for the "Comet" 3. They found it, as usual, in the J.B. Range of Precision Condensers and Dials. No need for J.B. to design one specially—it was already there, a standard J.B. Model, tried and tested in many successful circuits. Follow the designers of the "Comet" 3 who chose and used a '0005 J.B. "Thumb Control" Condenser for the original set. Start building the "Comet" to day but remember "P.W.'s" advice—don't depart in any way from their specification.

J.B. '0005 "THUMB CONTROL" CONDENSER, consisting of a J.B. '0005 Junior Log Condenser and a J.B. No. 1 Thumb Control



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

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The official list of specified parts FOR KIT "A" approved by "Popular Wireless."

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1 Red Triangle ebonite panel, 18" x 7", ready drilled and slotted to specification	6	0	
1 Baseboard, 10" deep	1	6	
1 Cydon .0005-mfd. thumb control variable condenser	11	6	
1 .00013-mfd. differential reaction condenser, J.B.	4	6	
1 Keystone 3-point wave-change switch	1	6	
1 Keystone L.T. switch	1	3	
1 Keystone P.W. dual-range coil	12	6	
2 Teisen valve holders	3	0	
1 Sovereign .0003-mfd. fixed condenser	10		
1 Franklin 2-mfd. fixed condenser	3	0	
1 Lissen 2-meg grid leak and holder	1	6	
2 L.F. transformers (Teisen "Radiogram" and Igranite "Midget")	1	3	0
2 Keystone spaghetti resistances, 10,000 and 25,000 ohms	3	0	
1 Formo or Sovereign .001-mfd. (max.) compression type condenser	1	6	
1 Formo or Sovereign .002-mfd. (max.) compression type condenser	2	3	
1 Terminal strip, 18" x 2"	2	0	
1 Sheet of aluminum foil, 18" x 10", for covering underside of baseboard	1	0	
9 Belling-Lee terminals	2	3	
1 Konecterkit, comprising Keystone angle brackets, wire for connecting, wood screws, G.B. plugs, etc.			

C.O.D. or CASH with ORDER £4 0 0

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KIT A - £4

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Cabinet £1-0-0
Valves as Specified £1-7-6
Any parts supplied separately. If value over 10/- sent C.O.D. We pay all charges.

FLEXI-COUPLED & L.F. Controlled "Comet 3"

Add 38/6 to each Cash price or 3/6 to each monthly payment. N.B. When ordering please state your requirements clearly as shown in the special order form printed in this advertisement.

FLEXI-COUPLED

(Described, P.W. 21/2/31).

EXTRA COMPONENTS:

- 1 Keystone Star-Turn Selector Coil 12/6
- 1 400 ohm B.M. Potentiometer 1/6
- 1 Bulgin Panel Light (without bulb) 2/6

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EXTRA COMPONENTS:

- 1/2-1 Megohm Volume Control (Igranite or Sovereign) 6/0
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- 1 Single Pole Change-over Switch (B.M.) 4/0
- Flex and G.B. Plug 3

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(Described "P.W." 28/2/31).

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- 1/2-1 Megohm Volume Control (Igranite or Sovereign) 6/-
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- 1 Formo Compression-Type Condenser 2 3
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Specially Packed and Sent C.O.D. for £1 9 9

POST THIS EXPRESS ORDER FORM

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- Kit "A" Flexi-Coupled "Comet 3."
- Kit "A" L.F. Controlled "Comet 3."
- Kit "A" Flexi-Coupled and L.F. Controlled.
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Better built with Pilot Kits

RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 1200.)

high-tension wiring (which includes everything connected to H.T. positive) to come into contact with the low tension (which includes everything connected to the filaments of the valves).

Great care must be taken about this, or batteries may be shorted, and valves may be burnt out. If you go over the set on the lines indicated, we think it is pretty certain you will come across a fault which is probably something quite simple, like a plug fallen out of a battery.

If, however, you are not able to see anything obviously wrong, you had better get your friend to look over it, as no doubt he can tell you in a few minutes where the fault lies.

KEEPING THE TWO TUNING DIALS IN STEP.

E. F. S. (Clifton Junction).—"I have a feeling that although I get plenty of stations there should be a lot more, if I was able to handle it properly. And I do not understand what is meant by 'in step'."

"The instructions say that the two tuning dials should be kept in step. What does this mean exactly?"

Well, it is really quite easy. All that keeping the two tuning dials "in step" means is that they must, at the same time, be adjusted to exactly the same wave-length.

As you know, the response from a set depends upon the wave-length adjustment of its tuning condenser, and thus such a condenser will help you to receive a station to which the set is tuned, and it "declines" or ignores stations to which the set is not tuned (at least, it should).

Now if you have a set in which two tuning dials are used, it is no good picking out one programme with the first tuning dial and then trying to pass it on to another valve in the set, the tuning for this being set to a totally different station!

What you want, obviously, is to pick up the broadcast on the first tuning dial and when you pass it to the next valve, to have that second circuit adjusted to exactly the same wave-length. In other words, the two tuning dials must be kept "in step."

In practice you can learn to do this very easily when no broadcasting is on. All you have to do is to listen carefully to the set and to the effect of adjusting the condensers.

Try it by switching on the set in the ordinary way, and set your first tuning dial to say 15 degrees. Now bring up the second tuning dial from 10 to about 20 degrees very slowly, listening very carefully in the 'phones or speaker to see what the effect is.

You will find that when you reach somewhere near the 15 mark the loud speaker will sound "lively," indicating the dials are in step at this point.

Now turn your second dial to say 50, and note that the "liveliness" immediately goes off. You can restore it by turning the first dial also to about 50—it may be 5 degrees or so out, but don't depend on the dial readings so much as on the signs of liveliness and "whispering" in the speaker (or 'phones).

Should you find that there is but little liveliness present, advance reaction slightly. Don't make the set oscillate or whistle or chirp or "pop-over"—just make it sufficiently sensitive to show up the "in step" condition plainly.

Remember that on such a set the keeping of the two tuned circuits properly in tune together is far more important than the reaction control. By just keeping the two tuning dials in step the stations will simply roll in, whereas with one dial set differently from the other you hardly hear a sound of them.

WHAT IS H.F. ?

S. W. P. (Pendleton).—"Being a logical sort of chap, I take the opportunity now I am writing to you, of asking you what is H.F. ?"

"I know what an H.F. amplifier is, and I know the difference between a neutrodyne and a screened-grid valve; and I know it is no good worrying because you can use an

'H.F.' valve as a detector, the valve names and types being mixed up beyond the ordinary man's comprehension. But what I do not understand is this.

"In a set with detector and two L.F.'s you will show one end of the set, and say this is 'the H.F. end,' or perhaps in the article you mention the fact that 'H.F. wiring' must be carefully spaced, etc.

"I suppose there is an explanation for it, but I should like to know why it is that you always seem to regard a detector as though it were an H.F. amplifier?"

It is an interesting point that you raise, and perhaps the best way in which we can explain it is to say that the ordinary detector valve is an H.F. amplifier as well.

Even when a crystal set is used the effect of the broadcasting station is to cause high-frequency currents to flow in the receiving aerial. In a crystal set there is no attempt at amplifying them, but when using a detector valve there is always a little high-frequency amplification.

If the set uses reaction you can be sure there is considerable high-frequency amplification, for reaction as normally employed is entirely concerned with high-frequency current.

A good general rule to remember in order to distinguish the high-frequency wiring is that all aerial circuits, all tuned grid circuits and all reaction circuits, are "high-frequency." Anything, in fact, connected between the aerial and the H.F. choke in the detector's plate circuit, including all such apparatus as the tuning coils and tuning condensers, the H.F. amplifying stages (if any), grid condensers, wave-change switches, wave-traps, selectivity adjusters, etc., is best regarded as H.F. wiring.

(Continued on page 1204.)

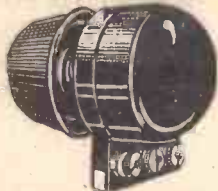
"P.W." PANELS, No. 9—EARTHING YOUR AERIAL.

The aerial can be "earthed" when not in use by an ordinary change-over switch.

This should be mounted near the lead-in, and a protective cover to keep it from being affected by the weather is advisable.

Automatic "earthing" of the aerial can be accomplished by means of a "lightning arrester."

In the "lightning arrester" is a small spark-gap, which is "bridged" by any heavy charge of electricity that the aerial may receive.



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VOLUME
CONTROL**

COMET 3

**SOVEREIGN SPECIFIED IN
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**MAKE YOUR COMET 3
A RADIO GRAMOPHONE**

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50,000; 100,000 ohms; Half (specified this week), 1 and 2 megohms; each.

4'6

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Most mains supply alternating current, which for radio purposes has to be converted to direct current; and for this a rectifier is necessary. Of the various types of rectifiers, the Westinghouse is acknowledged to be the most efficient. Unlike valve or chemical rectifiers, it does not burn or wear out. It outlives your set! Its use—with certain other components—converts "battery-run" into "mains-run" radio; it is most suitable for fitting into amateur-built sets; while anyone who is buying a mains-set will do well to make sure the Westinghouse Rectifier is incorporated—you will find it in most good makes.

Complete technical details are given in an interesting and lucid manner in our forty-page booklet, "The All Metal Way, 1931." The coupon will bring you a copy by return of post (please enclose 3d. to cover cost.)

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Please send your forty-page booklet, "The All-Metal Way, 1931," for which I enclose 3d. in stamps.
Please write in block letters.

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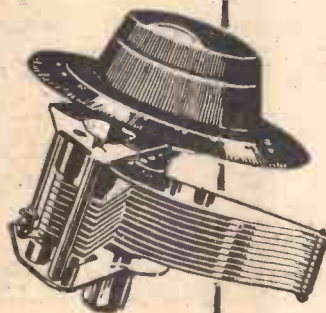
P.W. 7/3/31



USES

RADIO manufacturers all over the world are using Dubilier Condensers because it is known that their robust construction and high electrical efficiency can make all the difference to the performance of their sets.

You can do no better than follow their lead and make use of Dubilier Condensers for efficiency, accuracy and reliable Service.



K.C. Variable Condenser

With knob, dial, and slow-motion device **11/-**

Without knob, dial, or slow-motion device **7/6**

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**The
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The Clarke's "ATLAS" Model A.C. 188, which was voted first in the "Wireless World" Competition at Olympia, is entirely British made, and is the finest All-Mains Unit on the market at the price. A demonstration will immediately convince all Radio owners of its outstanding features and of the perfect results which can be obtained by its economic and reliable service.

This amazing model is fitted with two variable tappings of 0/100 and 0/120 Volts respectively, and one fixed of 150 Volts, and the output of 150 Volts at 25 m/A is twice that of any other Unit at the price. The combined L.T. Trickle Charger automatically charges either 2- 4- or 6-Volt Accumulators from the mains. A.C.188 is guaranteed for 12 months, and is built to conform with all necessary regulations. It is suitable for any set, standard or portable, up to 5 valves.

Ask your dealer for demonstration, and, in case of difficulty, write direct for Folder No. 55 to —

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**"CLARKE'S
ATLAS"
ALL-MAINS UNIT**

RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 1202.)

Similarly, the low-frequency wiring (where spacing is not so important) may be taken to include all connections to L.F. transformers, R.C. units, L.F. chokes, etc., up to and including the output wires to the loud speaker.

A SELECTIVE THREE-VALVER.

H. J. H. T. (Huddersfield).—"I live three and a half miles from Moorside Edge, Huddersfield, and feel that my present set—a detector and two low-frequency valves—will be useless when this new station begins. To be as brief as possible: What I require is a three-valver, with a reasonable chance of cutting out the North Regional. I want to fit your coils, also to retain the two transformers: it must not be too complicated to work, and to incorporate your wave-trap. I enclose a list of parts which I have at my disposal, together with voltages of H.T."

"A pentode valve I do not like, but have no objections to a screened-grid. In your choice of a suitable set, if there are any parts to purchase, please state, as it is not a case of cutting-the-price-or-cheap-parts."

You omitted to enclose your address so that we are unable to reply, by post. It would be unnecessary expense to draw up a diagram specially for your parts, as it would be far better to stick to an approved published design like the "Comet" Three, for which a great many of your parts are quite suitable.

As you are only three and a half miles from Moorside Edge you will want "super-selectivity," and this you can get from the "Comet" (with the aid of a rejector), as described in "P.W." February 21st issue. This set would give you a tremendous number of stations as well as easy tuning, and great power, without much extra cost, considering the extraordinary good service you would get as compared with an old-fashioned three-valver.

We are sure you would not regret building the "Comet" Three.

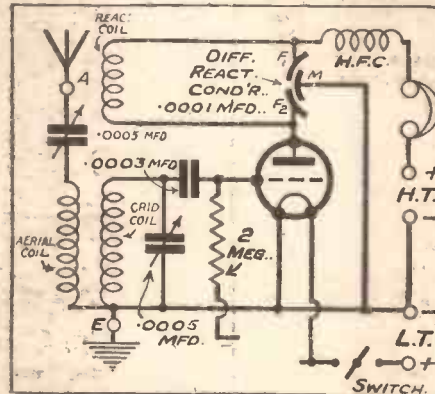
FITTING A DIFFERENTIAL CONDENSER.

F. L. H. (Chatham).—"One side of the reaction coil goes to the reaction condenser. From the remaining plates of the reaction condenser goes the lead to the plate of the valve and to H.F. choke."

"I have tried reversing the reaction condenser connections, but I get hand-capacity when this happens. I should like to ask if a differential condenser would be likely to improve matters, and if so what are the connections?"

You can easily fit a differential condenser to this arrangement, and it should certainly prove advantageous in overcoming hand-capacity trouble. Hardly any modifications of the circuit will be necessary.

MISSING LINKS No. 3



Here is a good one-valve circuit, but with the grid-leak connections unfinished and one component missing. Can you complete the circuit? (Look out for the answering diagram in next week's "P.W.")

You will find that a differential reaction has two sets of fixed vanes and one terminal which is connected to its moving vanes. The differential condenser, therefore, has three terminals, compared with two on your present condenser.

This means one extra lead, and all you have to do is to take out your present condenser and mount the differential in its place on the panel. The lead which formerly went from the reaction coil to one side of the reaction condenser now goes from the reaction coil to one side of the differential condenser's fixed plates.

The other lead (which came from the H.F. choke to the reaction condenser) now goes to the moving vanes of the differential reaction condenser. The vacant fixed plate terminal on the differential reaction condenser is joined to the low-tension negative or to earth terminal, and this completes the modification.

DIFFICULTY WITH REACTION.

F. F. A. (Paddington).—"The only snag I have found with this set is that I have difficulty in getting really good reaction, and the top of the scale falls off so badly that wherever I put the reaction condenser, and however much I increase my H.T. up to the limits of the 100-volt battery, I do not get proper reaction and oscillation. "Do you think it is due to the fact that I have used a .0002 grid condenser instead of .0003? It is the only alteration I made in the set, and I wonder if that could be the cause of poor reaction?"

As a matter of fact, it does sometimes happen that the use of a small grid condenser results in a little difficulty in getting good reaction control, so it is quite likely that the substitution for your .0002 of a .0003 would help to remove your trouble. Usually, however, the question of reaction is not linked at all closely with that of grid condenser capacity, and on most sets very little difference is found with reaction control even over rather wide variations of grid capacity.

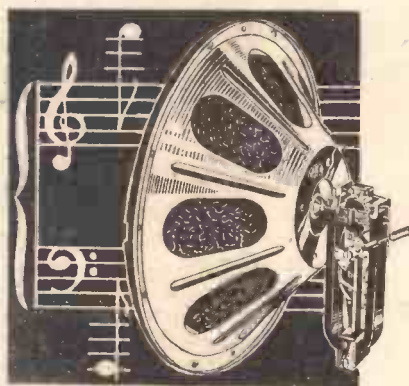
There are other common causes of indifferent reaction control which you should look into, one of these being an incorrect number of turns on the reaction section of your coil, inefficient detector valve, use of too high an anode resistance, and in some cases the use of an unsuitable grid leak.

Yet another factor which strongly affects the reaction control is the return of the grid lead to detector filament, the best plan being to take this

(Continued on page 1206.)

HIGH

and
LOW
notes well
handled....



"Even response, both very high and all low notes being well handled."

"The best unit I have tried."

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"WUFA" is the 'Ace'."

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3 ft. 10 ins. high, 2 ft. 2 ins. wide 1 ft. 6 ins. deep
Size of baffle board behind fret is 24 ins. x 24 ins
Metallic fabric for fret front is included. Opening at
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PRICES:

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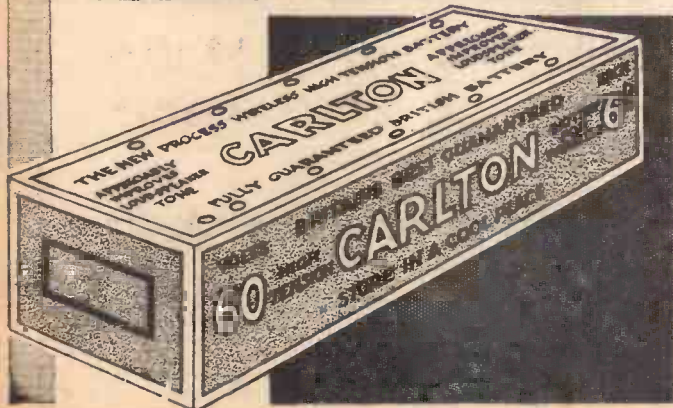
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W.131

RADIOTORIAL QUESTIONS AND ANSWERS

(Continued on page 1204.)

to a potentiometer, wired across the detector filaments, the grid return going to the slider of the potentiometer, and the position of this being varied for smoothest possible reaction results.

PROGRAMMES WITHOUT LOUD SPEAKER.

P. P. P. (Hull).—"You may think that I am just a Yorkshire tyke, trying to put you off with a lot of lies, but I can get programmes without a loud speaker, or 'phones, or anything of the kind.

"I found it out quite by accident. The chap who married my cousin came round to my house to ask if he could borrow the loud speaker, which is the only one I have got, and the set was not working, so I disconnected it and took it round to his house.

"We were there some time messing about with his set, but finally I brought the speaker home again, and put it on the table near the set. He was raving about my set being so small, and yet so powerful, when he put the switch on sort of absentmindedly.

"To our surprise, although the loud speaker was not connected, we both distinctly heard music.

"To cut a long story short, what we did was to take the loud speaker right out of the room altogether and listen carefully, when we found that the programme was coming from inside the set, apparently out of the choke, which is wired across the loud-speaker terminals.

"Now, what do you think of that? There is no doubt about it. We could both hear it, and he is prepared to swear to it."

This is not such a rare occurrence as you believe, for we have often had the experience ourselves, and a great many "P.W." readers have reported similar cases. Probably it is the choke, as you suspect, the reason being that some part of it, probably the core, has become a little loose.

When this happens, I.F. currents flowing through the choke tend to move the loose part, which thereupon starts to work like an inefficient diaphragm.

As it moves to and fro, it sets up sound waves, quite recognisable as speech or music, but usually distorted pretty badly. This is no doubt the sort of thing that happened, and gave you such a surprise.

AERIAL'S EFFECT ON SELECTIVITY.

P. L. W. (Chorlton-cum-Hardy).—"With the North Regional station in the offing I have been thinking I ought to alter my aerial system, which remains very much as it was when I first hooked up my set, over three years ago. As I had rather a long run for the lead-in I purposely erected a tall mast and really long aerial.

"As a matter of fact, I am afraid the P.M.G. might think I have stepped over his one hundred feet. The three-valve results have always been pretty good, and I don't want to alter the set, but from what I heard I thought perhaps an indoor aerial might give sharper tuning.

"Trying this just roughly with 24 D.C.C., of which I had a quarter-pound on hand, I got really astonishing selectivity with very little loss in signal strength. Certainly the foreign stations were not quite so loud, but those I did get were really wonderfully sharp.

"This makes me think there is a lot in this about selectivity being affected by the aerial, as the set has not been altered in any way except by fitting a differential aerial to it.

"So, if selectivity can be affected by the aerial, what do you think I ought to do to make my aerial more selective?"

RADIO SYMBOLS

No. 4.

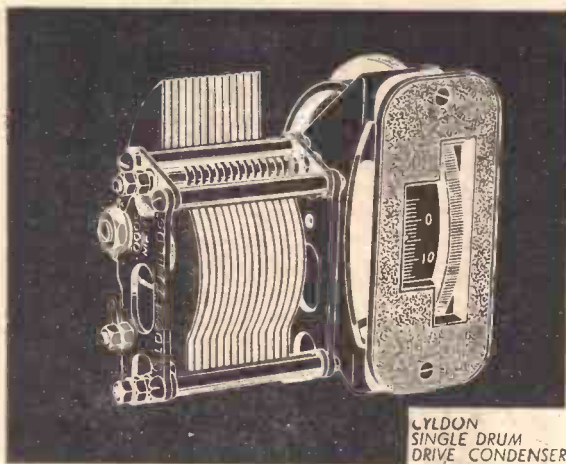


THE VALVE

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If of the power type, it should never be switched on unless proper grid bias is being applied.



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TECHNICAL NOTES

By J. H. T. ROBERTS, D.Sc.

Cutting Out Stations.

THE directional property of a frame aerial is often very useful in separating out B.B.C. stations, and I have several times had queries from readers with regard to this point, particularly the separating of Manchester and London stations.

Of course, if by any chance you should be located more or less on the line joining London to Manchester then obviously the setting of the frame for the one station will be the setting also for the other, and it will give you no advantage in cutting out one of them.

In cases where the property of the frame aerial cannot be taken advantage of in this way it is usually better to use a small line aerial to the set. Then a rejector may be introduced and it should be possible, by proper manipulation of the reaction and by

heating current altogether and use a valve in which the filament—or the cathode as we should then call it—would operate in the cold. Such a type of valve has often been spoken of as a "cold valve."

There is, however, all the difference in the world between a valve which requires a filament battery, no matter how small the heating-current drawn from that battery may be, and a valve which requires no filament battery at all.

It goes without saying that it would be an enormous advantage to be able to dispense with the low-tension battery, or (even in an all-electric set) to dispense with the low-tension heating current.

A Peculiar Cathode.

In the search for a cold valve, attention naturally turned to the use of some type of photo-electric substance which would emit electrons under the influence of light radiation and, in fact, experiments on these lines have been proceeding for a long time past.

Several times one has heard reports that the cold valve had at last been discovered; the latest information in this direction comes from New York, where a well-known radio engineer, Mr. Thomas, claims to have

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suitably adjusting the rejector to cut out the local station and tune in the one desired.

Capacity Effects.

Incidentally, readers often state that they find, particularly when listening to foreign or other distant stations, that on bringing the hand close to the set the volume is increased. This is because the presence of the hand is affecting the capacity reaction and it shows that the reaction and the tuning adjustments are not perfect. It should be possible to get just as good results by proper manipulation of the tuning controls.

A New Valve.

In the early days of broadcast reception, when we used bright-emitter receiving valves, a current of 0.75 amp. or even up to 1 amp. per valve was considered nothing out of the way, but since that time, and particularly since the introduction of dull-emitter high-efficiency filaments, the filament-current consumption has steadily decreased until to-day we regard a filament consumption of 0.1 to 0.2 as quite sufficient for an ordinary valve.

At the same time the idea has always been entertained that some day we might be able to do away with the filament

made a valve in which the cathode gives the necessary electronic emission under the influence of the light from a neighbouring electric lamp. The valve contains a grid and anode in the usual way and in general principle is similar to the ordinary 3-electrode receiving and amplifying valve.

According to my information this valve is still in the experimental stages, but it is stated that it has been subjected to all the usual tests and has given highly satisfactory results.

A Long Life.

It is evident that with such a valve, if it can be made to function efficiently, there is no danger corresponding to that of a burnt-out filament and therefore the electrical life of the valve—that is, apart from any mechanical damage—should be almost indefinite.

Another minor advantage is that microphonic noises do not arise and any mains hum in an all-electric set, in so far as it arises from the operation of the filaments, is eliminated entirely.

The main criticism one would make, however, in this particular case is that the illumination for exciting the photo-electric cathode has to be provided by a neighbouring electric lamp, and it seems that the

(Continued on next page.)

TECHNICAL NOTES

(Continued from previous page.)

inconvenience associated with this necessary electric lamp will be about as great as is involved in heating the filament itself in an ordinary valve. However, I will give you any further information with regard to this valve as soon as it comes to hand.

A Transformer Problem.

Low-frequency transformers, as you know, are often made with a small fixed condenser connected across the primary winding, and whilst this serves a very useful purpose in many cases there are others in which this condenser is a disadvantage.

For instance, if the transformer in question follows the detector and a reaction condenser is included in the circuit, then the shunt condenser will by-pass the H.F. currents in the anode circuit of the detector valve and will nullify the reaction effect which you want to obtain.

It is true that this difficulty can be overcome by introducing a high-frequency choke, but if there is no high-frequency choke present and you want to use the capacity reaction, it is better to use a transformer without such a condenser across its primary.

I mention this particular point because I have often been asked whether such-and-such a transformer is suitable for this or that position in the circuit and usually my correspondent relies mainly upon the question of the transformer ratio. You will see from the above remarks that other features of the transformer have to be considered besides the ratio.

Ratio or Impedance?

As a matter of fact, the actual ratio of the transformer is not nearly so important as many people seem to think. For instance, the results with a 3 to 1 transformer will generally not be noticeably different from those with, say, a 4 to 1. In fact, in many cases no difference will be noticed between even a 5 to 1 and a 3 to 1. Of course, when you get to quite high ratios, say 7 or 8 to 1, these are naturally not entirely interchangeable with the lower ratios.

Speaking quite generally, a low-ratio transformer such as, say, a 3 or 3½ to 1, can be used in more or less any position in the circuit. I should also perhaps add a word of warning, intended more particularly for newcomers to radio, who are sometimes apt to conclude that a high-ratio transformer will necessarily give a higher overall magnification than a low-ratio one.

This does not follow at all, and I have more than once previously mentioned the importance of considering the impedance of the valve with which the transformer is to be used.

In fact, the relationship of the transformer and the valve is really far more important than the actual transformer ratio itself, and cases often arise where a high-ratio transformer definitely gives inferior results to a low-ratio one.

Loud-Speaker Hints.

When a loud-speaker is used with an amplifier operating in conjunction with a mains unit, and an output filter, it is a very good plan to introduce a condenser into each of the leads to the loud-speaker.

(Continued on next page.)

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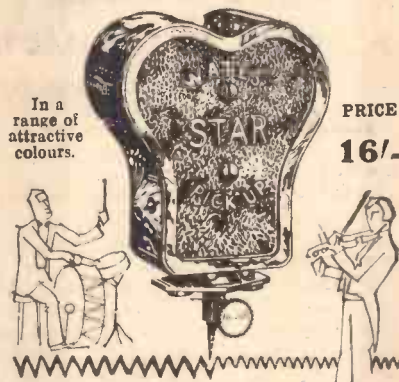
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TECHNICAL NOTES

(Continued from previous page.)

You might think that a single condenser in one of the leads would be quite sufficient to separate the loudspeaker from the set, and in one way this is true. The case is somewhat similar to the use of a single-pole or double-pole switch in ordinary electric wiring.

As you know, a single-pole switch breaks the current but does not entirely disconnect the instrument, whatever it may be, from the mains. By the use of a double-pole switch the instrument is completely disconnected from the mains.

When using an amplifier with batteries for the high tension, a single condenser (corresponding to a single-pole switch) is quite sufficient; but when using a mains unit it is, as I mentioned, very desirable to use two condensers, one in each of the loud-speaker leads. Incidentally, these condensers should be fairly large capacity, at least 2 mfd. each.

Some Pick-up Points.

There is a good deal of difference of opinion on the question of pick-up sensitivity. Some experimenters prefer to use a somewhat insensitive pick-up, and to make up for this by extra stages in the amplifier; whilst others believe it is more economical to get every ounce of sensitivity in the pick-up itself, and so to save in the amplifier.

There is something to be said for both of these points of view. A highly sensitive pick-up certainly economises amplifier stages; but, on the other hand, it is more difficult to manage, and many people have the impression that it reproduces record scratch to a greater extent. A less sensitive pick-up is easier to manage, and the volume can subsequently be controlled very conveniently in the amplifier itself.

"Scratch."

Possibly the reason why a highly sensitive pick-up is more liable to reproduce scratch is because the scratch is itself a conglomeration of high-frequency noises, and a sensitive pick-up generally seems to be more responsive to the higher frequencies.

Possibly some of my readers who use very sensitive pick-ups may have formed the opinion that these are equally sensitive to low frequencies; but it is impossible to generalise altogether about pick-ups, which are of a great variety of designs and are used in a variety of conditions. At any rate, there seems to be no doubt that a sensitive pick-up is somewhat more liable to reproduce the surface noise.

If you happen to have a large and powerful amplifier, naturally you will be tempted to use the whole of the amplifier; and it may be necessary, in order to get best results, either to use an insensitive pick-up or alternatively to shunt the pick-up by a volume control or to use a volume control in some other part of the amplifier circuit.

Sensitivity.

Personally, my experience has confirmed me in the belief that it is better to use a fairly sensitive pick-up—I do not say too sensitive—and to economise in valve-power accordingly. If I can make a two-valve amplifier with a suitable pick-up give me just as good results as, say, a four-stage amplifier with a different pick-up, I do so.

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FOR THE LISTENER

(Continued from page 1182.)

immediately. They are the surprise packets in the programmes; but there are blanks in every bran pie.

Often these talks are very useful. The papers were full of the Spanish Crisis; but how much more interesting it all was after Mr. Wickham Steed, in a brilliant quarter of an hour, had explained the situation!

Value of Explanations.

Explanations of this sort are of the greatest help to intelligent listeners who wish to understand what is going on in the world.

I have repeatedly asked in this column, but in vain, that some brief explanation might be given us as an introduction to the major musical items in the programmes. I am persuaded that thousands of listeners would have enjoyed "Die Fledermaus" the other night much more if they had known what it was all about.

The words of the singers are usually inaudible. I have given up listening to works which I do not know, although I must miss a lot of pleasure, because it only irritates me.

It seems such a little thing to ask.

Whither Mankind?

I sincerely hope that subsequent speakers in this series will strike a brighter note than Dr. L. P. Jacks, who started it by warning us that "our civilisation is moving towards collapse"; and went on to advise us, after the manner of those dreadful copy-book maxims, to "play the man."

Doubtless the world is changing, and some old-established things are breaking down; but I question if there ever was so much eager, vital, experimental, adventurous life in the world as there is to-day. Who cares about the "collapse" of the husk when the seed is seen to be sprouting?

Let those who belong to the husk bury the husk.

"The Tempest."

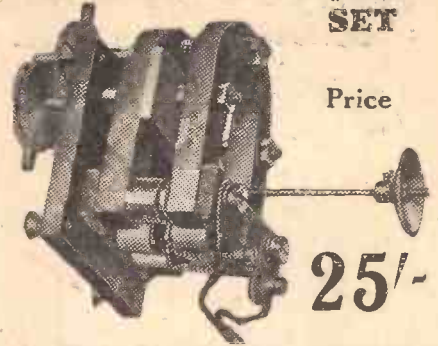
The performance of this play was distinguished by the presence of Mr. John Gielgud in the cast. It is always a delight to hear Shakespeare so beautifully spoken; every word clear; every sentence properly phrased; and every ounce of meaning drawn from the familiar lines.

I thought that the parts of Ariel and Caliban were badly cast as to voices. There really was not very much difference between them, though Caliban is of the earth earthy and Ariel is of fire and dew.

It must be very difficult to get the right voices; and yet it is of great importance to do so; for, unless the voices communicate the parts, you get a piece of elocution and not a play. The theatrical illusion is lost.

(Continued on next page.)

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FOR THE LISTENER

(Continued from previous page.)

Voices.

Talking of voices, it was a rare pleasure to hear Miss Edith Evans reading her part in Dryden's version of "The Wife of Bath." Hers is a beautiful voice, used to perfection.

No small part of the delight in listening to her was due to the entire absence of that affectation in speaking which, I am afraid, spoils many of the women's voices we hear on the wireless.

A Vaudeville Experiment.

Heaven forbid that the vaudeville programmes should become infected with the "highbrow" germ; but we were given a different sort of entertainment the other night, which I welcome as a sign that this

TECHNICAL TWISTERS

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Last week's missing words (in order) were: Two Sets, Fixed, Fixed, Reaction, Decreased, Filament.

most popular part of our amusement is being seriously taken in hand for improvement.

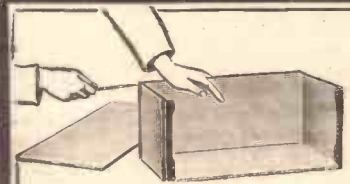
Elsa Lanchester sang "Frankie and Johnnie" as she only can sing it; Harry Graham read some of his humorous verse; Sara Allgood sang Irish ballads; and Jean Luxton's "Children's Theatre Company" gave selections from their repertory.

It was not an ideal programme. An ideal programme should contain more downright laughter. But it showed that the authorities are casting a wider net; and good luck to their fishing.

Peter Hannen.

Congratulations to Peter Hannen, who has been entrusted with an important part in the cast of "The Circle," a play shortly to appear in the West End. I was afraid that the Bar might get him, and am pleased to see that he intends to follow in his father's footsteps.

He has a fine presence and an excellent voice, and should go far in his profession. I trust this may not mean that we shall lose him altogether from the Studio; but, anyway, good luck to him!



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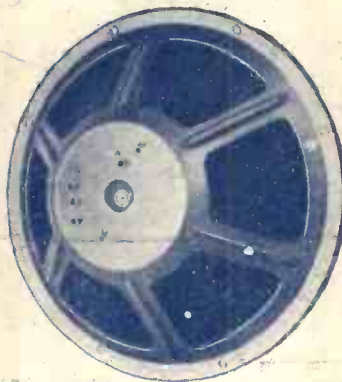
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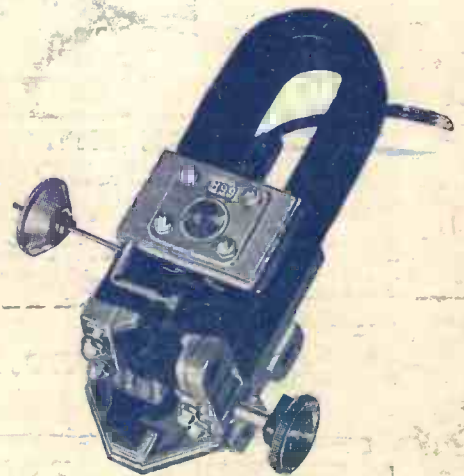
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