

BUILD OUR "ELECTION HOOK-UP" IN HALF-AN-HOUR

Amateur Wireless

Every
Thursday 3^d

and
Radiovision

Vol. XIV. No. 363

Saturday, May 25, 1929

**BRITAIN'S
FAVOURITE**

UP-TO-DATE 2

**ALSO "ELECTION
HOOK-UP"
BUILD IT IN 1/2 HOUR**

Handwritten notes on the right margin:

3-11-26
8-8-27
3-9-28
3-10-29

2-11-27
2-12-28
2-13-29

SECURE!

LOCKED!

INTER-LOCKED!

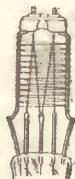
**SHOCK
PROOF!**

**NOISE
PROOF!**

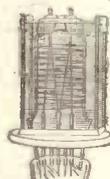
**BREAK
PROOF!**



1. The double length Cossor filament famed for its colossal emission. Note the seonite bridge holding it rigidly in position.



2. Around the two stout grid supports is wound the first grid, electrically welded at twenty-five points.



3. Note the strength and rigidity of the screen. Built on four stout supports, and anchored to seonite insulator.



4. Finally, observe the construction of the anode. Two rectangular nickel plates are used ribbed for greater rigidity.

Inter-locked Construction makes Cossor the strongest and most robust Screened Grid Valve ever produced. Look at the illustrations—see how each element is rigidly locked top and bottom—every joint scientifically welded—a girder-like construction ensuring absolute rigidity. Individual movement of the electrodes is impossible. Even the hardest blow cannot disturb

their perfect alignment. This wonderful new Cossor system of Inter-locked Construction is the greatest step forward in valve design since the introduction of the dull emitter—no other make of Screened Grid Valve has such enormous strength. For any Screened Grid Receiver use Cossor—there is no substitute for the Cossor patented system of Inter-locked Construction.

Made in 3 types for use with 2, 4 and 6-volt. Accumulators.



Technical Data.

Max. Anode Volts 150, Impedance 200,000, Amplification Fac. for 200, Grid Bias 1.5 volts at max. anode Volts. Price (either type) **22/6**

Cossor Screened Grid

THE ONLY SCREENED GRID VALVE WITH INTERLOCKED CONSTRUCTION

A. C. Cossor Ltd., Highbury Grove, London, N.5.

8853

Mention of "Amateur Wireless" to Advertisers will Ensure Prompt Attention

Amateur Wireless and Radiovision

The Leading Radio Weekly for the Constructor, Listener and Experimenter

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Manchester's Debut—Chief Os-Ke-Non-Ton—Loud-speaking Witnesses!—For Scotsmen and Others—D.X. Crystal Results!—Shouting at Buses

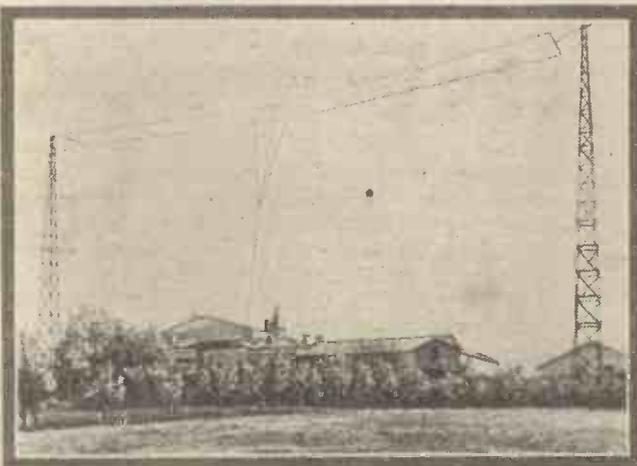
Manchester's Debut—The new Manchester headquarters, which were fully described in AMATEUR WIRELESS No. 361, comes into use first on Tuesday, May 28, when the first broadcast will be made via 5GB. This "christening" broadcast is to be a performance of Coleridge-Taylor's *Hiawatha*, to be given by Dr. Henry Coward and his Sheffield choir. Altogether, this is an item well worthy of an auspicious occasion!

Chief Os-Ke-Non-Ton—And mention of *Hiawatha* is a reminder that the famous Red Indian baritone Chief Os-Ke-Non-Ton, has been engaged for 2LO's programme on June 7. The chief, whose name means "Running Deer," is reputed to be the leading exponent of American-Indian melodies, and he has had frequent encounters with the microphone in the United States.

Loud-speaking Witnesses!—During the Board of Trade inquiry into the sinking of the liner *Vestris*, loud-speakers are installed. The hall in Westminster, in which the inquiry is made, is so large that without a microphone in front of the witness chair, and loud-speakers placed at different points, it is difficult to follow the proceedings.

For Scotsmen and Others—The following deserves to be remembered by those who are setting out to economise! "It has been brought to our notice that the difference between an outside and an inside aerial is estimated to be ten shillings."—*Glasgow Weekly Herald*.

D.X. Crystal Results!—The Marconi Co. has been carrying out some tests transmissions with the new Czecho-Slovakian broadcast station at Bratislava. Over 479 reports have been obtained of reception in Great Britain. One London listener reported that he heard the station on a crystal set, but as Bratislava has a 12 kilowatt



Radio Toulouse—a Frenchman well-known to the rest of Europe! And not to be wondered at, seeing that a power of 9 kilowatts is employed.

transmitter, this D.X. fiend can be believed or forgiven, whichever way you like to look at it!

Shouting at Buses—If ever, while standing at the bus terminus outside Victoria Station, London, you hear strange commands booming in your ears, do not be alarmed. They are coming from a loud-speaker which has been installed on the control tower and which the man therein uses to guide the buses below. At his side this "super" bus official has a microphone, and by whispering soft words into this to the bus drivers they are emitted from the

reproducer with a giant voice. Altogether a new use for wireless!

Listening to the Election—Make a point of getting the election results next Thursday. If you have not a set working at the moment, or if you want to hook up a simple arrangement to loan to those who scorn wireless (except when they find they need it), turn to page 737 in this issue. There you will find a rough "hook-up" of an up-to-date version of a two-valver which—but turn to page 737 and see for yourself.

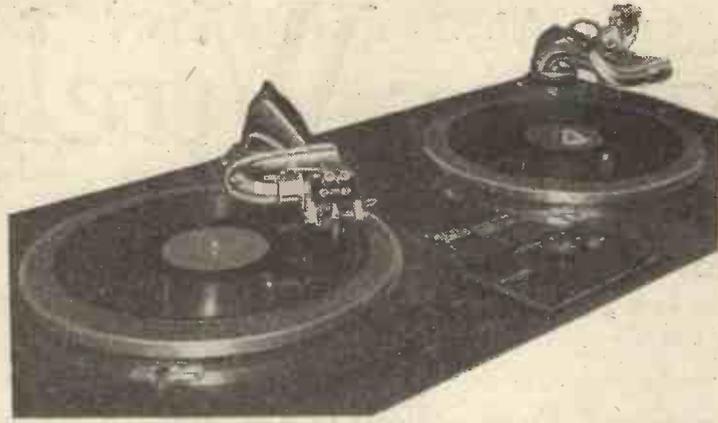
A Human Ark—This is the nickname which has been earned by Walter Lanhan, who is broadcasting on Friday, May 31. It is said that Mr. Lanhan comes as near as any human being to talking with animals and birds. A story is told that on one occasion he stopped beneath a tree in which some wood pigeons were holding a heated conversation, in which he joined. The birds immediately became silent and the impersonator carried on alone; but when he moved on one of the birds left its companions and followed him along the road for half a mile!

The B.B.C.'s Money—In continuation of a note last week, wherein we expressed regret at the number of well-known B.B.C. staff men who have been attracted to the more lucrative spheres of talkies and so on, it is worth noting what a well-known evening paper has to say about this. It is pointed out that the B.B.C. receives a gross sum of over £1,000,000 and yet is unable to retain the services of its most capable and experienced officials. Also no inquiries are possible. "Such financial obscuritism may, indeed, conceal the greatest possible degree of orderliness. The B.B.C. . . . may shrink modestly from the chorus of praise which would meet the revelation of exemplary financial administration in a public department. The public, however, cannot be expected to take all that quite for granted!"

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An "A.W." Special Representative was able recently to be in the studio during a



broadcast of gramophone records and here he tells just how the B.B.C.'s gramoradio is done.

WHEN GRAMOPHONE RECORDS ARE BROADCAST

PROBABLY the only time when the red and blue lights over the doors of the studios are not of vital importance is when there is a gramophone record broadcast in progress. The reason for this is because gramophone music is not broadcast directly—that is to say, the gramophone is not placed at one end of the studio and the microphone at the other, though this was done in the early days of broadcasting.

Nowadays, electrical reproduction is all the vogue, as it is with many amateurs, and an electrical pick-up is used with subsequent amplification. Thus you see that when a gramophone is being played for broadcast purposes, there is practically nothing to be heard in the studio, and, except when the microphone is in circuit, there is no possibility of studio noises being transmitted. Thus even the most unwary can push into the studio and call out cheerily, "I say, is Mr. So-and-So here?"—a *faux pas* not usually forgiven! The only exception is when an announcement is being made of the record named.

If only all listeners could know in what reverence the motto "Do not enter when

the red and blue lights are on" is held by the B.B.C. staff they would understand what the silence of gramo-radio means.

A New Studio

The other day, when at Savoy Hill, I was permitted to commit this fell deed of entering the new No. 3 studio while a gramophone broadcast was in progress. In parenthesis, let me say that "No. 3" is the latest at Savoy Hill and is reconstructed from the oldest and first studio in the original building at No. 2 Savoy Hill. In this studio there is a double turntable console which is clockwork driven and looks from the outside like an ordinary, but outsize, gramophone with a handle at one end. It is made by a well-known firm of gramophone manufacturers, and has a resemblance to other commercial products.

Inside it is very much modified. The sound-boxes have been removed and on the open end of the tone arms, one for each turntable, are fitted pick-ups of the magnetic type. In between the turntables is a switch which allows either one or the other to be used, while the central position brings the ordinary microphone into circuit. This is

used when an announcer wishes to give the name of the record.

Downstairs in the basement in the No. 9 studio — that is the Chinese room — is a single turntable console. This, too, is driven by clockwork and has no counter-balanced pick-up arm, but has the pick-up attached to the end of the normal tone arm.

A Surprise

I confess I was considerably surprised to see that in conjunction with the pick-up which is always of the magnetic type—though from time to time being experimented with—no scratch filter is employed. The B.B.C. engineers consider that with the type of pick-up used the amount of scratch on reproduction with the average wireless set is negligible; on this point listeners will doubtless have their own opinions. Neither is there any volume control on the console, and the reason for this is simply because the pick-up output is toned down and both amplification and voltage are then regulated by the operator in the control rooms. This is as in other B.B.C. transmissions.

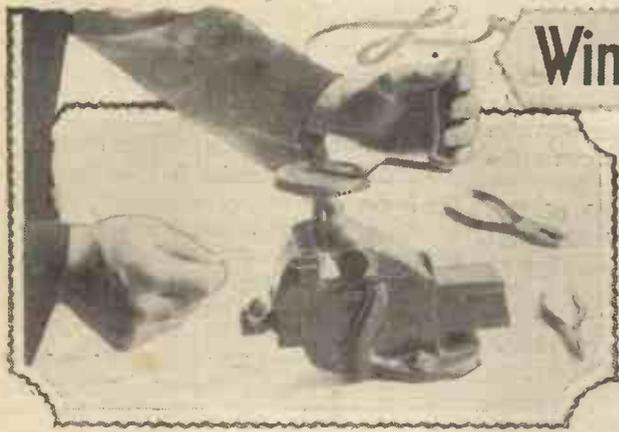
The pick-up winding is taken to one side of a transformer contained in the console of the gramophone and the other winding is taken to a special "hook-up," the purpose of which is simply to control the output from the pick-up and make it suitable for the standard microphone lines.

The output passes to an A type amplifier. This consists of a three-valve resistance-coupled amplifier, which is altered only in detail from the other "A" amplifiers used for normal microphone work. From the A amplifier the circuit is taken to a "B" amplifier in the control room of the main transmitter.

When a gramophone broadcast is in progress the announcer simply puts a record on to the turntable, moves a switch over to "mike," makes a preliminary little speech and clicks the switch back to "gramo"—at the same time starting the needle in the groove. There is thus no sizzling or crackling before the record starts playing and when the microphone is in circuit. Any amount of noise can be made in the studio and it will not be broadcast.



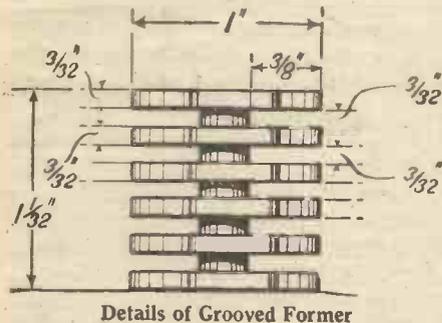
The double-turnstile console in the studio at Savoy Hill, which is usually reserved for talks and gramophone broadcasts



Winding Your Own Coils for the- "TALISMAN" PORTABLE

By L. A. CHAPMAN

IN conformity with AMATEUR WIRELESS'S usual practice of giving constructional details of components where possible, below are given the actual winding particulars of the coils used in the "Talisman Portable," described in the two preceding issues.



Details of Grooved Former

Amateurs are quite at liberty to make up these coils for their own personal requirements but commercial manufacturing rights have been granted only to Messrs. Wright and Weaire, Ltd., up to the time of going to press.

Principle of Design

Before actually describing the construction of the coils it will be well to discuss the various points which led to their design.

It is now a well-established fact that the screen-grid valve is capable of more amplification per stage than an ordinary three-electrode valve, other components in the receiver being equal. By designing

the tuning circuits coupled to such valves on sufficiently low-loss lines it is possible to obtain such great amplification that the H.F. stage will give too much amplification, which results in instability.

Properly to make use of the great amplification obtainable from screen-grid valves it is necessary to have coils that are only efficient to a certain degree.

By having reaction coupled into the tuned-anode circuit, we can arrange to introduce just as much damping in the anode circuit as we wish so that when reaction is applied we can overcome, to the required degree, the damping that is detrimental. This is just what has been done in the design of the "Talisman Portable" coil and readers who build the receiver will now realize why it is that the receiver does not go into oscillation until reaction is forced.

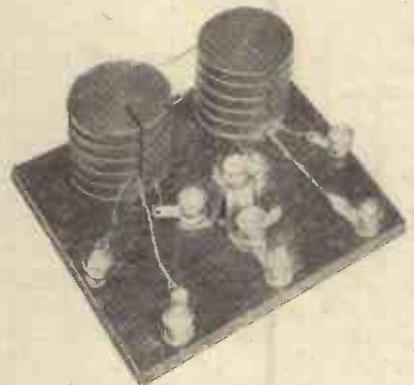
Medium and Long Wavelengths

The coils cover both the medium wavelengths and the long wavelengths, and what little damping is introduced to maintain stability on the medium wavelengths is not altogether sufficient for stability on the long wavelengths. The peculiar switching arrangement makes good this defect, however, for, when the coil as a whole is switched for medium-wave reception, the medium-wave winding and the long-wave winding are in parallel. As soon, however, as the coil is arranged for long-wave working, the short-wave winding is divided at its centre and the arrangement is such that one half of the short-wave coil is connected at each end of the long-wave winding, each half winding being left "dead."

The reaction coil is coupled into both the long and medium-wave windings, regardless of whether the tuning coils are arranged for medium or long-wave working. Now, when the medium-wave winding is left "dead," for long-wave working, the reaction coil supplies energy to both a closed inductive circuit and

an open inductive circuit. This explains why the reaction control is so smooth on the long waves.

With this particular coil it is possible to tune from as low as 200 metres right up to



The Complete Coil

600 metres, on the medium waves, and from 1,000 metres or less up to 2,000 metres on the long waves.

Winding the Coils

For the construction of the coils proceed as follows. Having prepared or obtained the grooved formers and the base, mark each former with some distinguishing mark, and then proceed with the actual winding.

Begin with the medium-wave winding, which is at the lower end of each former.

160 TURNS EACH NO. 36 D.S.C.

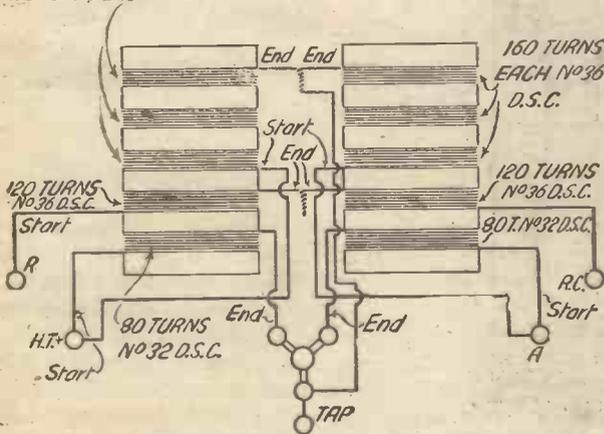
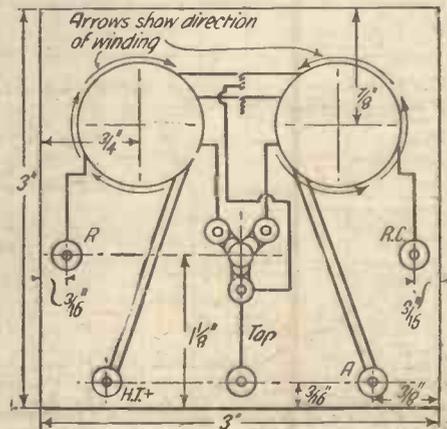


Diagram showing coil connections



Plan of coils on base showing directions of windings

Looking at the plan drawing of the complete coil, take the left-hand former and wind on 80 turns of No. 32 d.s.c. copper wire in a clockwise direction in the lowest slot and then bind the turns in place with a covering of silk thread.

Now turn your attention to the other former and wind on a similar number of turns in the lowest slot as before, still using No. 32 d.s.c. copper wire. The only difference between this winding and the winding on the first former is that it is wound on in an opposite direction.

The remainder of the coil is wound with No. 36 d.s.c. copper wire. Returning to the former first wound, wind on in the second slot from the bottom 120 turns of the No.

36-gauge wire in a clockwise direction. Bind this winding in position and take care not to get the beginning and ends of each winding mixed up. Now wind on in each of the remaining slots 160 turns of wire without breaking the wire between the third, fourth, and fifth slots.

Mark the beginning and end of this winding and then bind up the winding with silk or tape to keep the turns from slipping off the former.

Attention can now be directed to the winding of the other former. In the second slot are arranged 120 turns of wire as a complete winding for the reaction, and in the remaining third, fourth, and fifth slots 160 turns to each, this winding being continuous

or without a break between the three slots.

Remember that this second former is wound entirely in an anti-clockwise direction.

Connections

All that now remains is to connect up the beginning and end of each individual winding according to the drawing showing the detailed connections.

In making the final connections between the wires and the terminals solder the wires to soldering tags.

Although the coil in question has been specially developed for the "Talisman Portable" it is equally suitable for any receiver in which a screen-grid valve is used.

Using the Tuning Graph

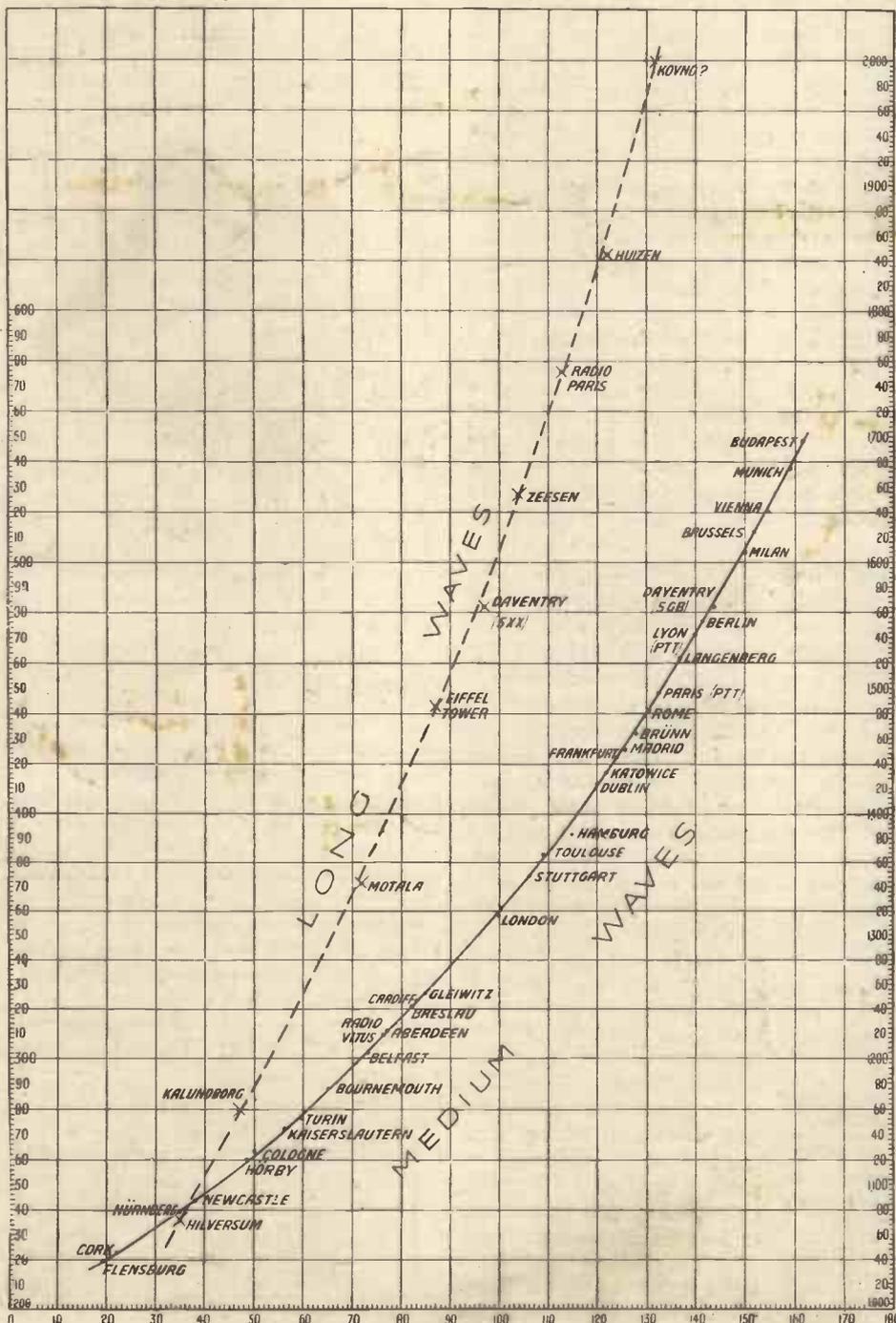
To facilitate the use of the coil a tuning graph has been plotted. To make use of this graph, which will be found a great assistance in tuning, it is suggested that readers obtain a large sheet of squared paper having ten small squares to the inch.

Mark along the lower (shortest) edge the condenser scale degrees and up the left-hand side the wavelength in metres for the medium wavelengths. Up the right-hand edge mark the wavelength in metres for the long waves.

Arrange the size of the squared paper so that every inch square along the lower edge represents 10 degrees of the condenser scale, whilst up the left-hand side the inch square represents a difference of 20 metres. The right-hand side should be arranged to illustrate a difference of 40 metres for every inch square.

Having accomplished this it will be possible to reproduce on the squared paper the condenser setting and the wavelength of any particular station received. For instance, suppose we tune in Daventry (5GB) 482 metres wavelength at 144 degrees on the H.F. condenser. Work along the lower edge of the paper until you reach 144 degrees and then follow this line up until it reaches a point where the line crossing it shows the wavelength to be 482 metres according to the left-hand edge of the graph. Make a pencil dot at this point where the two lines cross and then try tuning in another station lower down the condenser scale. Make a dot where the condenser scale reading cuts the line denoting the wavelength and tune in some further known stations. Many stations on the Continent, such as Toulouse (382.2 metres), Turin, Vienna (Radio Wien), Budapest, Gleiwitz, Breslau, Radio Vitus (pronounced Radio Veetee), announce the name of the station at regular intervals so that in this way readers should have no difficulty in making a graph with quite a few stations. The condenser settings for other stations can then be found and the curve finally completed.

The graph as shown is only applicable to standard manufactured coils used in conjunction with the condenser specified for the "Talisman Portable"



CONDENSER SCALE READINGS
Tuning Graph for the "Talisman Portable"

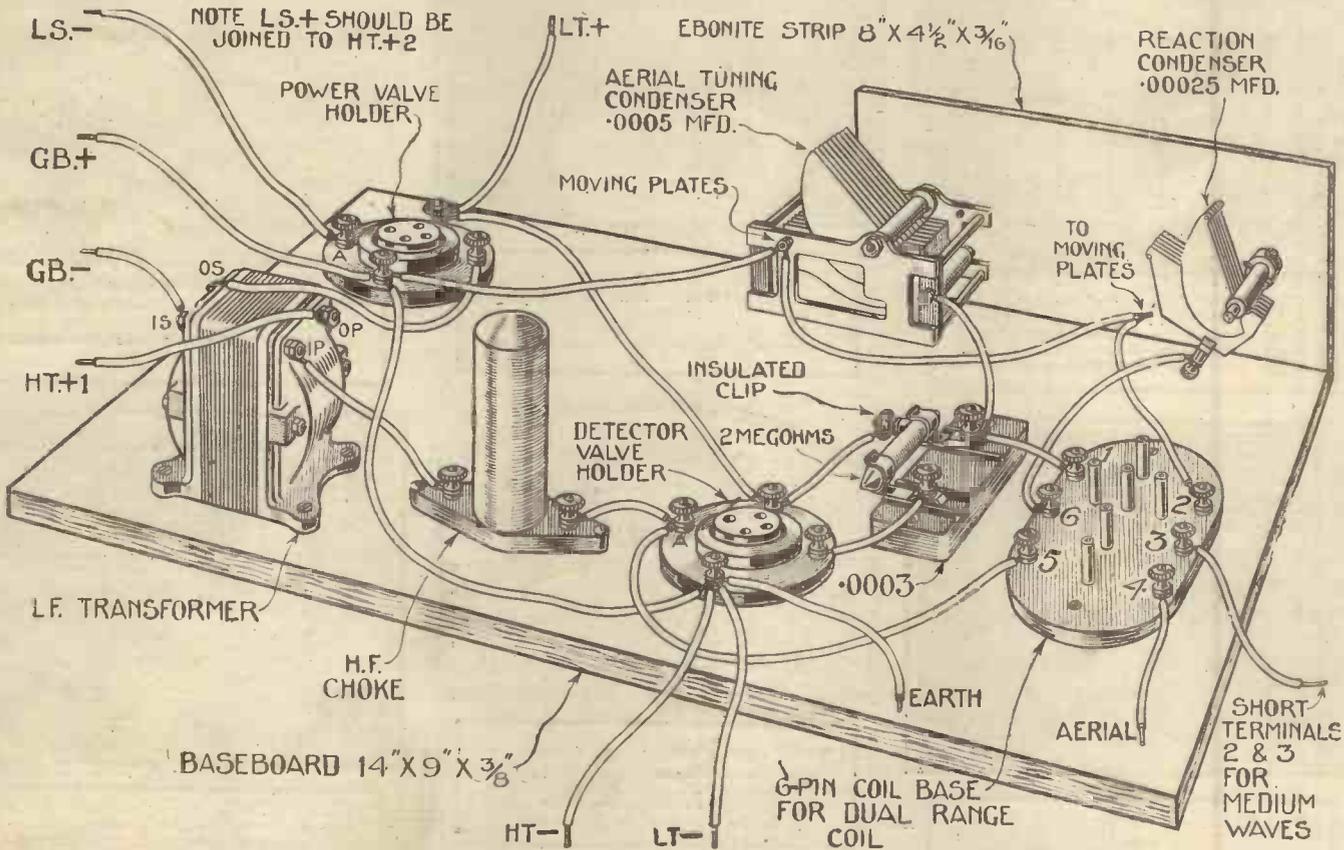
AN ELECTION HOOK-UP

Build this in half an hour and Listen to the Election Results

YOU will want to hear the election results on the evening of May 30. If you have not just the set for this purpose, or if you would like to make a simple hook-up for loaning to those who are either silly enough or unfortunate enough not to have a wireless set at all, then why not "hook up" "Britain's Favourite Two," full details of which are given in the centre pages of this issue?

This is the simplest possible of two-valvers, and if you are thinking of making it up for yourself, then the opportunity will be welcomed to string the components together on a piece of board to give it a preliminary trial—and you will be able to hear the election results. Above is a sketch of the hook-up, using nearly all the parts you will need for making the "Favourite Two." Just place them on

an odd piece of board, inserting wood screws where necessary to keep them in position, and wire up with odd pieces of wire. For simplicity, the wave-change switch and filament rheostat have been omitted from this "rough." The terminals, too, are omitted and the connections to the aerial, earth, loud-speaker, batteries, and so on are made by continuations of the wires from the components connected thereto. The aerial and reaction variable condensers should preferably be mounted on an insulated strip, and any scrap piece of ebonite, roughly 8 in. by 4½ in., will do. When working this rough hook-up, use a suitable six-pin coil, and for reception on the medium waves short-circuit terminals Nos. 2 and 3. Further hints on the construction and operation can be obtained from the description of the completed receiver, which is described on the centre pages of this issue.



NO-CHOKE SUPPLY UNITS

THE standard smoothing circuit used in an A.C. mains-supply unit consists of one or more chokes shunted by condensers. Choke coils are, however, fairly expensive components, and it is possible to use less costly high resistances combined with shunt condensers, the smoothing action of such an arrangement being proportional to the product of the resistance and capacity in circuit.

Unfortunately, the use of resistance introduces a corresponding voltage drop, which naturally varies with the load, i.e., with the current consumed by the valves. When a power amplifier is used, having a comparatively large output, the effect on the H.T. applied to the first stage becomes serious.

This defect can, however, be overcome by arranging a number of resistance-

capacity smoothers in parallel, one for each valve. Each smoother is designed to give the value of current and quality of smoothing necessary in each case, i.e., a small current and high smoothing for the first valve, and a large current and less efficient smoothing action for the power stage. This gives a less costly arrangement which is quite as efficient as choke smoothing.

M. A. L.

A company has been formed at Bellinzona (Switzerland) under the title "Unione Radiofonica Intercantonale," for the purpose of erecting a small broadcasting transmitter in the Swiss canton of Ticina. The reason given by the promoters is that the local population solely understands the Italian language, and for this reason cannot be served by the other Swiss stations.

ABOUT PORTABLE SETS

GENERALLY speaking, a portable set will operate better on long-wave stations such as Hilversum, 5 XX, and Radio Paris, than on the shorter waves, particularly in daylight. This is due to several reasons. In the first place long-wave signals are largely earthbound, and therefore suffer less from fading than the shorter waves.

In the next place a loop or frame aerial is heavily inductive by comparison with a straight or open wire, and therefore tunes more readily to the longer waves. Finally the interval couplings in a portable receiver are almost invariably of the choke or resistance type. These are naturally less efficient when handling short-wave energy, because the shunt capacity across the windings affords an easier leakage path for the higher frequency currents.

M. B.

BROADCAST ARTISTES IN PICTURE



TOM PURVIS.—One of the best-known wireless tenors, Mr. Purvis is equally at home in the classical arias of Bach, such as he sang recently, or in light operatic and concert-hall works. He was heard at 2LO on the 22nd.



ETHEL JOWSEY.—This brilliant young violinist, but yet in her teens, has won herself a name in the Midlands. Winner of the Achille Rivarde Scholarship, she has now established herself on the concert platform.



JOHN ARMSTRONG.—Mr. Armstrong has given many classical recitals and taken part in many special wireless programmes.



DÉSIRÉE MacEWAN.—One of the earliest of classical pianists at 2LO, she is also a professor at the R.A.M. With many concert-hall recitals, she has also been responsible for several broadcast concerts, and was heard most recently at 5GB on May 24.



JOHN COLLINSON.—An early broadcaster, Mr. Collinson possesses a voice of excellent range and power. He has sung at many big London concerts, and is also widely known throughout the provinces.



OLIVE KAVANN.—Gifted with a rich contralto voice, Miss Kavann occupies a high place in musical circles together with her composer husband, Mr. Percy Kahn. She has sung from most wireless stations, and has been heard many times this month.



NORMAN LONG.—Probably the first of the real wireless humorists, and known on the stage as "the man with a smile," Mr. Long is an excellent entertainer. He appeared at the Royal Command performance last year and appears frequently at all stations.



EDITH LAKE.—A brilliant young 'cellist heard at many London classical concerts, she has gained great favour with listeners. Her tone is particularly full and round, and a wide repertoire is another strong point.



PERCY FROSTICK.—The famous violinist is a pupil of Wilhelmj, and made his professional début as a child prodigy violinist at a "Prom" concert in 1896, when he was presented with a Guadagnini violin.

On Your Wavelength!

Transmission Quality

THE new condenser microphones being used at 2LO have, we are told, practically the same response to the musical frequencies as the old carbon type. Nevertheless, the quality of the musical transmissions seems to be more even, quite apart from the improvements in the matter of background noise and absence of "blasting." Technical listeners ought to be taken into the confidence of the B.B.C. in the later stages of the microphone tests. I feel sure that tests, outside broadcast hours, of musical items picked up on microphones "A," "B," and "C" would be of interest to a large number of "subscribers." After all, we ought to have some say in the matter! There would be a ready response to a call for our opinions.

Technical Matters

As a matter of fact, the B.B.C. is turning very "up stage" to its listeners in technical matters. Radio talks, experimental tests, "squeaks," and other technical items which could be broadcast, are now non-existent, and we have now settled down to a humdrum of talks, symphony, jazz, and ballads. Some of the surprise items have been fresh and bright, but R. E. Jeffrey, the man behind them, has now gone to Elstree. Please don't think that I am grumbling at the programmes; I am merely bemoaning the absence of those technical "appetisers."

The Gold Rush

The daily newspapers have come to notice the fact that a great many leading B.B.C. officials have "gone over" to talkies and the gramophone companies. Some little while ago it was exceedingly difficult for ex-B.B.C. engineers to get good positions with any of the big electrical companies, and it has been suggested that there has been some kind of "unwritten agreement" between the B.B.C. and these companies in order to keep down salaries and competition for the services of particular people. If this is so, then the B.B.C. is only getting what it deserves; the "talkies" will have broken the ring. Meanwhile, the "gold rush" to Elstree continues. One firm, I hear, is going to take on no less than fifty engineers, "preferably B.B.C. trained." Perhaps "B.B.C." stands for "British Boys' College," after all!

Lost from the B.B.C.

The latest list of "casualties" —

PROGRAMMES:

Dramatic Dept.: R. E. Jeffrey (British International), K. V. Wright (British International), J. Mair (British International).

Organisers: Cecil Lewis (H.M.V.), Rex Palmer (H.M.V.).

ENGINEERING:

Research Dept.: A. G. D. West (H.M.V.), B. Honri (Gainsborough), D. F. Scanlan (British International), J. A. Murray (British International).

O.B. Dept.: C. V. Thornton (British International), J. Watkins (British Acoustic).

London Station: R. Howarth (British Acoustic).

Development Dept.: A. N. Odell (British Talking Pictures), J. Roose, K. Knowles.

Lines Dept.: A. S. Atkins (British International).

Other "casualties" pending.

European Broadcasting

Do you ever look at the "Broadcast Telephony" page—or, rather, do you notice how alterations crop up in it from week to week? For some little time, when calibrating receivers, I have religiously consulted it, as I find that, in view of its weekly revision made at the eleventh hour when going to press, it has afforded me considerable assistance.

The alterations are not made in a haphazard manner, but are based on personal nightly observations, on actual measurements carried out at regular intervals and on information reaching its compiler from foreign correspondents. It is for this reason that from time to time you will find in these columns the new stations which may be testing, or "contrariwise" the disappearance of some broadcaster of mushroom growth which without warning may have retired suddenly into oblivion.

Varying Wavelengths

As to the wavelengths, they must, as you know, vary from time to time; but in those cases where a plus or minus is reported which does not materially affect tuning to any degree no alteration is made. What, however, is necessary is the notification to the effect that a transmitter, although advertising itself on a certain wavelength, is actually working on a higher or lower portion of the band. It is in these details that "Broadcast Telephony" renders great service for the weekly revision, showing as it does what the stations are really doing in the matter of wavelength changes.

Theoretical wave plans may be regularly formulated at Geneva, Brussels, or Prague, but so long as some transmitters take it in their heads to choose their own positions, irrespective of the fact that they may be seriously inconveniencing friends in other

countries, so long will a weekly revised "Broadcast Telephony" list be needed.

Were You "Had"?

The other night, whilst searching over the broadcast band, I came suddenly on to a transmission in a language which seemed to consist mostly of consonants. It wasn't French or German, quite obviously, and the station could not be Kattowitz, from the wavelength. Presently I caught the word "Kovno," and duly made a note that Kovno had apparently descended from his lofty heights into the broadcast band. I moved on, but came back again in a few minutes to the same wavelength, and found another transmission in a different language taking place. Sure enough, another station was presently announced. On the third visit to this wavelength yet another station and another language were heard. Was the Tower of Babel calling? Then I tumbled to it. Berne was conducting a relay of foreign stations; and a jolly good relay it was.

Fishing With Valves

It is being done really, really it is; though I don't mean that triodes or tetrodes or pentodes are being used as bait. A trawler was fitted recently with echo-sounding apparatus, which has proved an enormous success. The principle of the echo-sounder is this. At the bottom of the vessel there is a device for sending out a sound signal as well as one for listening to it. Very well, then: You shoot out your sound signal, which travels at a known rate through water. When the sound waves reach the bottom they are reflected back again, returning to the ship's bottom, where they are picked up by the receiving apparatus. There is, in fact, an echo produced under water. By measuring the time between the departure of the sound signal and the arrival of the echo it is a simple business to determine the distance that the sound waves have travelled, and half this, of course, gives you the depth of the water, since they have to make a double journey. Actually you need not make the calculations, because this instrument does it for you. Fish are queer creatures. They inhabit different depths of water at various times. Once you have found where they are you have only got to go on trawling in that depth to make a good catch! A skipper who returned the other day from a trial voyage was most enthusiastic. He had found fish at 200 fathoms and kept his vessel in that depth of water with the aid of the sounder, with the result that he had an excellent catch. Can't somebody find a wireless gadget to help those who are freshwater fishermen?

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On Your Wavelength! (continued)

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How Do We Stand?

The other day I was discussing with a fellow wireless man a question to which it seems impossible to find an answer: What is the proportion nowadays between valves and crystalisers? He held that the balance was about fifty-fifty, whilst I maintained stoutly that it was much more like 70 per cent. of valve users against 30 of crystalites. Five years ago there were certainly eighty crystal sets to twenty valve sets. When the B.B.C. held a kind of census some time ago the returns showed that the two kinds of sets were much more even and distributed. I believe to-day that the crystal set is becoming rapidly less and less used. The little town in which I live is well within crystal range of 2LO and 5XX and 5GB. There used to be a big flock of crystal users here, but nowadays their numbers are very few indeed. If the crystal set is used at all in this locality it nearly always has one or two note-mags. attached to it to enable it to operate a loud-speaker. Conditions are very different from what they were. Time was when you couldn't construct a crystal receiver for much less than a fiver and when the valve set ran you into quite big money. To-day you can make a valve set for £2 or £3 and maintenance costs very little. In America the crystal set is never seen outside museums, and I expect that the position will be very much the same in this country a year or two from now.

German Late Nights

The broadcast programmes starting at about midnight and continuing until 1.30 a.m. or later, which are now being run by many of the big German stations and their relays, are most interesting to any who are in the habit of consuming the midnight amp, for they enable one to see just what perfect reception would be obtainable from very distant stations if the ether were not quite so crowded as it is now. I shall probably be taken rather to task for speaking of many of the German stations as very distant. Some of them come in so loudly that we regard them as almost on our doorsteps. Actually the ranges at which we hear them are surprisingly great. Without looking at the map you will probably think it surprising that Turin comes in so astonishingly well all the way from Southern Europe, but you take it quite as a matter of course that you hear Koenigsberg, which is only in Germany. Actually, Turin is a little under 600 miles away, whilst Koenigsberg is rather more than 900 distant from London. Milan, again, is only about 600 miles away, though Breslau is 750.

Strong German Stations

Nuremberg, one of the strongest transmissions that we hear, is 550 miles away,

Stuttgart 500, Munich 600. Compare these with Brussels 200, Paris about the same, Hilversum a good deal less, and Lille a bare 150 miles. Even Vienna, which somehow sounds much further off than the German stations, is only 750 miles away. Bearing these facts in mind it is little short of marvellous how well the German stations stay the course, providing such wonderful reception in this country. In fact, if you make a trip over the broadcast band, logging only those stations which come in at full loud-speaker strength I am quite certain that you will find that the majority of them are Germans. And it is not done by means of enormous power, for with the exception of Langenberg no German station is rated at more than six kilowatts, and the majority are only four.

Appreciation

In the States, you know, they make a great feature of the "daily dozen," which is their name for the physical jerks exercises sent out at 6.30 a.m., or some other such unholy hour. A lady living at Cincinnati, who was finding to her sorrow that she was no longer as slim as she had been, set her teeth and her alarm clock, resolving to get rid of some of the superfluous adipose tissue *via* the loud-speaker. That last sentence looks a little ambiguous, but doubtless you will see what I mean. At the end of a month or so the scales proclaimed that she had lost no less than thirteen pounds. Chortling with joy she seized a sheet of notepaper and wrote to the striped-jersey fellow who runs the show. "It is quite evident," she gushed, "that you earn your living off the fat of the land!"

Long-range Chimes

An interesting experience came my way the other night when I was listening to W8XK, the 35.4 metre relay of KDKA, which is extraordinarily well heard just now. I found W8XK relaying dance music from London *via* 5SW. At midnight, which is, of course, 7 p.m. in the States, Big Ben's chimes and booms came through to perfection after their 6,000 odd miles journey through the ether. The American station had dispensed with its 7 p.m. time signal, making use of Big Ben instead. I was able to set my watch from Westminster *via* Chelmsford and Pittsburg. When you come to work it out the sound of the chimes actually reached me in less than the thirtieth of a second after it had boomed out, quite near enough anyhow for watch-setting purposes.

Patent Royalties

The High Court has been engaged for the past fortnight in reviewing the question of Marconi royalties on broadcast receivers. Some time ago the Comptroller of Patents granted a compulsory licence to the

Brownie Wireless Company permitting them to manufacture sets at a reduced royalty for 5s. for the first and 2s. 6d. for each additional valve holder. The Marconi Company have now appealed against this ruling. The appeal has been concluded and final judgment is at present under consideration.

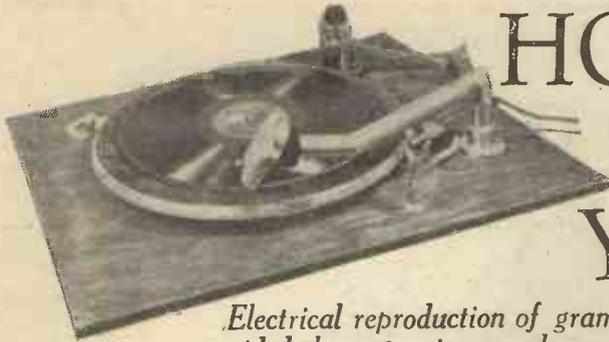
One point of general interest both to inventors and the public was made by the Attorney-General in the course of the proceedings. He said that the main object of the patent system was to encourage production and progress, to lead manufacturers on to produce a better article and so serve the interests of the community in general. It was not devised with the object of permitting inventors to make enormous profits at the expense of the public. They were entitled to secure a reasonable reward for their ingenuity, but only so long as they allowed the public to enjoy the advantage of their discoveries upon reasonable terms and as widely as possible. This seems perfectly reasonable to me in theory, though it will no doubt prove difficult to apply in practice.

Making Your Plans for Television

Have you ever tried to work two distinct receiving sets off the same aerial and receive two separate programmes from different stations without any interference one with the other? I have carried out many experiments in this direction lately, and find that it can be done. My reason for tackling this problem arose from the fact that I had seen it mentioned often that two aerials will be required in order to receive the television broadcasts as well as the speech broadcasts when these dual transmissions are on the air, but in my opinion in many cases this should not be so. Of course, it is quite understood that two receiving sets will be necessary, while, should you be in the happy position of already possessing two wireless sets, attention can be turned to a power amplifier. Better still, there is one useful unit you can prepare in advance, namely, a combination power amplifier and an H.T. battery eliminator which can be used with any type of receiver for the amplification of television signals as well as for the operation of dynamic loud-speakers.

As far as the eliminator is concerned, it will have to be tackled in a new light from the standpoint of current drain and adequate voltage supply, for in this case two receivers must be supplied. The wider the variety of needs which can be dealt with in a unit of this nature, the better will you be equipped to start your experiments in this new science. Make your plans well ahead of schedule, and thus get off the mark when the first experimental television broadcast is put out by the B.B.C.

THERMION.



HOW TO GET THE BEST FROM YOUR PICK-UP

Electrical reproduction of gramophone records has many advantages over the older method provided the system is properly operated. In the article below, W. James explains the correct procedure

ELECTRICAL pick-ups give approximately the same wide variation of results as the different types of loud-speaker.

tion, apart from the reproduction itself, are the noise made by the pick-up whilst playing, its sensitivity, and its general mechanical construction. A few types are very noisy and have movements which are rather too stiff or too free. A really noisy pick-up is a nuisance, because it has to be covered when playing a record or the noise will interfere with the reproduction. There are a few types with movements that chatter badly when playing certain records and give one the impression that they are rather severe on the records. This may be due to insufficient damping of the movement or to bad adjustment, but whatever the cause, a pick-up which chatters badly should be looked upon with suspicion.

may well decide there are only one or two that seem to provide a well-balanced output. Naturally the type of loud-speaker

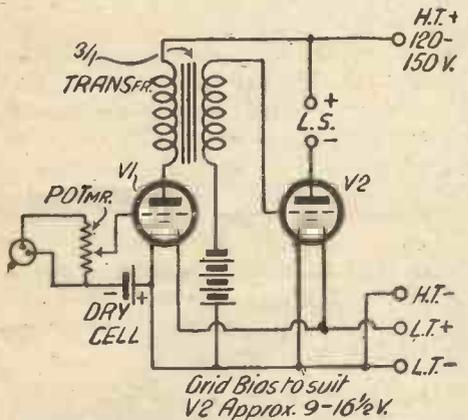


Fig. 1. Pick-up used with two stages of amplification. Some of them give too little bass and high-note output, whilst others seem to provide

Sensitivity, taken by itself, may not be a matter of great importance, but one should be on the look-out for pronounced resonances when the instrument appears to be very sensitive.

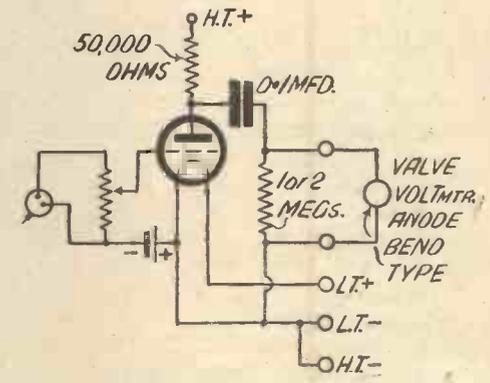


Fig. 4. A pick-up test circuit

employed when making comparisons is a matter of some importance, and one should

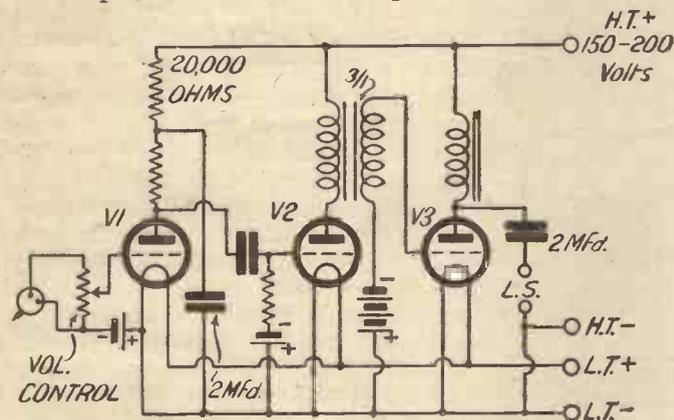


Fig. 2. R.C. and Transformer Amplifier

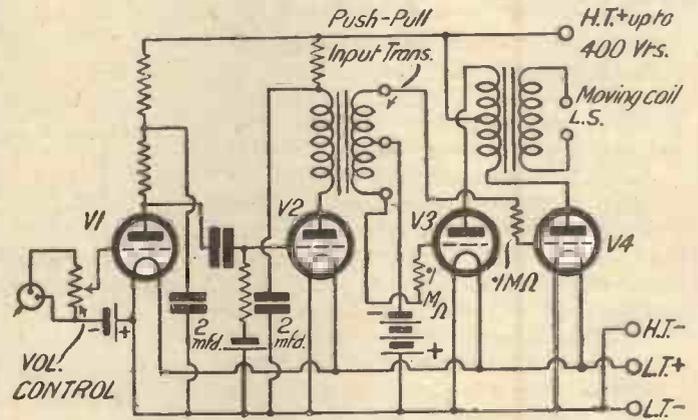


Fig. 3. A suitable push-pull circuit

too much bass, or too much treble, with the result that the reproduction tends to sound too low or too high pitched instead of being nicely balanced.

Those who are able to compare different makes will be surprised at the variations in the tonal qualities of the reproduction, and

always endeavour to adjust the volume to the same level in every instance.

All this, however, is not to be wondered at when the construction of the various types is examined, for whilst there are a number that are clearly and unmistakably the outcome of skilled design, there are others which are little better than phone ear-pieces with a needle holder attached. Fortunately, for the beginner who values his gramophone records, the well-made pick-ups easily outnumber the poor ones, and enthusiasts have a number to choose from.

There is little to be said regarding methods of connecting a pick-up. It is considered the best practice to join a volume control to the pick-up in order that the input to the first valve may be regulated. The usual form of volume control is a potentiometer having a fairly high resistance, such as 100,000 ohms. The resistance should not be too high, and there is usually no harm in employing a component having a resistance of as little as 20,000 ohms.

I suppose a pick-up is chosen partly as the result of demonstration and partly by its price. Points that should receive atten-

Two good amplifying stages may suffice when the power valve is an ordinary one (Fig. 1), and is supplied with high tension at from 120 to 150 volts.

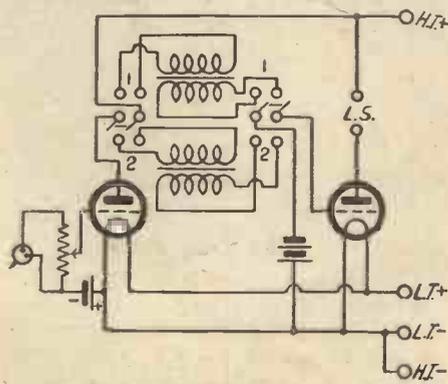


Fig. 5. A transformer test circuit

When the pick-up is rather insensitive, (Continued on page 758)

AVOIDING SATURATION IN CHOKES



By J. H. REYNER, B.Sc., A.M.I.E.E.

I HAVE just been testing a number of special L.F. chokes. These chokes have the peculiarity that their iron circuit is not complete, but that a small air-gap is left.

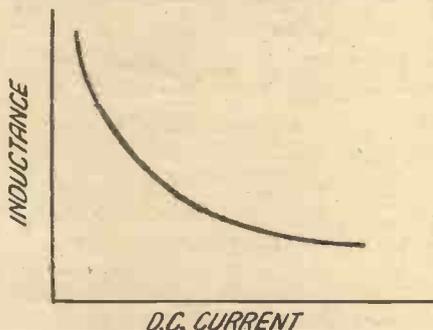


Fig. 1. Typical inductance-current curve

Many readers will have come across chokes of this nature, although they are not yet in general use, and they may have wondered why such a gap was permitted. The fact is that the use of a gap such as this solves one of the greatest problems in the design of iron-cored chokes, namely, the continuous falling off in the inductance which results when any steady current is passed through the choke.

Almost every circuit in which an iron-cored choke is used to-day carries both direct and fluctuating currents. The simplest cases are those of a choke in the anode circuit of a valve or a smoothing choke in the filtering arrangements of an eliminator. In each of these cases there is a steady current of several milliamps, in addition to the small alternating fluctuations, and we are defeated in our attempts to obtain a high inductance by the presence of the steady current.

Inductance and Permeability

The inductance obtained depends upon the permeability of the iron, which is not constant, but varies in accordance with the state of magnetisation of the iron. The presence of the direct current passing round the winding produces a certain steady magnetisation and our alternating currents cause fluctuations about this steady state. Under the conditions which normally obtain in a choke coil, the permeability of the iron falls off steadily as

the magnetisation is increased so that the greater the direct current, the less inductance of the choke or transformer or whatever the instrument is. This gives rise to the well-known inductance-polarising current curve, as shown by Fig. 1.

It is a little difficult at first sight to see how the removal of some of the iron from the choke can remedy this state of affairs. It is one of the principles of choke design that the more iron which can be obtained, the better will be the choke, as a general rule. It would therefore seem that the omission of some of the iron from the core would only result in a loss of efficiency. This, however, is not the case, because the inclusion of a small air gap of suitable dimensions and in the correct position enables us to work on a different portion of the permeability curve and to obtain

If we have a coil of wire carrying a current, a certain magnetic field will be produced. This will not be very extensive, nor will it be concentrated, but it will be

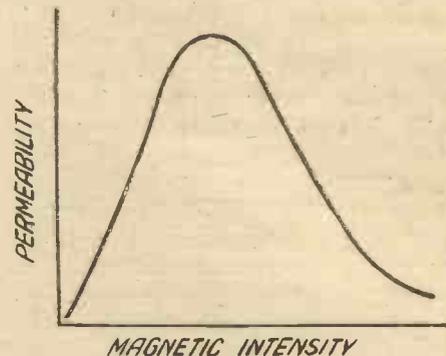


Fig. 2. Showing how the permeability varies with magnetic strength

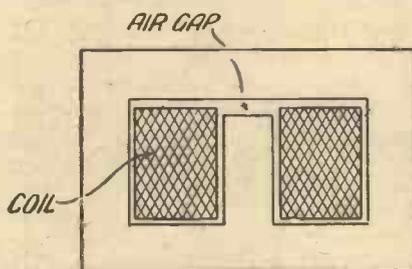


Fig. 3. The use of an air gap reduces magnetisation of iron due to steady current

somewhat surprising results. To understand this it is necessary to consider the production of magnetisation in a choke a little more closely.

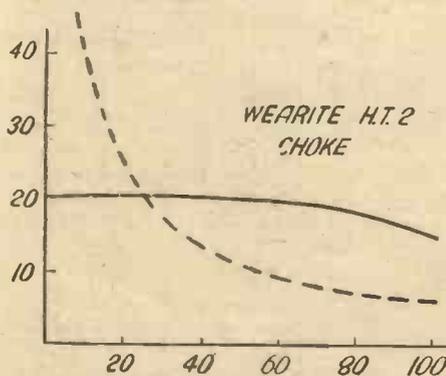


Fig. 4. The use of a gap gives greater inductance under working conditions

distributed through a large portion of the surrounding space. The magnetic field would be proportional to the current, the number of turns, and the shape of the coil.

If we place an iron core inside the coil we obtain two effects. Firstly, the magnetic field is nearly all concentrated within the iron itself, very little being radiated in the surrounding space; secondly, the magnetic field produced is much more intense. Various materials have different degrees of magnetic resistance or reluctance, as it is called, in the same way as different metals or substances have different conductivities. It is thus possible by using iron to obtain a magnetic force many hundred times greater than is the case with equivalent conditions using air or some ordinary metal. The actual magnetic field obtained is proportional to the current and the number of turns as before, but is now also proportional to the permeability and inversely to the actual length of the iron circuit.

Now, if the steady current through the coil is gradually increased we obtain increasing degrees of magnetisation of the iron, and, as we have already seen, the permeability will change. Although, as was stated earlier, under the conditions usually obtaining in practice, an increasing steady current causes a falling off in the

(Continued on page 757)

MY WIRELESS

DEN *By* W. JAMES



Weekly Tips,
Constructional
and
Theoretical—

For the
Wireless
Amateur

Ganging Condensers

ONE of the little difficulties that a designer who is attempting to gang the condensers tuning a number of circuits has to dispose of is that of the aerial circuit.

In this circuit we have a capacity effect introduced by the aerial and earth, with the result that the aerial tuning coil or high frequency transformer tends to tune to too high a wavelength as compared with the other circuits. Several methods are available for compensating for this effect, but I notice that the designers of receivers in America often prefer not to tune the aerial circuit at all. They merely include a choking coil or even a resistance in the aerial circuit, and this is connected between the grid and filament of the first valve.

Only the inter-valve high-frequency coils are tuned by the ganged condenser, with the result that the construction and the setting of the tuned circuits to match over the wavelength range of the set is simplified. There is no reason why, for normal reception, the efficiency of such an arrangement should not be satisfactory.

Grid Leak Position

The two well-known methods of connecting a grid condenser and leak, illustrated in Fig. 1, no doubt have their respective advantages, but I believe the arrangement of Fig. 1 B will gradually replace that of Fig. 1 A as the grid leak may be connected with very short wires between the grid and filament terminals of the valve-holder.

In a mains operated set it is important that the grid leak connections be kept short or a hum which would spoil the reception may result, and it is easiest to effect this by the Fig. B method.

When a tuned-anode circuit such as is so often used to couple a shielded valve is connected to a detector arranged for leaky grid rectification, the grid leak must be joined between the grid and filament. Similarly, when the aerial circuit is connected directly to the detector, for in this instance the negative side of the low-tension is usually earthed, whilst one end of the grid leak is generally taken to the positive side of the circuit.

Fixed condensers having three terminals

in order that the grid condenser and leak may be connected as in Fig. 1 B have been available for some time, but when one of these special condensers is not used, an ordinary two-terminal condenser and a grid-leak clip may be employed, always remembering that the grid leak connections should be made as short as possible.

Using an A.C. S.G. Valve

Valves of the indirectly heated cathode type have been available for the past year

fairly thick in order that its resistance shall be low.

Those who wish to try one of these new valves would have to employ a transformer which may be connected as in the Fig. 2 A. It will be noticed that a potentiometer of low resistance is joined across the terminals of the filament winding of the transformer and by adjustment of the sliding contact it is possible to find a point where there is no hum. Bias may be introduced as in Fig. 2 B.

Earth Matters

One might well imagine that most, if not all, amateurs would be familiar with the essential points of aerial and earth construction. Yet I am frequently asked whether a buried plate provides a better earth than a water pipe, or whether an insulated length of wire should be used to connect the earth to the receiver instead of a length of uncovered wire.

Personally, I prefer to use for the earth a metal plate having an area of several square feet, although when connection can be made with a water pipe relatively near the place where it enters the ground it may hardly be worth while to take the trouble of burying the plate.

I also prefer to employ a covered connecting earth wire, as I have found a bare wire is not always satisfactory. It would appear that noises may sometimes be set up when a relatively lengthy bare connecting wire is used, due, I expect, to the number of ineffective earths formed by the wire touching at various points a wall or other earthed object against which it might rest or be stapled. Whatever the explanation may be, however, I have a preference for the covered wire.

Those Howling Valves!

When a howling noise gradually builds up during reception, or sometimes a few seconds after the set has been switched on, one is inclined as a rule immediately to suspect the valves. Sometimes a cure is effected by changing the detector valve or by moving the valves around in the set, but I have had one or two instances where the trouble has been due to a faulty contact either between one of the valve pins or a socket in the holder.

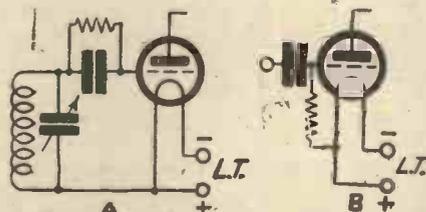


Fig. 1. Grid-leak Connections

or two, but it is only recently that shielded valves fitted with a rather special filament that may be heated with alternating current have been manufactured.

A particular shielded valve that I have been trying takes .8 ampere at .8 volt. The filament is, therefore, comparatively short and thick as compared with the filaments

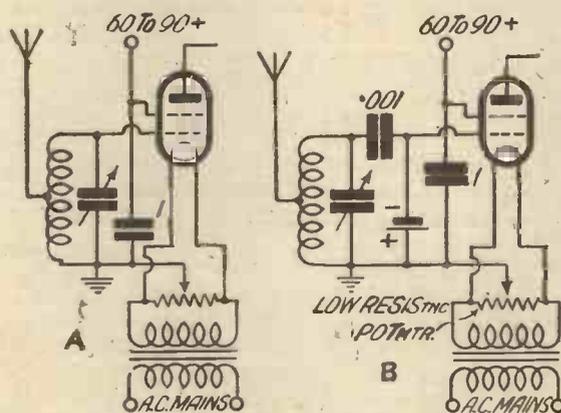


Fig. 2. How to use an A.C. Screen-grid Valve

of ordinary valves. From the figures given it is easy to see that the resistance of the special filament is 1 ohm only, whereas that of a two-volt .1-ampere valve is 20 ohms. This should be remembered when wiring the filament circuit, and more especially when several valves are to be heated from the same source. The wire should be

LETTERS TO THE EDITOR



The Editor does not necessarily agree with the views expressed by correspondents.

Correspondence should be brief and to the point and written on one side of the paper.

Sunday Programmes

SIR,—Regarding the Sunday programmes I am glad of the opportunity of answering my critics.

M. N. F. (Chesterfield) cannot understand anyone with five valves begrudging 1½ hours to religious service. I have not yet begrudged it, provided it is given at a reasonable time, and an alternative programme is offered at the same time. On other days programmes start in the morning and end at about 11 p.m. or later. Has M. N. F. realised the long empty gaps which occur on Sundays, with the Continent as the only alternative?

Fortunately on this occasion I have to answer reasonable comment. M. N. F. refers to "hundreds" of people who for one reason or another cannot attend church. I have every sympathy with their point of view and believe they should be catered for in strict proportion to their number. M. N. F. talks of them as hundreds; presumably he is using a figure of speech, but by using so inferior a figure of speech he is reasonable enough to admit that the public he defends are a small minority and I feel sure he will be reasonable enough to see that they only have a right to a very short service about once a month.

Unfortunately in the last paragraph he leaves the subject and comments on my morals. As he doesn't know me and probably doesn't want to, may I inform him for his own peace of mind that I am in no danger of immediate damnation, and my morals are under excellent local influence; also that I was a regular churchgoer for about fifteen years and number two ministers of religion amongst my acquaintances.

G. C. S. (Birkenhead).

H.F. Switching

SIR,—Re "Thermion's" remarks on H.F. switching. Being only one mile from 2ZY I have had to cut out my H.F., which is a screen-grid valve, when receiving the local station and after much experimenting have found the following method best.

The S.G. is coupled through a choke in the parallel-feed method. The circuit is broken between the coupling condenser and the tap on the tuning coil. A lead is taken from the condenser to one side of a single-coil holder which has two sockets, the other socket is connected to a terminal on the strip at the back of the set. A flex lead is taken from the coil tapping to either of the sockets so that if the aerial is con-

nected to the spare terminal the H.F. is not in circuit and it is only the work of a minute to plug over to the S.G.

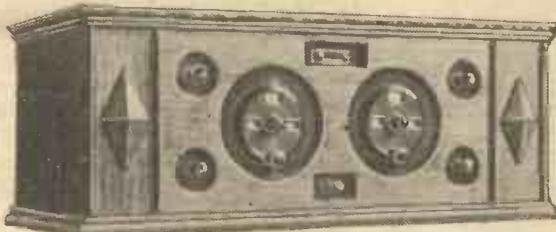
H. A. D. (Manchester).

The "Chapman-Reinartz Two"

SIR,—So far I have seen only one appreciation in your pages of the above, described in your issue of October 20, 1928.

It is a pity that such an excellent set seems to have sunk so soon into oblivion, or at least failed to arouse more enthusiasm, for its performance is remarkable.

With the addition of an extra valve, using R.C. coupling in the first stage, a potentiometer across the L.T., and a .0001 fixed series aerial condenser, I have evolved a circuit that gives all the volume, purity and selectivity one could desire. Radio Paris, Hilversum, Newcastle, Aberdeen, Königsberg, Koenigswusterhausen, and many other stations not yet identified,



The receiver with the decorative wooden panels to which reference is made in the accompanying letter

come in at full loud-speaker strength.

I am enclosing a photograph of the set, which shows how a wooden panel can be made to look artistic.

W. (Hammersmith).

Linen-Diaphragm Speakers

SIR,—Since the first appearance of the linen-diaphragm speaker, I have built up five, using various sizes, shapes and materials.

The circular shape makes the tensioning of the diaphragms a good deal easier and uniform, as I found with the square shapes that after being in use a short time the corners were liable to sag.

In the construction of my latest speaker I utilised 7-ply birch, which I had cut into two rings 1¼ in. wide, 20 in. and 15 in. diameter respectively.

I found, also, that when perforating the diaphragm in the centre, that it was a very good plan to cut two washers of linen (and fix with seccotine) over the holes, the threads of the washers being placed diagonally to the threads of the diaphragms. The reason for using the washers is that on

one occasion I was unlucky enough to split a diaphragm by using just a shade too much tension.

These speakers are, in my opinion, by far and away the best for the average amateur, and really give something approaching realistic reproduction.

J. H. P. P. (Nottingham).

A.C. Frequencies

SIR,—I was much interested in a discussion entitled "A Standard Set" which was included in the January 19, 1929, issue of AMATEUR WIRELESS under the heading "On Your Wavelength." I note that reference is made to the standardisation of supply in America and it was stated that 110 volts 50 cycles A.C. is universally used. The writer of this article was evidently not up to date in regard to American practice, as 50 cycles supply is most uncommon in this country, practically all of the alternating-current distribution being at 60 cycles. The 110 volts is a little more correct, but has now been superseded by 115 volts. In this connection I am enclosing a copy of the publication of the Lamp Committee of the N.E.L.A., entitled "Central Station Voltages." You will note that 58.8 per cent of the supply is now 115 volts, while only 14.8 per cent is 110 volts.

—A. B. MORGAN (Assistant Engineer), National Electric Light Association, New York.

TETRODE VARIETIES

IN the case of the two-electrode and three-electrode valve, the terms diode and triode were in themselves a sufficient classification. With four electrodes, however, the term tetrode becomes ambiguous. For instance, the indirectly-heated valve has

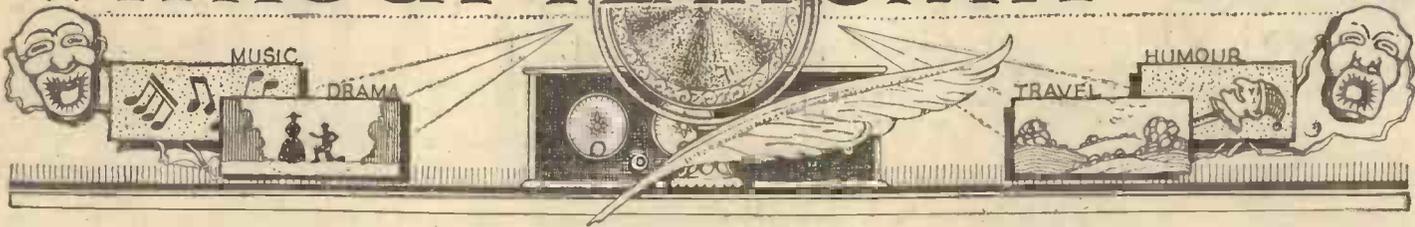
four electrodes, including the heating element for the cathode. This type of tetrode is quite distinct from the two-grid variety, which in turn has two separate forms. In the first, the extra grid carries a small positive bias and serves to overcome the "space charge" effect; whilst in the second it is heavily biased and is used to screen the plate from the control grid, so as to eliminate interelectrode capacity coupling.

A two-grid tetrode has no less than nine characteristic curves. This follows from the fact that each of the three "cold" electrodes collects a part of the electron stream from the filament, and the precise proportion going to each depends upon the relative voltages applied to all three. By fixing a steady voltage on any two electrodes and varying the voltage applied to the third, one definite characteristic curve is obtained.

The remaining eight curves are derived by ringing the changes between the fixed and variable electrodes.

B. A. R.

WITHOUT FEAR OR FAVOUR



A Weekly Programme Criticism by Sydney A. Moseley

THE passing of Rex Palmer from the B.B.C. brings to my mind two observations:—

The extreme reluctance on the part of habitual wireless listeners to part with a voice they know and have grown to like; and the ever-occurring question of wireless diction.

Didn't Shakespeare say something about conscience making cowards of us all? The same might be said about habit. As a friend of mine once put it, "When I switch on my set on a wet evening I like to hear a familiar voice—makes everything seem more homely!"

Most of the announcers are pleasant to listen to because they have that "naice" way of speaking without over-doing the polish. And then they say "orphan" for "often" and "dar" for "day"—and, we don't know where we are again!

Our Mabel's new sketch about Auntie recording her vote is one of the funniest little playlets I have heard for a long time.

Wish Wynne failed to give the impression of a "little girl" in her "Hello, Twins!" Her acts were well written, but they were lacking in execution.

A correspondent has pointed out that Harry Hemsley—the child impersonator—is not a ventriloquist, and for this reason does not carry things off on the stage. But across the wireless he scores.

But aren't you getting a little tired of these child mimics?

"2LO and its listeners should really be proud of Jack Payne and his band," writes "Harold." "I've been listening most carefully to them, and I must say that their arrangements are fine. By the way, I should like to know who is responsible for these arrangements. But, apart from this, the execution of the band is excellent."

In the next breath my young syncopated friend writes:—

"Sorry—but I don't like Geoffrey Gibson's saxophone solos. As a solo instrument the saxophone must be exceptionally well played in order to be effective."

I never thought that *The Prisoner of Zenda* would make a suitable radio play—but it did. Mr. Holt Marvell did good work when he adapted Anthony Hope's famous work to the needs of the microphone. In wireless plays of this description one misses, of course, the costume and scenic effects. But the absence of introduction or connecting narrative helped matters, because it heightened the "stagey" effect.

After studying the map of the castle, I switched off the light and settled down to the play. It was so well acted by the nameless performers that I was able to picture everything. Congratulations, everybody concerned!

My remarks about doing homework to music have resulted in letters from correspondents who each declare that they know the right and wrong of the matter. I notice that most of the scholars who write are not in favour of the wireless accompaniment!

Hyman and Franklin make a notable addition to the list of successful Jewish humorists who have broadcast. Their Cohen, *Commercial Traveller* sketch was quite funny.

"Although I am totally against those who want jazz and low comedy on Sunday," writes G. Carter, of Finsbury Park, "I must protest against the mass of religious matter to which we are treated

between afternoon and evening. Here is a recent Sunday programme:—

5.15 Missionary talk.

5.30 Sermon.

5.45 Church cantata.

6.15 to 8 The usual depressing silence.

8.0 Religious service.

8.45 Charity appeal.

"This programme is typical. In addition, the Epilogue (of which I am heartily in favour) can be added to the list of religious matter. This is an unfortunate attribute of the powers that be. They will insist upon giving us things in chunks."

My correspondent suggests that a string quartet or soprano solo should be sandwiched in between the religious items.

What an annoying habit some band leaders have of playing drawn-out solos on the squeakiest top notes. This happens with an alarming frequency during the lunch-hour broadcasts—which, by the way, are not so good as they used to be.

I have received a post card on which is written the following cryptic message:—

"Topical talk by a steelworker about his job full of interest. Could do with more! W. S."

WLS, Chicago, in reviewing its five years on the air, estimates in that time it has received 1,000,000 letters from listeners. Last year 4,000 persons appeared before the microphone.



The new London Regional Station in its lonely open situation is a contrast to the present station, which is amongst the London traffic

BRITAIN'S "FAVOURITE TWO"

THE FAMOUS SET VOTED

judgment a list of circuits from two-valvers to five-valvers was given and it was required that these should be put in order of popularity. As the list included ambitious kinds of sets such as four-valvers, with two neutralised H. F. valves and five-valvers with gang control, it follows that the winners in popularity had a hard fight!

Why it is a Favourite

To cut a long story short, a simple three-valver was judged to be the most popular circuit, and the next on the list was judged a certain simple two-valver. It follows, therefore, that at the time the competition

was held these two sets were popular with most amateurs, for AMATEUR WIRELESS entrants in this competition would judge not only by their own experience but from that of their friends. In later issues of AMATEUR WIRELESS, namely Nos. 294 and 295 respectively, were described the concrete results of the competition. These were "Britain's Favourite Three" and "Britain's Favourite Two."

This was in the early part of 1928. Since then (the issues, concerned being early out of print, of course, owing to the great demand) the AMATEUR WIRELESS Technical Staff has received so much correspondence regarding these two sets that it was considered advisable to publish new details. At the same time the opportunity was taken to see if any additions or modifications could be made, thanks to developments which take place in about eighteen months. The 1929 edition of "Britain's Favourite Three" was published recently in No. 356 and it is anticipated that these constructional particulars of an up-to-date version of the "Favourite Two" will meet with an equally wide appeal.

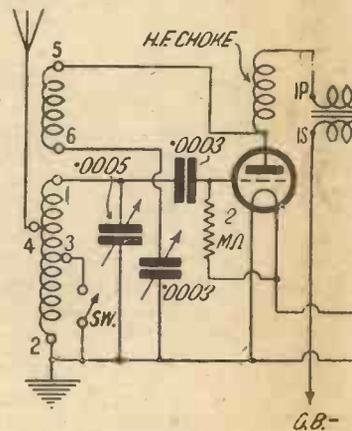
A Useful Set

There is a very definite demand for two-valvers, because although probably if a census were taken it would be found that three-valvers are slightly more popular than

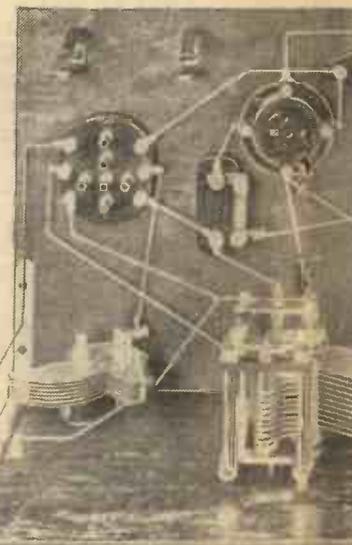
two-valvers, there is a strong line of demarcation between the two. The extra range and volume, given by a three-valver, are not demanded by those who live reasonably close to broadcasting stations and who do not want always to be able to receive the foreigners on the loud-speaker. In addition there is a big difference in running costs between a two-valver and a three-valver, although the difference in initial costs is not so remarkable.

The reason for this is that the extra valve added is generally a power valve, and apart from the additional .15-.25-amps. entailed in filament consumption a very much larger H.T. battery must be used to give a steady flow of anode current, and not to put too much strain upon tiny cells. With a "two" matters are much more economical, for it is not essential to use super H.T. batteries, although there is

UP-TO-DATE



The Circuit

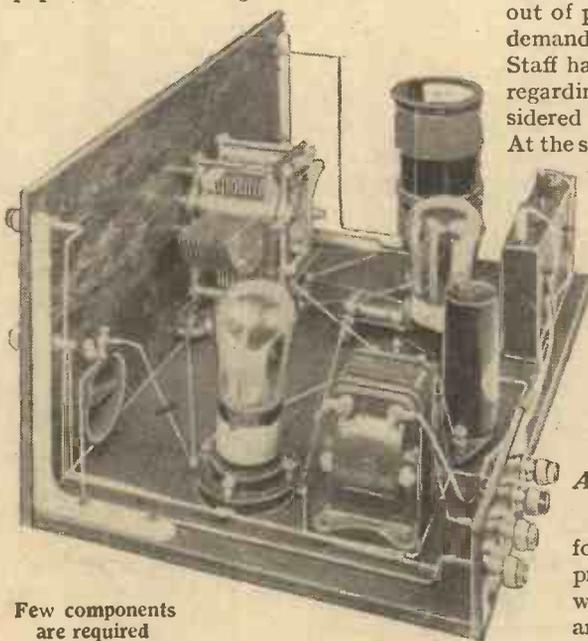


The wiring is direct and of



MAYBE you are wondering what is all this talk of "favourite," "voting," and so on, and perhaps you are wondering why a new version of a two-valver should be necessary.

Well, the whole story is that to celebrate the Christmas of 1927, AMATEUR WIRELESS decided to run a simple competition and in order to make this of utility, as well as pleasure to readers, the competition was arranged to be one for deciding the most popular circuit. To guide readers in their



Few components are required

OURITE TWO

THE BEST TWO-VALVER

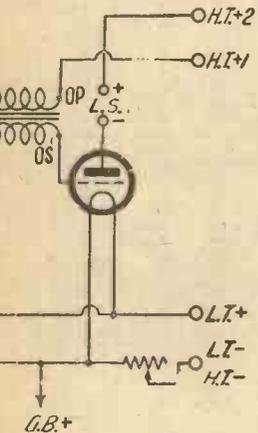
an advantage in economy to be gained by so doing. Those little trips to the charging station will be made less frequent,

THE MODEL

and nobody is going to say that that is not an advantage!

The New Model

If, as all good readers of AMATEUR



WIRELESS do, you keep a file one or two other small modifications. First, the moving coil magnetic reaction in the original set has had its place taken by "capacity reaction" in the semi-Reinartz fashion, effected by a .0003 variable condenser in series with a fixed reaction winding. This is very convenient because with the condenser control of reaction much finer manipulation is possible than with a moving-coil holder which, after lengthy wear, tends to sloppiness of action.

To ensure efficient reaction control over the whole wavelength range an H.F. choke is placed in series with the primary of the L.F. transformer. This keeps the H.F. currents out of the L.F. side of the set and ensures that the reaction portion of the circuit is not short-circuited.

It will be evident that these modifications have been carried out with the minimum of alteration to the original layout. This is because the original layout is very convenient and also because owners of existing "Favourite Twos" will want to fit a dual-range coil and capacity reaction without scrapping any more than is necessary of the original parts. Present owners will see for themselves how the modification is effected but it is necessary to give details of construction for the benefit of those who are making up the "Favourite" as an entirely new set.

switch on panel as shown in the photograph.

There is a further advantage in this in that the owner of a simple set such as this can convert it into quite an efficient short-waver, by removing the broadcast coil and plugging in a special six-pin coil for below the 100-metres waveband. If the wiring of the set is carried out neatly and "as copy" (as the printers say) there is no reason why it should not function very efficiently on the short waves and this, of course, adds to its charm and utility.

The fitting of a six-pin coil has entailed one or two other small modifications. First, the moving coil magnetic reaction in the original set has had its place taken by "capacity reaction" in the semi-Reinartz fashion, effected by a .0003 variable condenser in series with a fixed reaction winding. This is very convenient because with the condenser control of reaction much finer manipulation is possible than with a moving-coil holder which, after lengthy wear, tends to sloppiness of action.

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Components

The following parts will be required by those who are making up a new "Favourite."

Ebonite or bakelite panel, 14 in. by 7 in. and strip 4 in. by 2 in. (Raymond, Becol, Ebonart, Paxolin).

.0005-mfd. variable condenser (Cyldon, J.B., Polar, Lissen, Formo, Ormond, Burndept, Igranic).

.0025-mfd. reaction condenser (Formo, J.B., Igranic, Lissen, Cyldon).

7-ohm rheostat (Gecophone, Lissen, Igranic).

Panel brackets (Bulgin, Camco).

Push-pull switch (Lissen, Benjamin, Trix).

Two valve holders (Lotus, Benjamin, W.B., Formo, Lissen).

Six-pin base (Tunewell, Lissen, Lewcos).

.0003-mfd fixed condenser with series clip (Dubilier, Lissen, T.C.C., Mullard).

2-megohm grid leak (Dubilier, Siemens, T.C.C.).

High-frequency choke (Lissen, Lewcos, Peto-Scott, Dubilier, Wearite).

Low-frequency transformer (B.T.H., Lissen, Philips, R.I., Ferranti, Igranic).

Baseboard, 14 in. by 9 in. (Pickett, Camco). Grid-bias battery clips (Bulgin).

Eight terminals marked, Aerial, Earth, L.T.+ , L.T.- , H.T.+1, H.T.+2, L.S.+ , L.S.- (Belling-Lee, Eelex, Igranic).

Connecting wire (Glazite "bare").

One yard of flex (Lewcoflex).

One red, one black wander plugs (Clix).

C.A.V. accumulator—type 2AN7, non-spillable,

Ever Ready H.T. battery, 120 volts.

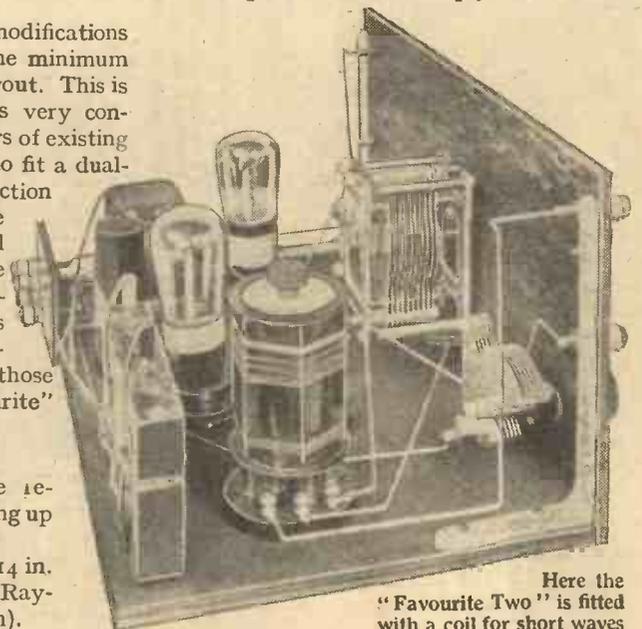
Construction

The first constructional operation is to mount the parts on the baseboard, and when doing this use the blueprint as a guide to show the exact positions. There is plenty of space on both baseboard and panel; but for the sake of neatness endeavour to adhere as closely as possible to the layout given. The panel drilling is quite simple and, again, the blueprint should be used as a template.

The panel carries simply the aerial



a simple character



Here the "Favourite Two" is fitted with a coil for short waves

“BRITAIN'S FAVOURITE TWO” UP-TO-DATE (Continued from preceding page)

tuning condenser (which necessitates three fixing holes, and, of course, a fourth hole for the spindle); the reaction condenser, wave-change switch and rheostat (all three

side of the H.F. choke; (6) the other side of the reaction winding to the fixed vanes of the reaction condenser.

The transformer connections are made as follows: I.P. to the free terminal on the H.F. choke, O.P. to the H.T.+I. O.S. to the grid terminal of the L.F. valve holder and I.S. as mentioned before is connected by means of a flex lead to the grid-bias battery. The remaining connections can very easily be carried out and the blueprint will show just how these should be arranged. If bare wire is employed particular

care should be taken to ensure that there is no possibility of one lead touching another. All the wire should be quite straight and joints should be made neatly and sharply with the aid of a pair of pliers.

First Tests

When these simple constructional jobs have been finished the set can be given its preliminary test. A C.A.V. type 2AN7 non-spillable accumulator, 30 ampere-hour capacity, will be found very suitable for supplying the filament current. Next week will be given details of the right valves to use, operating notes and so on. In the meantime, present and potential owners of the “Favourite” should make a point of seeing it, if they can conveniently do so, at the Somerset Street windows of Messrs. Selfridge & Co., where, every week, AMATEUR WIRELESS sets are displayed.



Testing out the “Favourite Two”

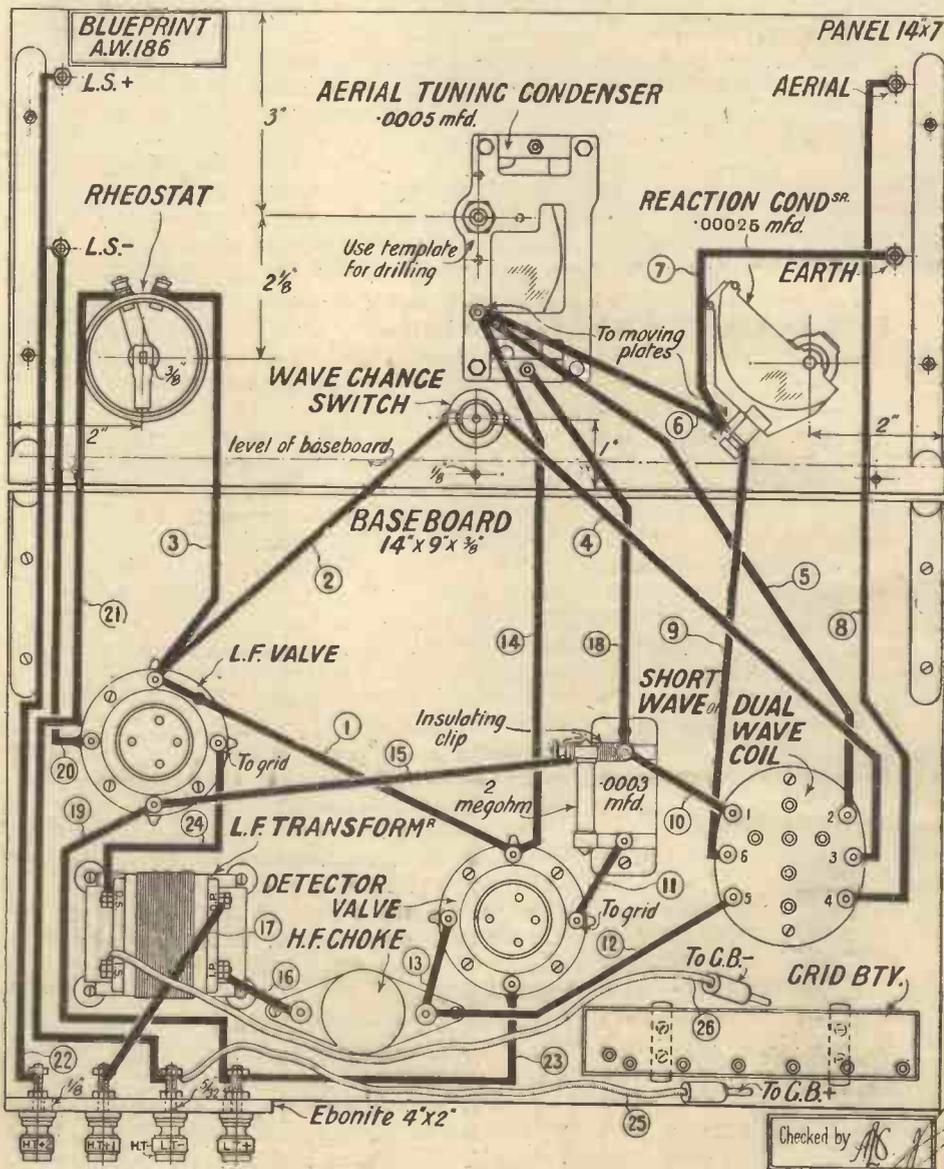
of which are one-hole mounting components), four terminals for aerial, earth, loud speaker positive and negative, and, finally, the holes for bolts clamping the panel brackets. It is advisable not to mount the aerial tuning condenser until some of the wiring has been carried out, because this component comes immediately above the wave-change switch.

At the back of the baseboard and near the L.F. transformer is a small terminal strip carrying terminals for high-tension positive, tapings for the detector and low-frequency valves, and low-tension positive and negative. So far as other battery matters are concerned the grid-bias battery is contained in clips at the corner of the baseboard opposite to the terminal strip.

Wiring

Wiring is carried out with rigid bare wire, for this is the easiest when soldered joints have to be made. Soldering is, however, by no means necessary, and insulated wire, such as Glazite, can always be used as an alternative by those who do not mind taking a little extra trouble in order to achieve a neat appearance. The connections to the grid-bias battery, one from the I.S. terminal on the transformer and the other from the shank of the L.T.— terminal are made with thin rubber-covered flex, such as Lewcoflex. A red wander plug is attached to the lead from the L.T.— terminal and a black wander plug to the end of the wire connected to the transformer.

The connections from the six-pin coil base are really very simple, for the terminals thereon are numbered and are connected to other components as follows: (1) to one terminal on the grid condenser; (2) to the frame terminal on the aerial tuning condenser; (3) to one side of the wave-change switch, (4) to the aerial terminal; (5) which is one side of the reaction coil, to one



The Wiring Diagram. Blueprint available, price 1/-



"ALL POSITION" NON-SPILLABLE ACCUMULATORS

The C.A.V. "ALL POSITION." Jelly Acid Battery is making a strong appeal to users of Portable Receivers. They are not merely adaptations of a standard cell, but specially constructed with exclusive devices which in conjunction with the specially prepared C.A.V. jelly acid, enable them to claim preference over other non-spillable types.

JELLY ACID keeps the plates completely immersed in electrolyte with the battery in any position, and full capacity is therefore obtained in all positions even when completely inverted.



TYPE 2AN7
2-volts
30 AMPS (20 hr. rate)

This type of cell has been chosen by "Amateur Wireles" and "Wireless Magazine" for use in many of their portable receivers, and is recommended for the "BRITAIN'S FAVOURITE TWO," described in this issue.

CUT OUT AND POST

Please forward descriptive literature of your Non-Spillable Batteries, and name of nearest Agent who can supply.

NAME

ADDRESS

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SMALL COMPONENTS OF BIG IMPORTANCE



IGRANIC - PACENT JACK

A high-class jack giving long and efficient service. As no metal parts are in front of the panel, the special insulated fixing bush obviates all possibility of shocks from H.T. voltages. To facilitate soldering, the lugs are fan-tailed, and the bush is adjustable, thus fitting any panel from $\frac{1}{8}$ in. to $\frac{1}{2}$ in. in thickness. From 2/-



IGRANIC Q.M.B. SWITCH

For switching filament current on and off no other can equal the quick make and break of this switch. The switch knob is heavily nickel-plated and all working parts are enclosed in bakelite, sound electrical contact and rapid control being provided by the definite action of switch mechanism. 2/6



IGRANIC FIXED GRID LEAK

Easily interchangeable and minutely accurate, this grid leak will remain permanently constant in performance. The method of assembly is a complete departure from that previously employed, and this, together with the special compound of which the resistance element is composed, ensures absolute silence and reliability in operation. 2/3

IGRANIC DUAL RESISTANCE-CAPACITY COUPLING UNIT



Simply by rotating a two-position switch incorporated in the unit, you can employ alternative anode resistances of two different values. Low value, to preserve a high standard of reproduction when receiving powerful signals or higher value when receiving weak signals. 17/6



Works BEDFORD

Sole manufacturing licensees of the Pacent Radio Essentials.

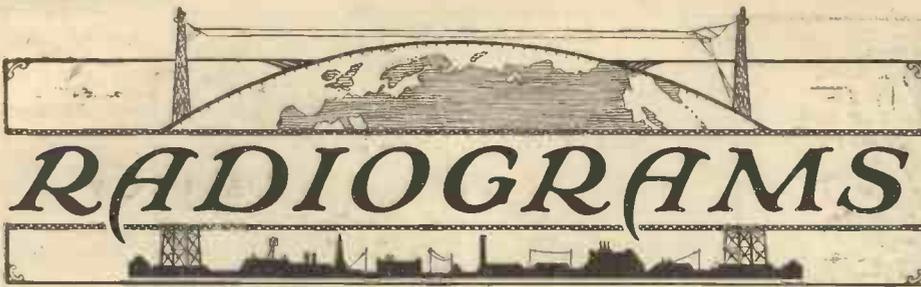
If your dealer cannot supply you, please write direct to Dept. A120.

IGRANIC SHORT WAVE H.F. CHOKE

The difficulties of short-wave reception demand that only components of the most careful design and manufacture shall be used. This choke, for use over the 10-85 metres range, has been skilfully planned with resonant wavelength above this limit, so that perfectly smooth reaction control is obtained when used in the plate circuit of a detector. 2/-



To Ensure Speedy Delivery, Mention "A.W." to Advertisers



RADIOGRAMS

FRANK TITTERTON, the tenor who on many occasions has been heard from the London, Birmingham, Cardiff, and Manchester stations, will take the title part in Massenet's opera *Le Jongleur de Notre Dame*, to be broadcast from 5GB on May 27 and from 2LO, 5XX, and other stations two days later.

Miss Peggy Cochrane, who will appear before the "mike" at 5GB on May 28, holds a record, for at the age of three she played tunes on the piano and at six she was studying both that instrument and the violin. When fourteen years old she obtained her certificates from the Royal Academy of Music for violin, piano, and sight singing.

On May 31 listeners are to hear a broadcast by Walter Lanham, the "Human Noah's Ark," in his remarkable imitations of animals and birds.

Wallah-Wallah is the title of an obviously Oriental revue written by Gordon McConnell for performance on June 5. The cast includes Norman Griffin, Olive Groves, Michael Shaw, and the revue chorus.

June 11 and 12 are the dates fixed for Germany's contribution to the series of the "World's Great Plays"; on this occasion Lessing's drama *Minna von Barnhelm* will be heard.

Mercia Stotbury, the well-known violinist who recently returned from a tour in Jamaica, was the first English artiste engaged to broadcast from Continental stations; her name is down in the programme to be given by 5GB on June 4.

Lovers of brass band music should not fail to listen to the concert given at Swansea on June 2 by the Ystalyfera Town Prize Silver Band, which has been in existence for some fifty years and since 1900 has gained hundreds of awards, including seven first prizes in one season. The performance will be relayed to the Cardiff station.

The Betrayal, by Padriac Colum, an Irish play of the eighteenth century, and *Becky Sharp*, from the pen of Olive Conway, based on the Waterloo chapters of Thackeray's *Vanity Fair*, are down for transmission by 5GB on June 8. On the same evening Cardiff presents an original programme in the form of a visit to dockland, which introduces conversation by sailors of all nationalities, one scene being laid in a Chinese laundry.

In New York, three hotels belonging to the same management have been connected up for the broadcast of lunch-hour, tea-time, and dinner-hour music by one single orchestra.

Radio Wallonie (Liège), whose transmissions have been interrupted, has now resumed its broadcasts on Sundays, Tuesdays, and Thursdays between 9.10 and 11.40 p.m. B.S.T. The wavelength adopted is that of 280 metres.

Chief Os-Ke-Non-Ton ("Running Deer"), a Red Indian baritone who has not appeared before a B.B.C. microphone for nearly two years, will give a recital of American-Indian melodies at the 2LO studio on June 7.

It is reported from Toulouse (France) that the Municipal Council of that city recently voted an annual subsidy of 1,000 francs to the local P.T.T. broadcasting station. As at to-day's rate of exchange this sum equals £8 6s. 8d., it is not expected that the station in question will see its way to extend or improve its programmes!

From January 1 to April 13 the number of registered listeners in Austria was increased by 21,335, bringing it to a grand total to date of 346,545. On the other hand, it is estimated that the country possesses over 62,000 radio pirates.

The new private broadcasting transmitter at Luxembourg (Grand Duchy) is now testing on 1,220 metres on a power of some 3 kilowatts. Provisionally, the tests are carried out on Sundays from 12.20 to 4.20 p.m., and on Tuesdays and Wednesdays from 9.20 to 11.20 p.m. B.S.T.

A performance of Coleridge Taylor's *Hiawatha*, by Dr. Henry Coward and his Sheffield Choir, to be relayed to 5GB on May 28, will give listeners the first opportunity of hearing a broadcast from the new Broadcasting House in Piccadilly, Manchester.

A CURIOUS COINCIDENCE: MR. FLEX HEARS STRONG SIGNALS—

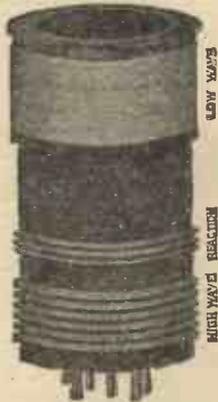


—WHEN YOUNG FLEX PICKS UP THE GORGONZOLA!

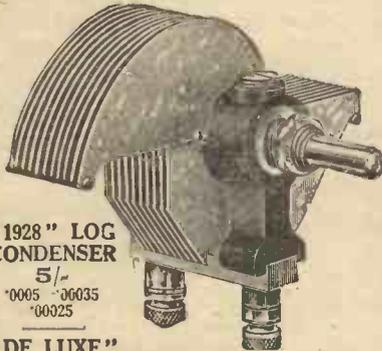




During the past year Formo components have been chosen by set designers for nearly all the popular circuits published in the Technical Press. Does not this prove to you that these components must be of outstanding merit?



COILS SG 1 & 2
10/6 each



"1928" LOG CONDENSER

5/-
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"DE LUXE" MODEL 6/-

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In "Britain's Favourite Two," described in this issue, our parts are chosen once again. Build this set and incorporate Formo coils, condensers and valve holders. The results will justify your faith in Formo parts.

THE FORMO CO.

CROWN WORKS, CRICKLEWOOD LANE,
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The Essence of Craftsmanship

FLOATING VALVES!

BUTTON 1/- EACH

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C.F. & H. BURTON PROGRESS WKS. WALSALL

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Ask your Radio dealer to show you a Philips Trickle Charger for your A.C. Mains, and save yourself time, money and trouble.

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"A.W." TESTS OF APPARATUS

Conducted by our Technical Editor, J. H. REYNER, B.Sc. (Hons.), A.M.I.E.E.

Pentamu Transformer

THE pentode output valve has been somewhat of a disappointment to some people who, having purchased one, placed it in the last stage of their amplifier followed directly by the loud-speaker. In many cases they found that the volume output was quite satisfactory, but the tone on the thin side with not too much bass.

Now, compared with a normal power or super-power valve, the impedance of the average pentode is considerably higher, the effect of this being that the impedances of the final valve and the loud-speaker are not, as a rule, correctly matched. Thus, if a pentode with an impedance of 60,000 ohms precedes a 2,000 ohms loud-speaker, it is essential for best results both as regards quality and volume, to employ a step-down transformer. With the correct step-down ratio not only will the volume be increased, but the balance of reproduction throughout the musical scale will be considerably improved.

The Pentamu output transformer, made by Messrs. Radio Instruments Ltd., of 12 Hyde Street, New Oxford Street, W.1, is designed specially for use after pentode valves and gives four different step-down ratios suitable for loud-speakers of varying resistances. The high-inductance primary winding will carry currents up to 25 milliamps. without saturating the iron circuit. The step-down ratio varies from 3 to 1 to 25 to 1 for loud-speakers having resistances of from 2,000 to 10 ohms.



Pentamu Transformer

One definite advantage of having a number of alternative ratios is that one may connect speakers in parallel and yet match them up for maximum results with a pentode output valve. All users of pentodes will be interested in this transformer.

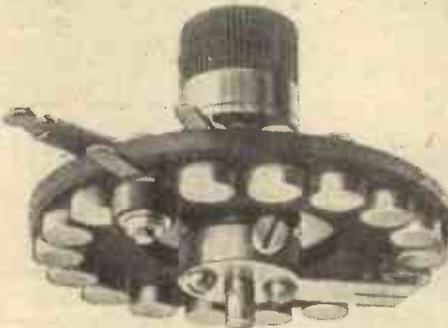
G.E.C. Volume Control

A HIGH-RESISTANCE potentiometer is a useful component, particularly for

adjusting small values of grid bias. Modern screen-grid valves and rectifying valves are often critical on the value of grid bias, and a reliable potentiometer assists greatly in obtaining optimum results.

We have just tested a G.E.C. potentiometer marketed by the General Electric Co., Ltd., of Magnet House, Kingsway. Since such a device entails the use of a rotating arm over some resistance element, the makers have considered that reliability is of primary importance and eliminated a plain friction contact between the rotating arm and the resistance by the use of a large number of studs.

The total resistance value between the end studs is 900,000 ohms. This can be varied to a value of 70,000 ohms by the



G.E.C. Volume Control

aid of 15 tapping points. Thus it is that the resistance variation between adjacent studs is small, and therefore affords a satisfactory control.

The finish and workmanship of this component are both excellent; the motion of the contact arm is exceptionally smooth, whilst the contact pressure is sufficiently great to avoid noisy action.

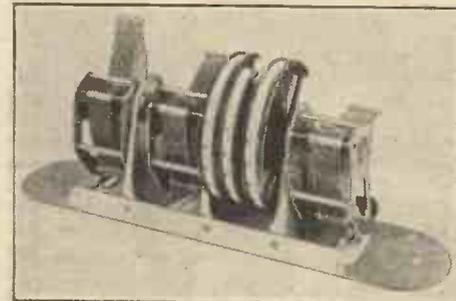
This is a useful component and may be recommended to readers.

Dubilier Triple-drum Condenser

THIS drum-drive condenser has a number of advantages over the standard type, especially in the case of circuits employing more than one tuning control, for in these cases it is possible to obtain the advantage of a gang control and yet retain the individual motion of each condenser. Then again, in the old type of gang condenser, the sets of plates were in line and consequently there was some difficulty in screening one high-frequency circuit from another. In the drum-drive multi-unit condenser each set of vanes comes up against the panel and can therefore be screened with greater ease.

We have tested a Dubilier K.C. triple condenser with drum control. The three condensers, which have a maximum capacity

of approximately .0005, are mounted on one metal base plate and have their moving vanes electrically connected to this. The moving plates of each condenser are rotated by a separate drum. The three drums are arranged side by side with one condenser on one side and two on the other. When



Dubilier Triple-drum Condenser

mounting the component, it is necessary to drill out a rectangular section of the panel to allow the drum to project. A neat black moulded escutcheon plate completes the assembly and gives an attractive appearance to the panel. We did not like the fact that the middle drum controls the end condenser, but this is apparently unavoidable.

The separate condensers are smooth in motion, having a substantial ball and cone bearing at one end. The condensers as in the Dubilier K.C. type follow an S.L.F. law. Two terminals are provided for each condenser and are mounted in an accessible position.

The maximum capacity of each condenser proved to be .0005 microfarad and the minimum .000038 microfarad. The component is well made and should give reliable service.

Mr. Merlin Aylesworth, president of the National Broadcasting Company, who has just returned to the United States after an extensive tour of Europe studying European broadcasting methods, stated that while in England he completed arrangements with Sir John Reith for a regular interchange of programmes between England and America in the autumn.

L. V. Brekner, wireless operator on Capt. Byrd's ship, the *City of New York*, now in the Antarctic, sends a daily word to his mother which is relayed to her by C. L. Barker, an amateur operator at Henning, Minn., who has talked with Brekner every day since the ship left New York.

The National Broadcasting Company in America, recently paid £20,000 for a musical library.



RULES.—Please write distinctly and keep to the point. We reply promptly by post. Please give all necessary details. Ask one question at a time to ensure a prompt reply, and please put sketches, layouts, diagrams, etc., on separate sheets containing your name and address. See announcement below. Address Queries—AMATEUR WIRELESS Information Bureau, 58/6r Fetter Lane, London, E.C.4

Use a Fuse.

Q.—Recently I finished the construction of a screen-grid valve set, and before attempting to test the set I asked an expert friend to check over the wiring. Everything being pronounced in perfect order, I inserted the valves and connected up the batteries. Imagine my surprise when, so soon as the H.T. tappings were inserted in the battery, a blue flash occurred and the filaments of all valves were ruined: I again had the wiring checked over, and the verdict was still that the set was correctly wired. I am submitting a copy of the wiring for your inspection. It has been proved that there is no shorting of the H.T. battery through the screens and tuning condensers, and I am at a loss to account for the damage to my valves. Can you explain what might have been the cause of the trouble?—K. R. (Monmouth).

A.—We have checked the wiring plan you submit and it is quite in order. As you are so positive that you have wired up correctly according to plan and you are also sure that there is no shorting of the H.T. battery via the screens, then the only conclusion to arrive at is that the screen-grid valve must have been subjected to bad handling between the time it left the works and the time you received it, and in this way the electrodes must have become displaced and shorted internally. This

is the most probable cause of your trouble. It is wise to fit a safety fuse between the negative wander plug of the H.T. battery and the

Which H.T. Battery?

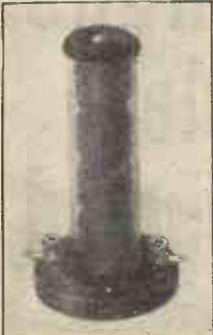
Q.—I have made up the "Clarion Screen-grid Three" set, and whilst it appears to work satisfactorily, there seems to be a dearth of power somewhere. The receiver "gets" the stations, but there is no "punch" behind the reception, only London and the two Daventry stations being received at anything like good loud-speaker strength. Can you advise me regarding this? My first set, a detector and one-stage L.F. amplifier, worked very well indeed, and I am using the components and accessories of this set for the new screen-grid set.—F. A. (Millwall).

A.—It appears that you were using a standard capacity dry-cell H.T. battery with your original two-valve set, and that this battery is still being used with the three-valver. It is quite possible that the standard-type battery gave good results with the two-valver, but in view of the fact that a screen-grid valve consumes between 3 and 5 milliamperes, this extra load on the H.T. battery proves too much for it. Consequently the greater current demand reduces the all-round efficiency of the working of the valves and very little power is obtained. If you use a triple-capacity dry cell H.T. battery, you will be able to get your current supply, and in this way the necessary "punch" from the stations received.—L. C.

When Asking Technical Queries PLEASE write briefly and to the point A Fee of One Shilling (postal order or postage stamps) must accompany each question and also a stamped addressed envelope and the coupon which will be found on the last page. Rough sketches and circuit diagrams can be provided for the usual query fee. Any drawings submitted should be sent on a separate sheet of paper. Wiring plans and layouts cannot be supplied.

negative H.T. terminal on the receiver. This will be the means of avoiding a recurrence of a similar happening.—L. C.

THE High Frequency Choke

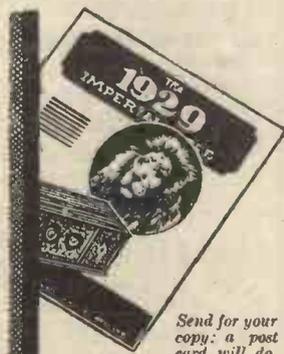


FIT your receiver with a Watmel H.F. choke and obtain greater stability, range, selectivity and purity of tone. It makes an all-round improvement to the performance of your set, and has been fitted with outstanding success to the Cossor Melody Maker. Of all good Radio Dealers or direct from us in case of difficulty 5/-

Have you had your copy of this blueprint and assembly chart? It tells you both how to build a really modern, inexpensive three-valve receiver (1929 Imperial 3) and also how you can bring many old-fashioned sets up to date by incorporating a few Watmel components.



THE WATMEL WIRELESS Co., Ltd. Imperial Works, High St., Edgware, Middx. Telephone: Edgware 0323



Send for your copy: a post card will do.

P61

THE MONARCH CABINET with Components and Circuit for TE-KA-DE Two in One Receiver



This handsome Counter Display Box contains a Complete Outfit for a Receiving Set with a simple yet very efficient Circuit designed for a Te-Ka-De Valve, V.T. 126 two in one Valve. Made up correctly to printed circuit as supplied, it will give marvellous loud-speaker results. From 200 to 2,000 metres. Price £2 - 19 - 6 including cabinet with drilled and engraved panel. ASK YOUR DEALER.

DR. NESPER LTD., Colindale Avenue, Hendon, London, N.W.9



For the Newcomer to Wireless: OHM'S LAW MADE EASY

CAN you give me some simple way of remembering ohm's law? I am always wanting to make use of it in matters wireless, but I never can remember which is multiplied or divided by which, and it's a nuisance to have to turn it up in a book every time.

Here's a method that will help you to fix it in your mind once and for all. An old envelope? Thanks. I write down a capital E, put a line under it, then below the line I put a capital R, a multiplication mark and a capital I, like this:

$$\frac{E}{R \times I}$$

Yes, I follow.

You can't forget the order of the letters if you think of the word ERIC. You know what the letters stand for?

E is volts, R ohms of resistance, and I amperes of current.

That's it; and if you prefer to call current C as some people still do, ERIC still holds good.

How does your little diagram work?

Simply cover up with your finger-tip the factor that you want to find and then work out what is left.

Well, I know, let me say, that the

current flowing in a circuit is 2 amperes and that the voltage is 6. How do I find the resistance?

You want to find R. Right; put your finger over it. Now what's left?

E divided by I.

Volts divided by amperes, eh?

Then the answer is 6 divided by 2, or three ohms.

Exactly. Similarly if you know the resistance and the current and want to find the volts, you cover up E and find $R \times I$ left. In other words, you'd see that amperes must be multiplied by ohms.

I see; and to find the current I cover up I, which leaves E over R, or volts divided by ohms.

Don't forget one most important thing, though.

What's that?

The formula is for volts, ohms, and amperes.

Well, then, suppose it's a problem in milliamperes. Ten milliamps are flowing through a 10,000-ohm circuit. What is the voltage?

Cover up E as before, leaving ohms to be multiplied by amperes. Ten

milliamps is one-hundredth of an ampere, or .01 amp. if you prefer decimals. Multiplying this by 10,000, we have 100, which is the voltage.

That's quite clear.

Here's a useful application of that very problem to a point that often crops up in the wireless set. You are using R.C. coupling and you want to discover what potential is being applied to the plate of the valve. Clearly it is not the same as the battery voltage, for there must be a drop across the resistance. How would you tackle this?

Why not use a voltmeter between the plate and L.T.—?

No use at all unless the meter has an almost incredibly high resistance. I'll explain why this is so another time.

Then what is to be done?

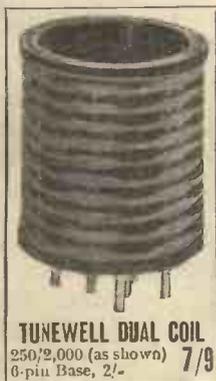
Use Ohm's law and the milliammeter! The resistance has a value of, say, 80,000 ohms and the instrument measures a flow of one milliamp. Work it out by the formula, and you'll find that 80 volts are dropped across the resistance. If the battery voltage is 150, the plate potential is 150 less 80—or 70 volts.

TUNEWELL COILS FOR CLEAR ELECTION RESULTS

NEW MULLARD SET

COILS to specification
3/11 each; 7/10 pair

High Wave
4/11 each; 9/10 pair



TUNEWELL DUAL COIL
250/2,000 (as shown) 7/9
6-pin Base, 2/-

BRITAIN'S FAVOURITE TWO COIL as specified 7/9 Base 2/-

Tunewell coils are suitable for all sets. They are specified in the most popular receivers of the year and have justified that selection.

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A Famous Portable Re-designed

So successful was the "Chummy Four" last year that Mr. W. James has designed a new model, based on the original circuit.

Two outstanding features of the 1929 "Chummy" are (1) it is suitable for both broadcasting wavebands (2) a much lower H.T. consumption.

For full details of this splendid portable get the June number of the

WIRELESS MAGAZINE

Containing 65 Features and 120 Illustrations

On Sale at all Newsagents, etc., on May 24th, 1/-

CASUALLY PICKED UP!

Jottings from my Log. By JAY COOTE

NO doubt, at various times during the day, many of you will have heard speech on the long wavelength associated with Huizen (Holland). Except on Sundays or after 6.40 p.m. these transmissions do not emanate from this broadcasting studio, but from the Dutch commercial station at Scheveningen Haven. At odd moments, if you tune in to about 1,846 metres, you will pick up a man's voice giving out news and various announcements, all at dictation speed, and in order that the stock exchange quotations and market prices of produce may not be mistaken they are repeated twice. Where proper nouns of foreign origin crop up in the news bulletins you will notice that the announcer spells them out in the conventional manner using such names as Albert, Isidore, Jacob, and so on to designate letters.

Scheveningen Haven usually comes on the hour with a pronounced buzz and this sound previous to the mid-day Dutch time signal is prolonged for some one-and-a-half minutes and followed by a stroke of a gong. Holland having gone over to Summer Time on May 15 last is now again twenty minutes in advance of B.S.T. Later than 6 p.m. the commercial transmitter rarely works; its service from that hour is unnecessary and the wavelength is then jumped by Huizen for the balance of the broadcasting programme. It is this dual wavelength possessed by the Dutch station which puzzles many listeners.

Radio Schaerbeek

Possibly, up to the present, Radio Schaerbeek has only been a name to you, although for some considerable time you may have seen it under Belgium in the "Broadcast Telephony" page. Within a few weeks' time, while still a "disembodied voice" (*vide* B.B.C.) you may be able to add it to your daily log. On a recent Sunday when all good announcers had retired to rest, I heard a call "*Allo! Allo! Radio Schaerbeek,*" followed by a series of well-known and well-worn gramophone records. Now, the strength at which this broadcast was received clearly convinced me that the long-awaited alterations to the plant had been made and that from a mere toy the Schaerbeek transmitter had been converted into something worth while.

Originally erected in a suburb of Brussels, in a private house with an outside aerial draped across the street, Radio Schaerbeek is to be moved shortly—if this has not already been done—to the centre of the Belgian capital and the Salle Patria, a disused concert hall is to be taken over as a studio. Its daily transmissions have been carried out on roughly 250 metres, but on this occasion they were higher up the scale and somewhere in the region of Naples or

Petit Parisien. It will repay you to make a search now and again for you may meet with success. The announcements are made by a lady in French and Flemish—a language akin to Dutch—and the interval signal is the metronome. As a gramophone record, *Constantinople* is greatly prized by that studio, for I heard it at least three times in the course of one evening. For the bulk of its programmes it turns to the Moulin Rouge, the Hotel Cosmopolite, the Gambrinus Café, the Coliseum and the Ten o'Clock Theatre, a popular variety show. These entertainments are relayed to the transmitter by land-line and the quality is not too bad. In future, I understand that we may expect more entertainments in competition with those put out by Radio Belgique.

Listeners on the short waves who may have picked up the Polish programmes in which the ticking of a metronome (about 240 strokes to the minute) was heard between items will be interested to learn that the broadcasts emanate from the new Posen transmitter on .30 metres. The power at present is only 30 watts in the aerial, but it is shortly to be increased to something much more substantial. The tests are carried out between 11 p.m. and midnight B.S.T. on Mondays and Thursdays. Announcements by both male and female speakers are made in Polish, German, French, and Italian; the bulk of the transmission consists of gramophone records.

The new Montpellier (P.T.T.) broadcasting station on most nights, relays the Marseilles local programmes, as arrangements have not yet been made for the installation of a studio in the former city.

The Paris-Lyon-Mediterranée Railway Company has equipped some of its express trains with telegraph receiving apparatus in order that passengers during the journey may receive urgent messages.

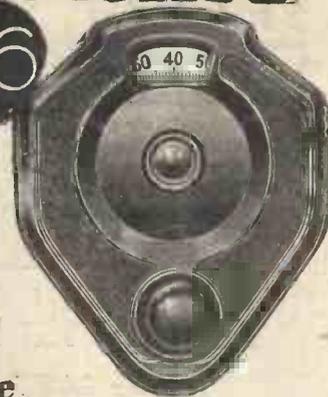
The Tunis (Kasbah) wireless telephony station has resumed its broadcasts on a wavelength of 1,350 metres. As it is the only station in Tunisia, it is hoped to make the service a regular one.

"Radio Salon St. Quentin" is the call put out by a small French station now working on 170 metres every Thursday and Friday evenings.

At the Coney Island (WCGU) U.S.A. radio station, which is situated on the Atlantic coast, it has been noticed that alterations in wavelength occur with the ebb and flow of the tide. Measurements made in the wireless laboratory demonstrated that, whereas the wavelength at high tide was 210 metres, on the ebb it had increased by 1.6 metres.

Brownie

3/6



the 'DOMINION' Slow Motion Dial

A Vernier Dial at 3/6! Bring your set up-to-date by fitting this slow motion dial. The mechanism is of special non-back-lash construction which makes very fine tuning easy. Finished in smooth black or beautifully grained mahogany bakelite, this unique dial gives high-class finish to every set in which it is included.

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wireless

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ARCADIAN PORTABLE COILS, 10/6. Screening Box, 9/6. TALISMAN PORTABLE COILS, as specified by Chapman, 7/6. Screens, 6/- pair.

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34 BEAK ST., REGENT ST., London, W.1.
Telephone: Ger. 2834

"AVOIDING SATURATION IN CHOKES"

(Continued from page 742)

permeability, this does not apply throughout the whole of the range. For very small magnetising forces the permeability increases and the relationship between the two quantities follows a curve somewhat as that shown in Fig. 2.

Here it will be seen that the permeability rapidly rises to a maximum, after which it begins to fall away, and it is on the falling part of the curve which we normally work in practice. If we could arrange to work at or near the maximum point we might conceivably obtain better results. In order to do this, therefore, we have to find some means of cutting down the magnetic field, and we do this by introducing a certain amount of magnetic resistance in the circuit.

This may be achieved by breaking the iron circuit and inserting a small gap, as in Fig. 3, which has the immediate effect of reducing the magnetic field just in the same way as the introduction of a resistance into an ordinary electrical circuit will

cut down the current. By a suitable choice of the length of this gap in relation to the other constants of the circuit, we can arrange matters so that we work at or around the maximum permeability point, under the particular working conditions which we require. Moreover, the presence of the gap means that the variation in the magnetic field for a large variation of polarising current is only quite small, and therefore the inductance of the choke does not vary so largely as is the case with an ordinary choke.

Constant Inductance

In the chokes to which I referred at the beginning of this article the design of this air gap has been carried out so skilfully that it is possible to maintain the inductance almost constant over the working range of the current. Fig. 4 indicates the inductance curve of one of the most popular types, together with an indication of the variation which would normally be expected without the use of an air gap. This dotted curve was estimated from the constants of the choke, and represents the inductance of an identical choke having the same number of turns and the same iron circuit, but without the air gap. It will be seen that at the smaller currents the inductance may rise considerably above the inductance with the gap. This is not where we wish to operate, however, and for all currents above about one-third of the full load current the inductance of the gap choke is definitely higher than that which can be obtained without the gap, due to the absence of the usual saturation.

The use of an air gap of the correct proportions thus gives us a distinct advantage, for, apart from the greatly reduced variation of inductance with polarising current, the actual value of the inductance under working conditions is greater than that obtained with the same number of turns without a gap, so that a more efficient use is being made of the material at disposal.

In view of the considerable assistance that wireless telephony has given to the operation of railways in the United States, the Federal Radio Commission has allotted five short-wave channels for the use of railway rolling stock. On many trans-continental main lines, radio telephony communication has been tested between the locomotive and guard's van, and this has proved very helpful in the case of trains made up of a great number of trucks. Moreover, it has been demonstrated that in the event of the train breaking in two—not so unusual an occurrence as might be expected—the staff can be assured of telephony communication between the locomotive and the runaway wagons.

The Minister of Communications at Rio de Janeiro has prohibited the clearing of any Brazilian vessel from a Brazilian port unless it is equipped with wireless in good working order.

ELECTRADIX BARGAINS

GRID BIAS METERS, for elimination of distortion, read to micro-amps. Set to zero for purity. It will be worth fitting on your panel. All made by Weston and listed 65/- Sale price, 35/-.

MOVING COIL SPEAKER PARTS FOR R.K., etc. Marconiphone 6-volt wound Magnet Pots for battery or off A.C. mains rectified. Sale, 20/- B.T.H. 1 1/2 in. Coil and Cone R.K., with leather flexible edge, 10/-.

B.T.H. PANATROPE POWER AMPLIFIERS. For working M.C. Loud-speakers on Gramo Pick-up from mains. Also for Public Address Systems from Microphone, D.C. £3 10s. 3-valve Receivers, 27/6.

CONDENSERS. New Stirling, 2-mfd., genuine Mansbridge Condensers to 440 volts, at reduced price of 2/10, 4-mfd., 5/4; 6-mfd., 7/- Capacity Meters, £8; Wheatstone Recorders, £12; Multi-Micro Galvos., 60/-; Res. Boxes, 17/6; Hydrometers, 1/6; Relays, 6/6; Remote Switches, 15/-; 12 in. Spark Coils, £10; Weston, 60/-; Micro Ammeters for Grid bias testing: 35/- only.

MISCELLANEOUS. Geared Condenser Dials, 2/-; Shock Coils, 6/6 and 8/6. Voltmeter, 0-6 v. and 0.120 v., 4/6 only. Loud-speaker Magnets, 1/8 each. H.T. Batteries, 60 v., 7/6. Gramophone Pickups, 14/- Valve Boxes, 3-cell padded, 1/4. Double Protractors in Leather Case, 5/- Instrument Cases, mahogany, with Handle, Lid and Drop Front, 7 x 8 x 5 1/2 in., each 2/6. Plated Angle Terminals, 100 C.A., 1d. each. Marconi T6 Table Variable Condensers, 7/6. Mahogany Cases, with Lid and Ebonite Panel with 5 Brass Sockets for H.T. 8 x 4 x 3 1/2 in., 2/- Earth Spikes with Terminal, 1/2. Tons of other goods unclassified. Send cash with order plus postage or your inquiries.

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3 READINGS ON ONE DIAL! AMAZINGLY ACCURATE AND IS THE IDEAL INSTRUMENT FOR TESTING ELIMINATORS.

THE WATES ELIMINATOR VOLTAGE TEST
Remarkably accurate readings can be obtained from eliminators with the Wates 3 in 1 Meter using the new Wates testing formula, which is now supplied free in leaflet form with each meter and is available free to every user of a Wates Meter.

Those who possess Wates Meters are invited to apply at their dealers for this form.

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Crystallised black finish. Fully guaranteed. Can be used as a Pole Finder.

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RD. 40
2/-

**LET "Amateur Wireless" Solve
Your Wireless Problems**

"HOW TO GET THE BEST FROM YOUR PICK-UP"

(Continued from page 741)

however, or when great volume is desired, three stages of amplification should be used. One of them may very well be resistance coupled, and the other transformer coupled, as in Fig. 2, or a push-pull circuit may be employed as in Fig. 3.

In these circuits the grid of the first valve is shown biased negatively with one dry cell and a special filter is not incorporated.

Many interesting facts may be obtained by careful listening, but it is obviously useful to be able to make tests with records specially produced to provide a known amplitude. The serious experimenter will, therefore, welcome for testing purposes the new series of *constant note* records issued by the H.M.V. Gramophone Co. They cover a wide range of frequencies, but a complete set is, unfortunately, rather expensive. A selection of three or four records to cover the low and high notes, as well as those of middle frequency, will, however, be found of great interest.

I have several of these new records, and find that much useful information is to be obtained by measuring the voltages generated at the different frequencies by various pick-ups.

How to Test

For tests of this description, a single resistance-coupled stage is employed with a valve voltmeter of the anode-bend type connected as in Fig. 4. This resistance-coupled stage may be so constructed that it can be regarded, for all practical purposes, as quite distortionless. Only a little magnification is needed in order that the voltage may easily be noted. An amplifying valve of medium impedance with a fairly low value of anode resistance, such as 50,000 ohms, a coupling condenser of .1 microfarad, and a grid leak of 1 or 2 megohms may therefore be used.

Various pick-ups may be tested in this way, and the results compared with those obtained by listening to the sound output, obtained by playing the special records in the ordinary manner. One should not necessarily expect the results so obtained for a particular pick-up to be correct for all amplitudes however. In fact, it is probable that amplitude distortion will occur. But the results are of such a nature that in combination with careful aural tests of ordinary records, the peculiarities of pick-ups may be quickly determined.

The experimenter will be able not only to compare different types, but to determine the behaviour of filters and other circuit arrangements either in the amplifier, or before it. Thus, for example, one could compare a pair of transformers by arranging a change-over switch for connecting one or other of them to the amplifier (Fig. 5). Similarly, different loud-speakers may be compared by listening to the various frequencies as provided by the special records.

BLUEPRINTS

Copies of the "Wireless Magazine" and of "Amateur Wireless" containing descriptions of all these sets can be obtained at 1s. 3d. and 4d. respectively, post free. Index letters "A.W." refer to "Amateur Wireless" sets and "W.M." to "Wireless Magazine" sets.

All Post Free

CRYSTAL SET (6d.)

1929 Crystal Receiver AW 165
A Daventry-Local Crystal Set AW 185

ONE-VALVE SETS (1s. each)

Beginners' One-valver AW 145
Reinartz One WM 127

TWO-VALVE SETS (1s. each)

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Beginner's Two (D. Trans.) AW 171
Auto Two (D. Trans.) AW 174
All-Mains Two (D. Trans.) AW 180
1929 Favourite Two (D. Trans.) AW 186
Key-to-the-Ether Two (D. Trans.) WM 107
Meteor Two (D. Trans.) WM 114
Clipper Two (D. Trans.) WM 135
Twinflex (Reflex) WM 138

THREE-VALVE SETS (1s. each)

All-wave Mains Three (HF, D. Trans. Rectifier) AW 144
All-purpose Short-wave Three (D, RC, Trans) AW 147
Screen-grid Coil Three (HF, D. Trans) AW 150
All-Britain Three (HF, D. Trans) AW 158
Bantam Three (D, RC, Trans) AW 160
Hartley Dual-range Three (D, RC, Trans) AW 166
Listener's Three (HF, D, Trans) price 4d. free with copy of "AW" AW 169
The Binowave Three (D, RC, Trans) AW 172
Clarion Three (SG, D, Trans) AW 175
1929 Favourite Three (D, RC, Trans) AW 179
Everyday (D, 2 Trans) WM 52
All-wave Screen-grid Three (HF, D, Trans) WM 117
Standard Coil Three (HF, D, Trans) WM 118
Festival Three (D, 2LF-dual Imp.) WM 123
Wide-world Short-waver (SG, D, Trans) WM 123
New Year Three (SG, D, Pentode) WM 124
The Q3 (D, RC, Trans) WM 124
Lodestone Three (HF, D, Trans) WM 129
Simple Screen Three (HF, D, Trans) WM 131
Dynamic Three (SG, D, Trans) WM 136
At Home Three (D, 2RC) WM 141

FOUR-VALVE SETS (1s. 6d. each)

Overseas Short-waver (HF, D, 2Trans) AW 131
The Ranger (SG, D, RC, Trans) AW 145
Broadcast Picture Four (HF, D, 2RC) AW 161
Orchestra Four (D, RC, Push-pull) AW 167
All Europe Four (2 HF, D, Trans) AW 173
Stability Four (HF, D, RC, Trans) AW 182
"Q" coil 4 (HF, D, RC, Trans) WM 71
Five-pounder Four (HF, D, RC, Trans) WM 01
Touchstone (HF, D, RC, Trans) WM 09
Reyner's Furzehill Four (SG, D, 2Trans) WM 112
Economy Screen-grid Four (SG, D, RC, Trans) WM 113
Binowave Four (SG, D, RC, Trans) WM 119
Standard-coil Four (HF, D, 2 RC) WM 122
Dominions Four (2SG, D, Trans) WM 134
The Drum Major (HF, D, RC, Trans) WM 137

FIVE-VALVE SETS (1s. 6d. each)

"Q" Gang-control Five (2HF, D, 2Trans) AW 161
Empire Five (2 SG, D, RC, Trans) WM 06
Fidelity Five (HF, D, 2 RC) WM 130

SIX-VALVE SETS (1s. 6d. each)

Short-wave Super-6 (Super-het, Trans) AW 67
Eagle Six (3 HF, D, RC, Trans) WM 06

AMPLIFIERS (1s. each)

Screened-grid HF Amplifier AW 133
"A.W." Gramophone Amplifier (3RC) AW 162
Searcher Unit (HF) AW 176
Gramophone Amplifier (3 v.) AW 187
Gramo-radio Amplifier (2v) (Trans.) WM 12
Signal Booster (HF Unit) WM 128
Auditrol Amplifier WM 134

MISCELLANEOUS (1s. each)

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L.T. and H.T. Mains Unit (D.C.) AW 123
Listener's Speaker, price 4d. free with copy of "AW" AW 170
Arcadian Linen-diaphragm Loud-speaker (Full-size) AW 177A
D.C. Unit (HT) AW 178
Short-wave Adaptor (1 v.) AW 183
Universal Short-wave Adaptor WM 82
Buzzer Wavemeter (6d.) WM 121
H.T. Unit for A.C. Mains WM 125
Lodestone Loud-speaker WM 126
James H.T. Unit for D.C. Mains WM 133
Short-wave Adaptor for Dominions Five WM 140

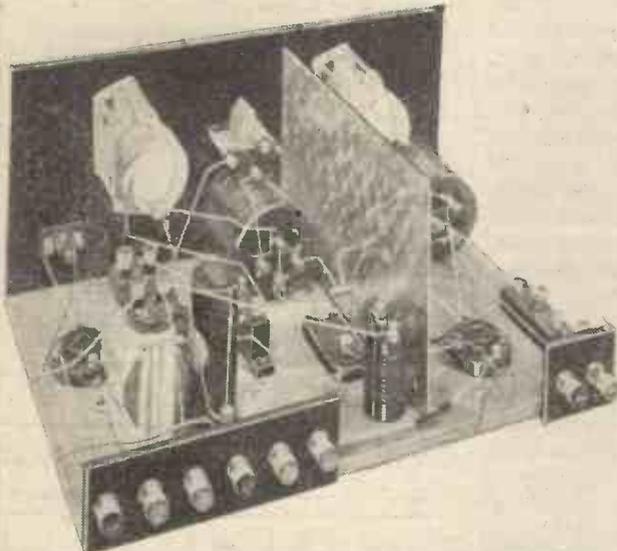
PORTABLE SETS

House Portable (SG, D, RC, Trans) AW 153 1/6
Arcadian Portable (SG, D, 2 Trans) with linen-diaphragm loud-speaker (half-scale) AW 177 1/6
£5.5.0 Portable (D, Trans.) AW 181 1/6
Talisman Portable (SG, D, 2 Trans) AW 184 1/6
Chummy 4 (with modifications for LS and HD) WM 351 1/6
Wayfarer Portable (Super-het) WM 139 1/6

Send, preferably, a Postal Order (stamps over sixpence in value unacceptable) to Blueprint Service

AMATEUR WIRELESS 55-61 FETTER LANE LONDON, E.C.4

MAKE THIS WONDERFUL RECEIVER



The CLARION SCREENED GRID 3

DEFINITELY CUTS OUT 2LO AT 1 MILE and obtains 5GB, 5XX and Continental Stations with 2LO working. This actual test has been made by the designer of set at our premises. See report.

UNSOLICITED TESTIMONIAL

(One of many) Proof "A.W." April 6th Russell Sq., London, W.C.1

Messrs. Raymond, I made up the Clarion 3 from the parts supplied by you and I am DELIGHTED with the results. One mile of 2LO I received and many others not identified. I shall recommend to all my friends.—Yours sincerely, H. PERIS.

THIS SPEAKS FOR ITSELF.

The Clarion Three was tested at the London workshops of Messrs. Raymond, within a mile of the London aerial and in an area wherein 5GB and 5XX are only faintly received on most sets, owing to the shielding of the aerial. Although the aerial wire is about 60 feet from the ground, the proximity of the neighbouring roofs gives it an effective electrical height of only a few feet.

With the Clarion attached to the business end of the aerial however, conditions were found to be entirely different. Both the long and short-wave Davenporty came in at good loud-speaker strength and quite free from any kind of interference. Greatly to the surprise of the operators, Radio Parts was also received on the loud-speaker without any interference and with excellent strength against a background of silence. The test was made early in the evening when not many foreigners were on the air. On the short waves it was notable that Langenberg was received well enough to provide a complete evening's programme had this been so desired.

PORTABLE CABINETS FOR "ROADSIDE" FOUR
in real Rexine, made to Mr. Percy W. Harris's specification 39/6

Illustrated CATALOGUE (144 pages). 1/- refunded on first 10/- order.

ALSO—I have some Handsome Suit Case type in Leatherette with Speaker Grille fitted, with frame for aerial, grey or brown. 22/6 CARR. 2/-

PORTABLES for MULLARD MASTER 5, Oak, Complete as specified. Carriage and packing, 5/- 30/-

GENUINE IDEAL BLUE SPOT. Adjustable Power 66K (101) 4-pole Bal. Arm. complete with Cord, 25/-

Handsome Oak Polished SPEAKER CABINETS 13 x 13 x 6

12/11 Post 1/3
BLUE SPOT 25/-
66K (101) (as above)
See above for specifications.
OR CABINET BLUESPOT 35/-
12" CONE
(With Triotron 4-pole unit 27/6)
The Lot Carr. Pd.

KIT OF PARTS

"A.W." 9-3-29

Any other Condenser, H.F. Choke, or L.F. Transformer, supplied by adding balance.

2 Polar .0005, No. 3, at 5/9. .0001 Reaction 4/-. 2 Dual range C.T. Coils, with Reaction (Tunewell), Anode 10/8; Aerial, 10/8. 3 Lotus or W.B. V.H. at 1/3. Formodensar, "J." 2/-. Dubilier 1 mfd., 2/6. .01 Fixed, T.C.O., 1/9. 3-meg. Lissen or Edison Bell, 1/-. S.G. H.F. Choke, Peto-Scott, 5/-. H.F. Choke, Lissen, 5/6. L.F. Transformer, R.I. and Varley, 15/-. Ebonite Strips. 14x7 Ebonite Panel. Screen, 8 1/2 x 6. 8 Engraved Terminals. Push-pull Switch, Flex, Plugs, 10-g. Wire, 2 S.M. Dials.

THE LOT 70/-

POST FREE U.K. .0002 Fixed and Series Clips 1/6 extra. 1/6 EXTRA C.O.D.

American Type CABINET, Polished Oak Colour, Baseboard 14x7x9, 12/6. Extra quality, 16/6. Post 2/-

VALVES

Screened Grid, Marconi, Mullard, Six-Sixty, 22/6 each. Detector, 10/6. Power, 12/6.

CLEARTRON

S.G., 2-v., 12/6. C.T.15, L.F. or H.F., 4/-. C.T.15X., Power, 6/-.

ALUMINIUM CRADLE

With fitted 10 in. Floating Cone and 12 in. Square Baffle Board. Takes all Bal. Armatura Units.

7/11

Post 9d. U.K.

VALVES

10/8 each. Cossor 210RC, H.F. L.F. Mullard PM1A, H.F. L.F. Six-Sixty RC, H.F. L.F. Marconi DEH210, HL, DEL. Osram DEH210, HL, DSL. Ediswan RC, H.F. L.F. 12/6 each.

Cossor 220P. Mullard PM2. Six-Sixty 215P. Marconi DHP215 (Osram same). Ediswan PV215. 15/- each.

Cossor 230P. Mullard 232. Six-Sixty 230SP. Marconi 240 (Osram same). Ediswan PV232. Screened Grid, 22/8. Pentodes, 25/-

LEWCOS

Lewcos C.A.C.5, 10/6; C.A.C.20, 12/6; C.S.P.5, 10/8; C.S.P.20, 12/6; P4 to 14, 3/- each; P16 to 22, 4/- each. Touchstone Coils, 30/- pair. C.T. Coils, 3/6, 5/3. Q Coils: Q.A., 15/-; Q.S.P., 21/-; Q.A.R., 21/-; Q.A.A., 15/-; Q.S.G., 21/-. All Lewcos Products.

LOTUS 0 COILS QA, 15/-; QSP, 21/-; MASTER 3 STAR 15/-; ALL LOTUS PARTS.

VALVES

DARIO RADIO-MICRO

2-v. or 4-v. G.P. 5/8 Super Power 7/6 Super H.F., 2-v. or 4-v. 7/8 Post 3d. (3 Post Free).

TRIOTRON

H.F., Det. R.C., 5/2 each; Power, 6/9. 2-v. or 4-v. Post 3d. (10/- Free).

CLEARTRON

SCREEN GRID 2-volt, 12/6; usual types, 4/-; R.C. or Power, 6/-. Post 3d.

ULTRA SHORT-WAVE COILS

FOR COSSOR Per pair, 7/6 Post 4-pin. 6d.

Illustrated Catalogue (144 pages). 1/- refunded on first 10/- order.

TRIOTRON UNIT

Adjustable 4-pole Bal. 17/6 Ann. Carriage Paid

Tunewell Dual

250/2000 6-pin Base, 1/6 7/9

PANEL MOUNTING 10/6 PUSH PULL

TUNEWELL COILS

for MULLARD S.G.P.3 Aerial or Anode, BBC or Long-wave, 7/10 pair.

DUAL C. TAPPED

with reaction AERIAL 10/6 each.

ANODE 10/6 each.

FOR CLARION (post extra)

WEST END DEPOT for TUNEWELL COILS TRADE SUPPLIED

1,000 Miles Range on Your 1927 COSSOR

LIST OF PARTS

Screen Assembly—2 Coil Holders, McMichael Binocular Choke, Peto-Scott .0001, Peerless Rheostat, Dubilier 1 mfd. Insulated Wire, 2 Coils, for 200/600 metres. Post free Cossor S.G. 220, 22 6. High-wave Coils, pr. 12/6. Cossor Patt. Dials stocked.

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LISSEN

Valve Holders, 1/-; Fixed Condensers, 1/-; 1/6; Leaks, 1/-; Switches 1/6, 2/6; Latest 2-way Cam. Vernier, 4/6; Rheostats, 2/6; B.B., 1/6; Lissencols, 13/6; L.F. Transformers, 8/6; Coils, 60X, 6/4; 250X, 9/9; 40-v. H.T., 7/11; 100-v., 12/11; Super 60-v., 13/6; Grid Bias, 1/6; 4.5, 5d.; Super L.F., 2-v. or 4-v. Variable .0003, 6/-; .0005, 6/8.

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HARTLEY DUAL RANGE 3

"A.W." Jan., 12/29
ALSO
.0005 Polar S. Motion 12/6; .0001 J.B. 4/6; All Wave Tunor, Bulgln 15/-; .0002 and 3 meg. 2/-; H.F. Choke 5/6; Lissen 50,000 ohm anode and holder 5/6; Dubilier 2 Mfd. 3/6; Igranite L.F. 14/-; Lissen R.C. Unit 4/-.
3 A.M. Valve Holders 1 Strip 8x2 Fl. Switch High-grade Panel 14x7 Baseboard 14x9 7 Engraved Terminals Flex 9 B. Clips 30 ft. Connecting Wire Plugs

THE ABOVE LOT **65/-** POST FREE (U.K.) C.O.D. 1/6 extra

BRITAIN'S FAV. 2

A.W., 25th May, 1929 UP TO DATE.

Ormond .0005, 6/-; .00025, 5/6; 7 ohm Ormond, 2/-; 2 W.B. V.H., 2/6; 6 pin Base, 2/-; .0003 and Series Clip, 1/6; 2 meg. leak, 1/-; H.F. former, Lissen, 8/6; Push Pull, 1/3. ALSO with the following—14x7 Ebonite Panel, Pair Panel Brackets, Baseboard, Battery Clips, 8 Engraved Terminals, Wire, Flex, Plugs.

The Complete Lot 38/6 NETT

Post 1/- If by C.O.D. 1/- extra. Coils extra. Tunewell Dual Range. Six-pin, 7/9.

MULLARD MASTER 3 S.G.P

Strictly to specification. KIT OF PARTS £7 19 3
3 MULLARD VALVES, 25/-, 10/6, 22/6 £2 18 0
As an advertisement ONLY Purchasers of ABOVE LOT can BUY FROM ME (only) Table Cabinet 2/6 Oak; Transportable 5/- Oak. All carr. and packing extra.

MULLARD S.G.P. RECEIVER

All parts stocked. The following items, ARE ESSENTIAL FOR ABOVE, but you can use the others from Master 3 Star or Five P. if desired, or we have them in stock. Full List on request. Drilled Panel, Aluminium, 5 1/4, or Ebonite for D.C. Mains, 10/3. Pair .0005 Log "J.B." 16/-. Paid Drum Dials, L. and R., 21/-; Junit Piano B. Board, 2/-; Cydon .0003 Bebe, 8/-; Sovereign 50 ohms, 2/6. B.B.C. Anode and Aerial, 9/8. Long-wave Anode and Aerial (Colvern), 10/6. Metal Screen, 10/6. Pair Junit "H.V." Holders, 3/6. 3 Mullard Valves, 5/6, 22/6. Pentode, 25/- and one at 10/6.

PLEASE SEE A.W., MAY 18

BRITAIN'S FAV. 3 (DeLuxe)

A.W. 6/4/29

Ormond Log .0005, 6/-; .00025, 5/6; 7-ohm panel Rheo., 2/6; 3 Benjamin V.H., 4/6; Formodensar, Type "J." 2/-; .0003 and series clip, 2/-; 2-meg. Leak, 1/-; Tunewell All-purpose H.F. Choke, 5/9; R.C.C. Unit Dubilier, 7/-; 50,000 ohm wire-wound, 5/6; 2-mfd. Mansbridge, 3/6; L.F. Transformer, R.I. Varley, 15/-; add balance any other. Push-pull Switch, 1/3, complete with Panel Brackets, Indicator, C.B. Clips, 6-pin Base, Connecting Wire, Thin Flex, 7 Engraved Terminals. EBONITE Panel, 16x8, and 16x9 Baseboard.

Above Lot 63/-

Tunewell Dual Coil 6-pin, 7/9; Lewcos Short Wave, 20.45 or 40/90. 7/6 extra. C.O.D. 1/6

SIEMENS H.T. BATTERIES, 60 v. 8/-; 60 v. Power, 13/6; 108 v., 13/-; 100 v. Power, 22/6; 9 and 4 v. G.B. L.T. BATTERIES, Exide D.F.8, 8/6; Exide D.M.G., 11/-; D.E.9, 14/8; Oldham IV.D., 9/-; U.V.D., 14/-. All with carrier. Carr. extra on Batteries except by arrangement.

WEARITE

Dual Wave Tuner 15/-; H.F. Choke 6/8. S.W. Choke 4/8. 2-way Switch 6/-; 3-way Switch 7/-; Loading Coil 7/6. Titan Coil Unit 15/-.

Ebonite cut while you wait at 1d. square inch, also 1 inch at 3d. Only the best supplied. Drilled Panels for all circuits. Post extra.

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FOR EVERY 30/- you spend retail YOU CAN buy ONE of the following for 3d. each extra (on this Coupon)

H.F. Choke, Silk Loud-speaker Cord, 9-volt Grid Bias, Pair Panel Brackets, .0001 Reaction, 2 mfd. Mansbridge, 100 ft. Insulated Aerial, 4- or 5-way Battery Leads, 30 ft. Coloured Connecting Wire, S.M. Dial, 12 yds. Lead-in, Fuse and Holder, 12 Nickel Terminals, 60X Coil, Permanent Detector, Battery Switch, .0003 and 2-meg. Leak, 6-pin Coil Base, 12 yds. Twin Flex, 100 ft. Indoor Aerial, .005 Variable, Set of 12 Plugs and Sockets (red or black), Set of 3 Coil Plugs with Terminals, Wave Change Switch, .01 Fixed Condenser, 1 mfd.

MORE RADIOGRAMS

FOLLOWING the example of England, Holland, Germany and Italy, Belgium now proposes to erect a high-power short-wave transmitter in the neighbourhood of Bruges with a view to direct communication with the Congo and South America.

Picture transmissions by the Fultograph system are broadcast from the Rome station every Monday, Friday, and Saturday between 11 and 11.18 p.m. B.S.T., and a further test is made on Fridays at 7.38 p.m.

So soon as the new Bucharest high-power station is in operation the Rumanian railway authorities propose to equip all passenger carriages on the system with receiving apparatus. In the meantime tests are being carried out on the Oradea-Mare-Bucharest main line.

For the forthcoming International Exhibition to be held at Barcelona in May, the two rival broadcasting companies in that city are erecting high-power transmitters, namely, Radio Barcelona (7 kilowatts) and Radio Catalina (10 kilowatts); the former will operate on 349 metres (860 kilohertz) the latter on 268 metres (1,121 kilohertz).

The Berlin broadcasting studio proposes to relay during the month of June, an *al fresco* midnight performance of Shakespeare's *Midsummer Night's Dream*, from the historical Babelsberg Castle Grounds. For the benefit of European listeners the broadcast will be simultaneously given out by the high-power station at Zeesen.

Just as world history has come within the province of the microphone, so has local history. In Glasgow the B.B.C. plays its part in a memorable occasion by broadcasting one of the opening services from a new church in Mosspark—the first church in Scotland to be built and run on a union basis in view of the approaching union of the two great Presbyterian churches—the Church of Scotland and the United Free Church.

Short-wave wireless communication from Panama, 9 degrees from the Equator, with the Byrd Antarctic Expedition, on the edge of the ice barrier near the South Pole, was established by the Tenth Signal Company of the U.S.A. Army.

EASY TERMS

We specialise in the supply of all good-quality Radio Apparatus on deferred terms. All well-known kits of parts, components and sets, now supplied from stock. **LOWEST TERMS.** Send List of requirements to

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Phone: NATIONAL 1977

TRADE NOTES

OWING to the extensive demands for the varicus instruments invented by Mr. S. G. Brown and manufactured at the works in Western Avenue, North Acton, W. 3, reorganisation of the manufacturing side has been decided upon by the directors, who have been fortunate in securing the services of Mr. H. Walkington as works manager to bring the factory up to a big production basis. On the sales side, home wireless is now under the care of H. C. Goodman (late of the B.T.H. Co., Ltd., and Electromonics, Ltd.), the foreign sales remaining in the hands of Mr. V. Waterhouse.

Messrs. William Whiteley, Ltd., of Queen's Road, London, W.2, have opened in their basement a department for selling radio components, said to be the largest department of its kind in the world.

It should be noted that in the list of components for the "Daventry-Local Crystal Set" (described in AMATEUR WIRELESS No. 361, page 677) the crystal detector is given under the name Jewel Pen. This component is, of course, manufactured by the Jewel Pen Co., Ltd., 22 Great Sutton Street, London, E.C.1, but to prevent confusion should be correctly named the Red Diamond Detector No. R.D.40.

Another French mystery broadcaster has cropped up at Douai, according to calls picked up by listeners both in northern France and southern England. The wavelength would appear to be in the neighbourhood of 262 metres and transmissions are usually heard between 5.30 and 7 p.m. B.S.T. The announcer frequently puts out the call: *Ici Station LY a Douai.*

"Amateur Wireless and Radiovision." Price Threepence. Published on Thursdays and bearing the date of Saturday immediately following. Post free to any part of the world: 3 months, 4s. 6d.; 6 months, 8s. 9d.; 12 months, 17s. 6d. Postal Orders, Post Office Orders, or Cheques should be made payable to "Bernard Jones Publications, Ltd."

General Correspondence is to be brief and written on one side of the paper only. All sketches and drawings to be on separate sheets. Contributions are always welcome, will be promptly considered, and if used will be paid for. Queries should be addressed to the Editor, and the conditions printed at the head of "Our Information Bureau" should be closely observed. Communications should be addressed, according to their nature, to The Editor, The Advertisement Manager, or the Publisher, "Amateur Wireless," 58-61 Fetter Lane, London, E.C.4.

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ALL MAINS 2 and 3 VALVE SET for £1 deposit. Balance £1 a month. Write for free Illustrated List.

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For Multi-Valve Receivers
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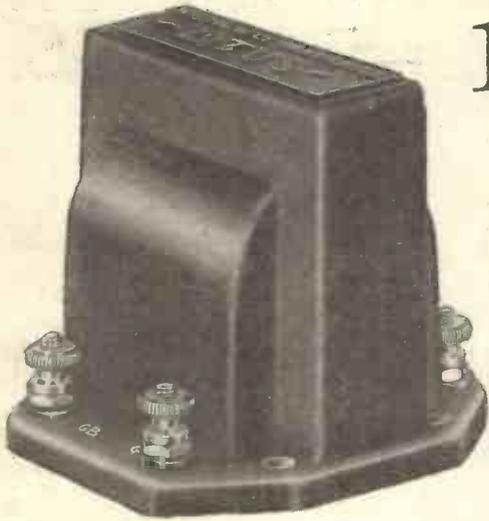


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 NEW Lotus Drum Dials from 29/6; Lotus Flat Vernier Dials, 4/9; Lotus Valve Holders, 1/3; Lotus Variable Condensers, from 5/-; Lotus Remote Controls, Jacks, Switches, Plugs, etc.
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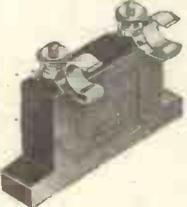
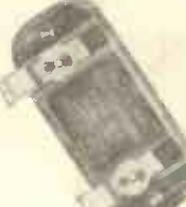
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