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Amateur Wireless

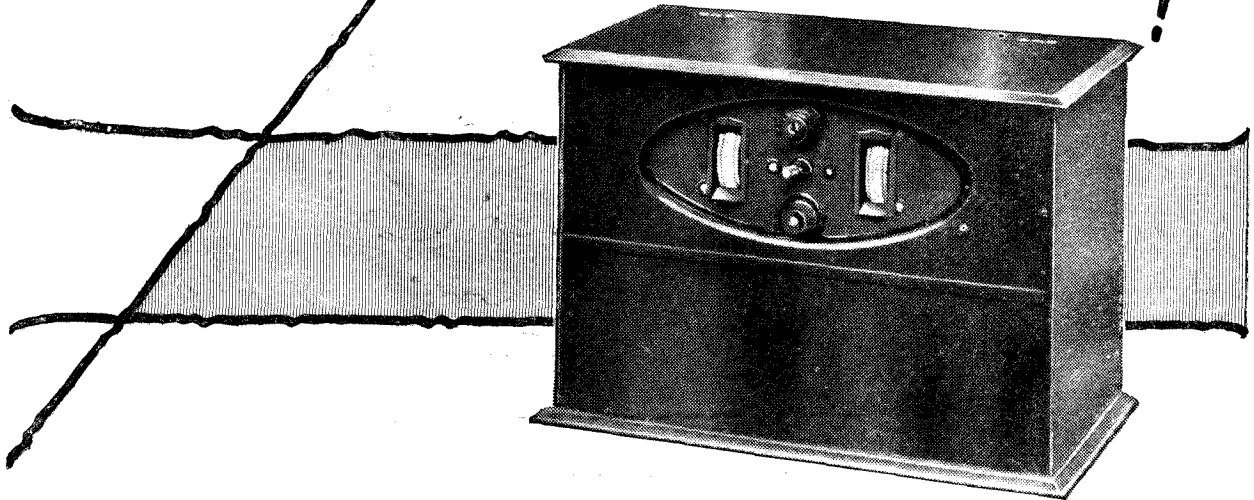
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Vol. XV. No. 387

Saturday, November 9, 1929



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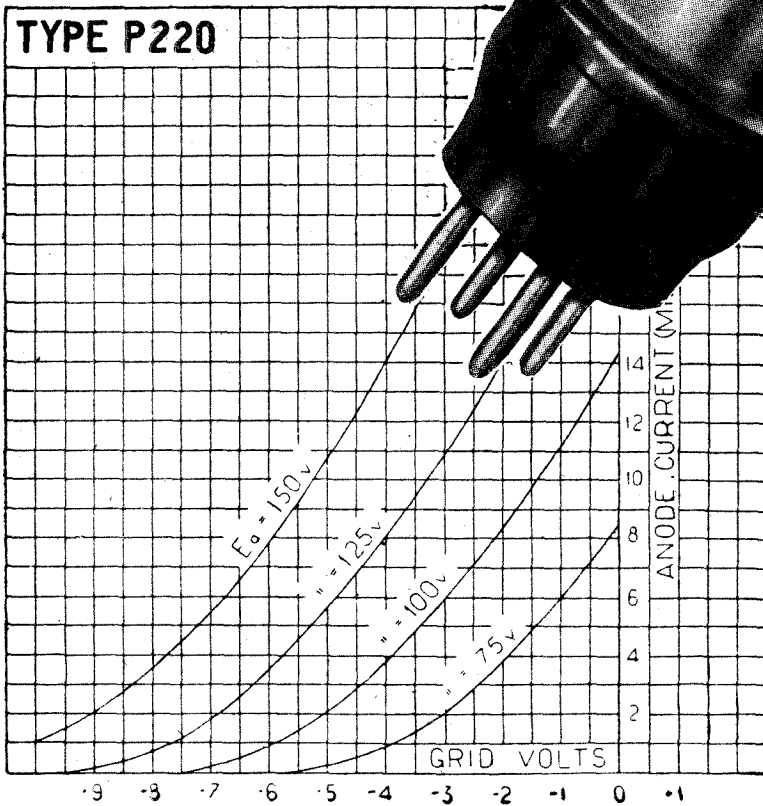
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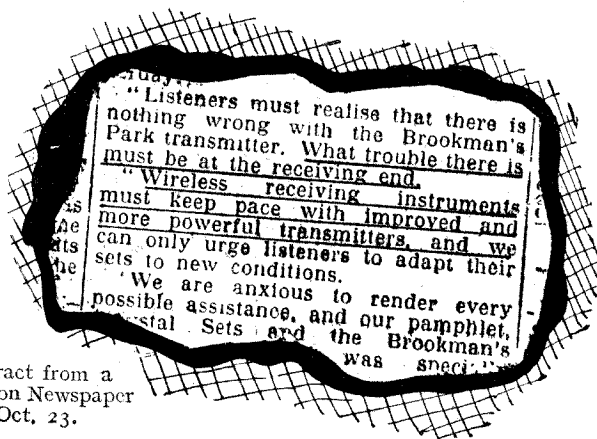
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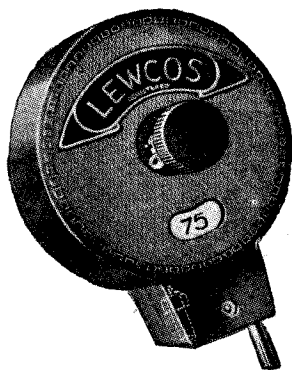
Solve



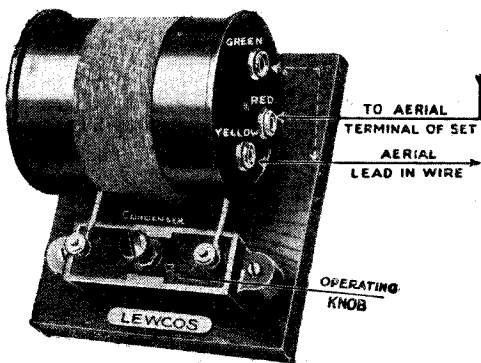
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Extract from a London Newspaper Oct. 23.

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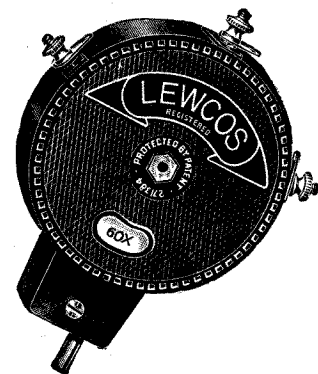


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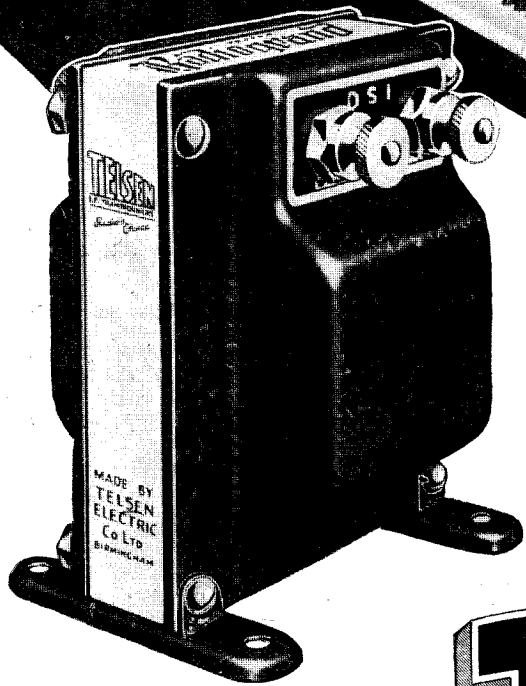
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Amateur Wireless and Radiovision

The Leading Radio Weekly for the Constructor, Listener and Experimenter

Editor: BERNARD E. JONES

Technical Editor: J. H. REYNER, B.Sc., A.M.I.E.E.

Research Consultant: W. JAMES

Assistant Editor: H. CORBISHLEY

A New Station, and a Rumour—Can We Help Motorists?— EAJ8 versus Glasgow!—A New Radio “Thrill”

A New Station, and a Rumour—Rumours are ever current in our hobby, and the latest concerns the erection of a new short-wave station. The following report comes from a reliable source: “Short-wave broadcasting is being considered by the B.B.C. with a view to a reorganisation that will make it possible for the London programme to be heard all over the Empire by ordinary wireless listeners. The building of a new short-wave transmitting station is under consideration. True, dissatisfaction is expressed in many quarters with the present scope of 5SW. At present programmes are broadcast daily to the Empire from Chelmsford from Monday to Friday between 12.30 and 1.30 p.m., and from 7 p.m. to midnight.”

Can We Help Motorists?—In referring to safety-first propaganda, our contemporary, *The Light Car and Cyclecar*, says, “We plead that snappy reminders intended for the hearing both of those who ride and those who walk should be broadcast periodically by the B.B.C. If couched

in the right terms and sympathetically delivered, such reminders should prove a considerable benefit to the community.” It is not a question of whether they would be “sympathetically delivered,” but rather whether they would be sympathetically received. We doubt it. But undoubtedly if the scheme could be made to work in some way, the final result would be worth achieving.

EAJ8 versus Glasgow!—For some weeks past Glasgow listeners have been complaining that their reception has been interfered with by a high-pitched whistle, somewhat similar to that produced by a badly-handled valve set, but louder and steadier. This has been due to the heterodyne produced by the Spanish station, San Sebastian, EAJ8, which has been working on a frequency not allotted to it under the Prague Plan. The station has been identified and its frequency measured by the B.B.C. engineers and found to be 755 kilocycles per second, approximately; the frequency of the Glasgow station, which has been strictly adhered to, is 752 kilocycles per second (399 metres). The interference was at once reported to the Technical Committee of the Union Internationale de Radio-diffusion at Brussels. The identity and frequency of the interfering station was confirmed at the U.I.R. listening

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post at Brussels, and they immediately communicated by telegram with the Spanish authorities. Further, the B.B.C. requested the British Post Office to make representations to the Spanish administration, in accordance with the provisions of the Prague Plan. This request was complied with immediately by the General Post Office, who have telegraphed to the Spanish authorities. It is hoped that this will be effective, and that the grievance of Glasgow listeners will be removed.

A New Radio “Thrill”—Screams and cries of “Let me go! Let me go,” heard by some Kensington residents recently led them to believe that a murder was being committed. They telephoned to the police station, and three officers, a sergeant, acting-sergeant, and a constable arrived to make inquiries at a house whence the screams had been reported to be coming. They found there was nothing there, except a three-valve set, which had been reproducing a B.B.C. broadcast dramatised version of Mr. W. W. Jacobs's story, *The Monkey's Paw*. This is a “thriller,” and the screaming and shouting came at the end. The police departed satisfied that no crime had been committed!



Through!

KESTON is no more! This doesn't mean to say that the B.B.C. has decided to scrap its relaying and testing station: rather the reverse, for these two activities, sidelines of broadcasting though they may be, are becoming more and more of importance. A new station, Tatsfield, has taken the place of the former experimental shacks at Keston.

The 1924 Days

Keston was opened towards the end of 1924, when there was a temporary "boom" in relays from America. How well we remember the times when U.S.A. relays were fished for on a clumsy multi-valve super-het, and when amateur DX "fans" vied with one another and the B.B.C. to pick up the transatlantic transmissions. Keston consisted of a couple of huts in a 30-acre field at Fairchilds, Kent, overlooking the valley to Biggin Hill Aerodrome. The main idea, at first, was to make Keston the experimental test laboratory of the B.B.C., for formerly relaying and work of this kind had been done with apparatus installed in engineers' private houses—a makeshift which could not last. As time went on the work of Keston became more and more important. Inter-house forms at Savoy Hill, relating to some or other activity, experiment, or discovery at Keston became increasingly common, and the Big Wigs had to sit up and take notice of the work which the engineers were doing in the "wilds" of Kent.



The Tatsfield testing station, to which the Keston apparatus has been removed

A Personal Account—By KENNETH ULLYETT

Gradually a new job evolved and settled itself on Keston's shoulders: that was the checking up of European stations' wave-lengths, and, later, the calibrations of international wavemeters. This necessitated the installation of very complicated gadgets, such as valve-controlled tuning-forks, and roughly-constructed wooden huts are not ideal houses for expensive apparatus of this ilk.

A Move

So, when a move became necessary, the engineers pressed for a comfortable esconce-ment for their valuable sets and wave-meters, and now, at Tatsfield, they have it.

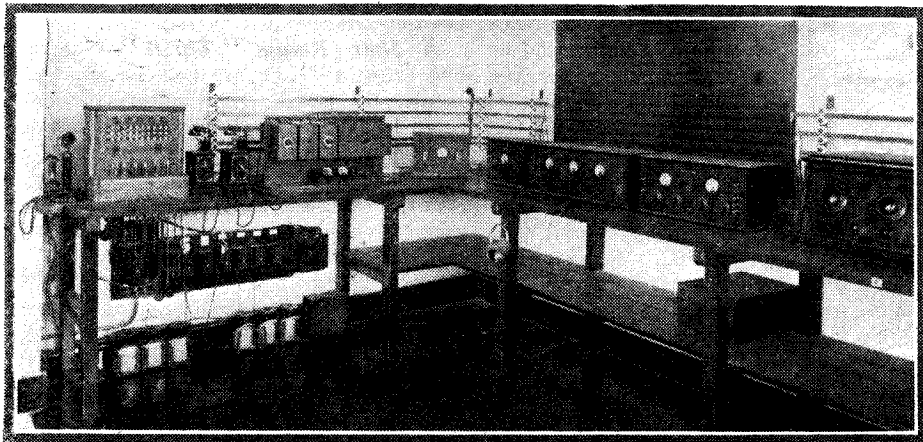
Tatsfield is only about three miles from Keston, that particular locality having been found entirely suitable. It is in Surrey, but on the borderline, and the nearest town is actually in Kent. The field chosen, I remember, is very close to that which was seriously considered, but subsequently turned down for various reasons, when the Keston station was being planned in 1924.

The site is 850 ft. above sea level, and is the highest local point, with the exception of course, of the famous Leith Hill. The

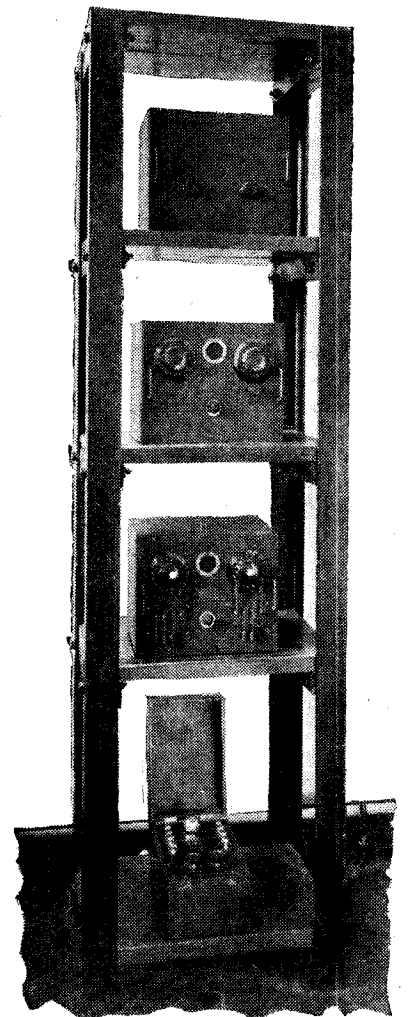
AMATEUR WIRELESS is, therefore, the first to publish exclusive details of the new tester.

As you will see, there are two rooms, these housing the apparatus for the two entirely

(Continued on page 740)



A corner of the instrument room, showing part of the L.F. apparatus, and the line termination equipment

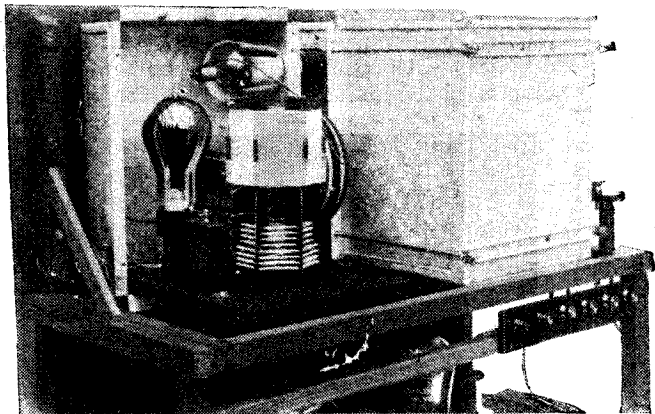


The iron frame, bolted to the concrete floor, supporting the frequency sub-standard

B.B.C. is fortunate in being able to choose its good positions for reception. The heading photograph to this article gives a very good idea of the station as I saw it a few days ago. As a matter of fact, everything is not yet quite ready, the change over from Keston having been made in a hurry, and no official "views" have yet been made.

MAKING YOUR OWN SCREENING BOXES

By F. W. RIDGE



Now that screen-grid valves have become so efficient and we are able to get an amplification of over two hundred times without back-coupling in the valve, it has become imperative to adopt thorough screening of the H.F. circuits to take advantage of this great advance in valve design.

components and when open giving accessibility to all wiring, etc., and thorough shielding when closed. The photographs show the H.F. and detector stages of a mains operated set and will make clear the general arrangement of the boxes. It will be seen that they are made in two halves, the fixed part being shallow (2 1/2 in. deep) and through its side passing the S.G. valve, the spindles of the thumb-control condensers and the rod operating the wave-change switches, which in this case are of the push-pull type. As can be seen, ordinary dial-type condensers can be used equally well by passing the spindle through the bottom of the tray.

long as the metal is clean at the time of making is electrically sound without soldering.

The size of the boxes described is 9 in. deep by 9 in. high by 7 in. wide. This is rather on the large size, but too close a proximity of metal to the coils will un-

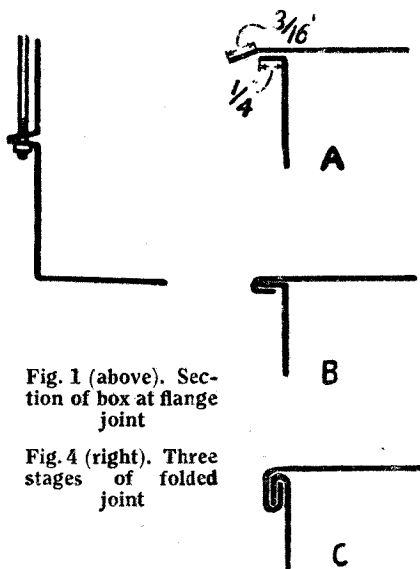


Fig. 1 (above). Section of box at flange joint

Fig. 4 (right). Three stages of folded joint

The screening boxes have, therefore, become the first consideration when designing a modern set.

Now it seems to be generally considered that whereas the average handyman can

The Cover

The coils and other components are mounted on the small baseboards which are fixed to the bottom edge of the tray.

The cover is a deep box (6 1/2 in. deep) which can be drawn right off for wiring or making adjustments to the set. When the cover is on, contact at the joint is made by pressure between the flanges which are bent at an angle greater than 90 degrees so that as the long bolts are screwed up, the flanges press together and are bent slightly back making contact all round by their own springiness. This will be made clear from the sketch Fig. 1.

To make the boxes, aluminium or copper may be used. We shall also require two

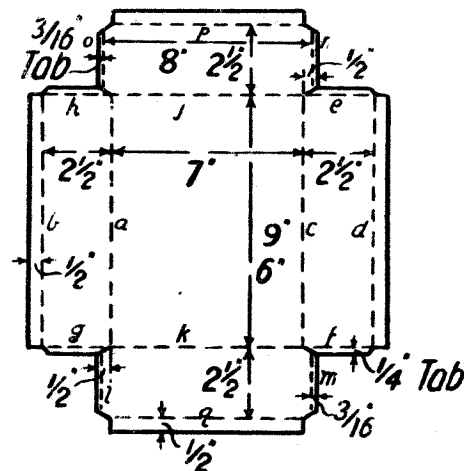


Fig. 2. Development of shallow half of box

doubtedly introduce eddy current losses and it is advisable, therefore, to err on the large side. Should it be essential to reduce the size of this box it will be a simple matter to adjust the dimensions given accordingly.

Commencing by making the shallow half of the box which is all in one piece; the sheet metal should be carefully marked out with a scriber, marking the lines for cutting and bending as shown in Fig. 2 and cutting the piece out with the shears.

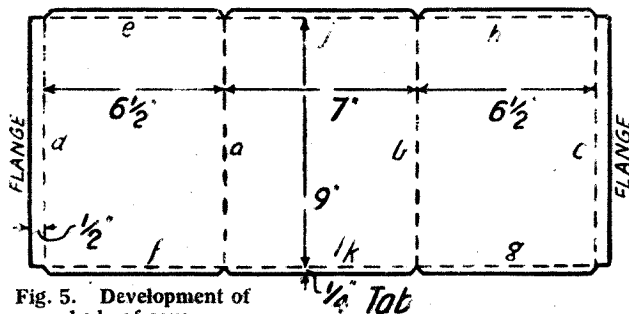


Fig. 5. Development of body of cover

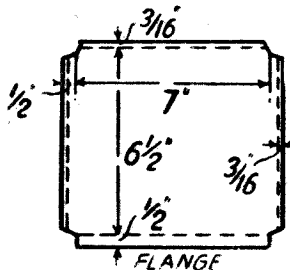


Fig. 6. Development of ends of cover

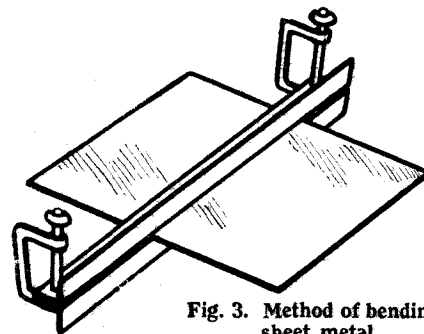


Fig. 3. Method of bending sheet metal

make a wooden cabinet he cannot make a metal one. This is not the case and from the following details any amateur with an aptitude for odd jobs should be able to make up boxes of his own or the particular design given.

pieces of about 1 1/2 in. by 1 1/2 in. angle iron about 18 in. long as a guide for bending and some odd short pieces of iron and the use of a vice.

All the joints are made by folding. This method makes a strong, neat joint, and so

The development drawing should be carefully studied so that it is quite clear just how the bends have to be made to fold up and form the finished tray; if a bend is made in the wrong direction it is difficult to rectify satisfactorily. Should one

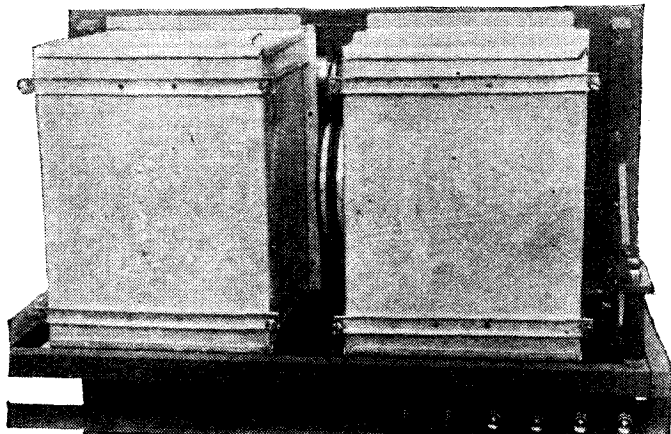
be in doubt it is worth while making a paper pattern and folding this up, when the procedure will quickly be made plain.

The metal is very easily and accurately bent by placing the two pieces of angle iron on the top of the vice jaws and clamping the sheet between at the line where we require to bend and pressing over with the hands and tapping along with the hammer. If a vice is not available one piece of angle iron is placed in front and the other at the back along the line and they are held in position with the two "G" clamps while the bend is made. (See Fig. 3).

Making Bends

Unfortunately when a few bends have been made we find the sides already bent are in the way, but with a certain amount of ingenuity and some odd short pieces of angle- or bar-iron the difficulty can be got over quite easily.

The order of making the bends should be watched so that as many as possible can be made with ease in the vice. The best order of bending is indicated in the development diagrams by the letters. Taking up the piece which we have cut out for the shallow half, first bend up one of the sides marked (a) then its flange (b) outwards,



Arrangement of boxes at back of panel

then turning the piece of metal do likewise with the opposite sides (c) and (d). Now bend outwards the four 1/4 in. wide tabs (e, f, g, and h) using the vice or the end of the pair of angle irons.

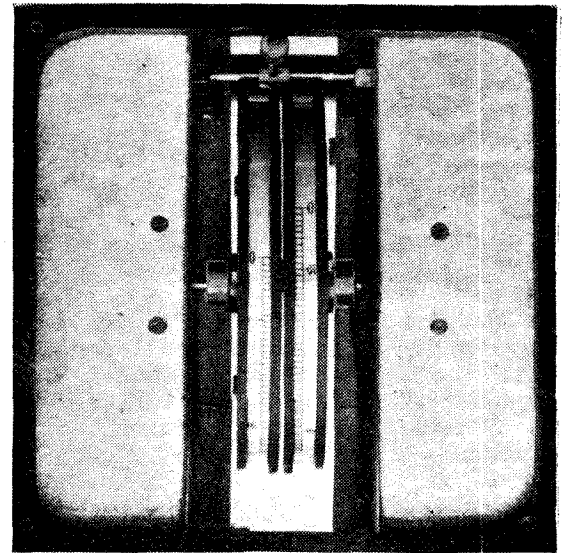
The other two sides must now be bent in and to do this a short piece of iron about 7 in. long must be used for clamping on the inside, as the sides already bent are in the way of using the longer piece. To join up the corners it now only remains to bend up bit by bit with the pliers the 3/16 in. tabs and to tap them right down to engage the 1/4 in. tabs of the other sides (Fig. 4 a and b). Then the corner of the box should be supported by a piece of angle-iron held in the vice while the fold is flattened down against the side of the box with the hammer (Fig. 4 c).

The covers are made in three pieces, the body (Fig. 5) and two ends (Fig. 6). This economises material and makes the job

easier than attempting it in one piece. There should be no difficulty with this part; the joints are made in exactly the same manner and the best order of bending is indicated in the diagrams. It will be seen, of course, that as the ends are separate, the 5/16 in. tabs can be bent up between the angle-irons first and then slipped on to the body and the tabs bent right down over the body tabs and the whole joint flattened back as before. The flanges of the two ends should not be bent up until the rest is completed so as to be sure to get them in alignment with the side flanges. It now only remains to provide a means of clamping the two halves of the boxes together. The most obvious method is to put small bolts through the flanges, but these will be difficult to get at and it will be found that they only press the flanges together locally. The method used, which can be seen from the photo-

rod already screwed and can just solder heads on.

The boxes seen in the photographs were fitted to an existing set of rather an unusual



Front of panel with finger plates removed

These two illustrations clearly show how the screening boxes are mounted at the back of the panel

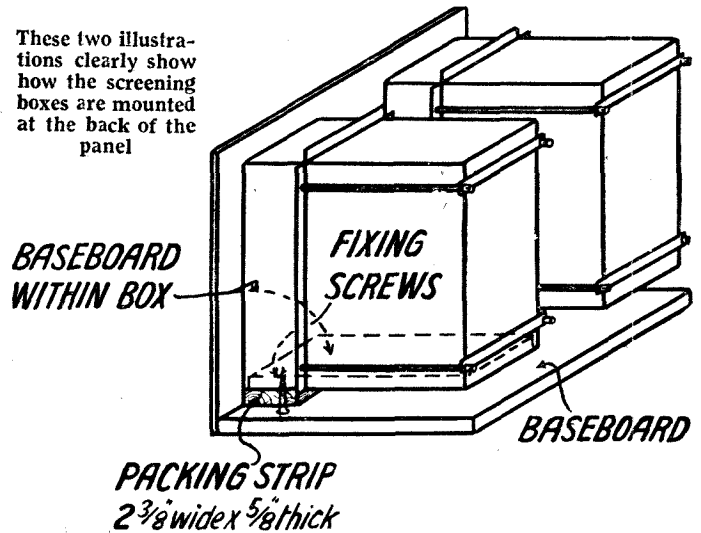


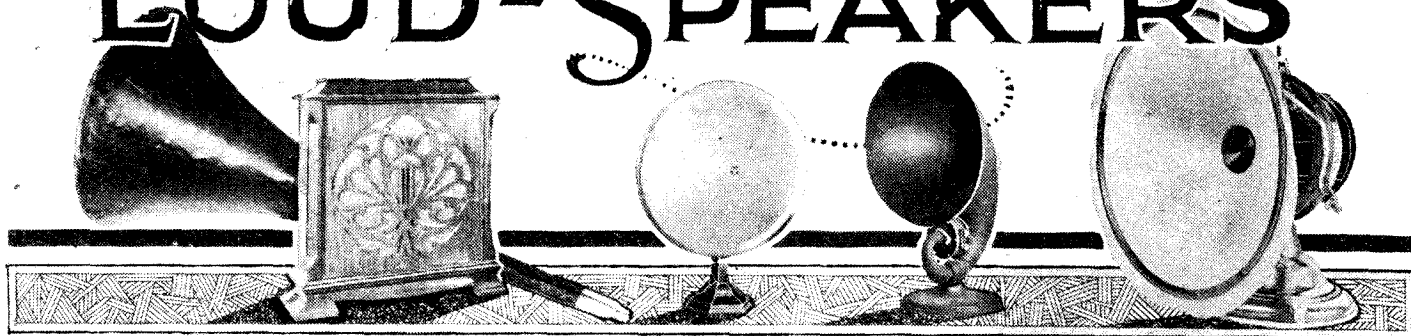
Fig. 7. Method of assembling boxes

graphs, is to press the whole cover forward by means of two straps across the back and four long bolts. The straps may be made from strips of 22-gauge sheet brass with the edges bent up to form a channel section for stiffness or strips of 3/8 in. by 1/8 in. iron may be used. Holes are drilled in their ends for the long bolts to pass through and they are secured to the box by two small rivets or screws. Clearing holes about 3/16 in. diameter are also drilled in the flanges opposite the ends of the straps. Beneath the flange of the fixed half of the box and opposite the hole, a 4B.A. nut, or better, a piece of 1/8 in. brass with a tapped 4B.A. hole in it, is soldered. The long bolts are made from pieces of brass rod 9/64 in. diameter and 7 1/4 in. long with about 3/4 in. of 4B.A. thread run on one end and a head of hexagon brass screwed and soldered on the other. Those people who have no dies can obtain 4B.A.

design having the L.F. stages beneath the H.F., but for those making sets of the more usual baseboard arrangement the sketch (Fig. 7) will show how this is done. Large holes such as required for passing the S.G. valve through can be cut out by drilling small holes close together all round a circle and clipping out the intervening pieces with wire clippers or by chiselling and trimming smooth with a half-round file.

When the condenser spindles pass through the box a hole about 1/8 in. larger in diameter than the spindle should be drilled so as not to short circuit the bias battery; in the case of drum control a piece of ebonite about 1 1/2 in. by 1 in. by 1/8 in. with a hole in it of the correct spindle size should be secured with two 6B.A. screws and nuts over the large hole in the box, thereby forming an insulating bush and also an extra bearing for the condenser.

MORE EXPERIMENTS WITH LOUD-SPEAKERS



"Thermion" describes some further modifications and improvements

THE many excellent driving units now on the market enable the wireless man to make up his own loud-speaker at remarkably small cost. They will appeal very strongly to those who want first-rate reproduction but cannot face the cost of a moving-coil speaker, as well as to those who like a rather smaller volume of sound than is necessary to enable many types of moving-coil speaker to do themselves justice. I have recently tried out most of the best balanced-armature or similar driving units at present available with a view to discovering the most suitable ways of using them for building up good loud-speakers and readers may find the results of these experiments of use.

Three Cone Types

There are various methods of employing these units, every one of which of course demands a cone or a diaphragm of some kind, though a baffleboard may or may not be used. Three possible ways of utilizing the balanced-armature drive are:

- (1) With fixed-edged convex cone of large size and no baffleboard.
- (2) With fixed-edged concave cone of medium size and a baffleboard.
- (3) With freely-suspended concave cone of small size and a baffleboard.

Experiments show that the results obtainable with the first system are inferior to those which either of the others will give. The large convex cone with fixed edge has distinct resonances, which make reproduction somewhat peaky, whilst the absence of a baffleboard makes it impossible to do much with the bass notes.

The second method is not altogether unpromising, but I do not think that any balanced-armature driving-unit is given a fair chance if it is called upon to operate a 12- to 14-inch cone of convex type with fixed edge. Such a cone must clearly be rather heavy, which means that inertia is present to an undesirable degree and the fact that its edge is fixed prevents just that unhampered movement which is most desirable for good reproduction.

It must be remembered that the balanced-

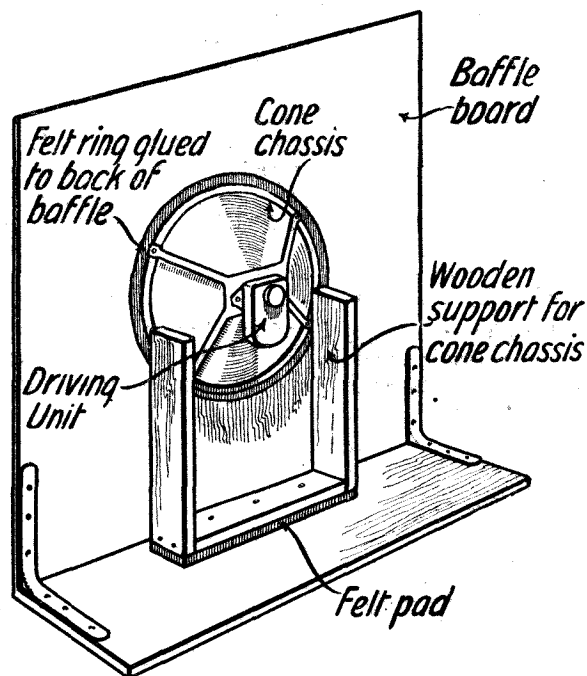
armature unit has not quite the "punch" of the moving-coil drive. With the latter a powerful atmospheric may cause the cone to move as much as a sixteenth of an inch or even more. The maximum movement possible for a cone connected to a balanced armature unit is only a minute fraction of this amount. It would seem, therefore, that to get the most out of a drive of this kind it is essential to use a very light cone and so to arrange it that its small movements are in no way hampered. If this is done a good driving unit will give an amazingly large volume of sound without any signs of chattering and one can obtain wonderfully good reproduction of the bass.

What I would recommend, then, with most balanced-armature units is the use of a simple chassis containing a light cone very freely suspended by means of a ring of flexible material. A chassis of this kind is made by several firms and an exceedingly handy one is the Baker, which will take almost any unit on the market. Another which I have found most satisfactory is the White Spot.

I think, however, that makers are not always wise in designing their cone chassis, with a view to their being attached by screws directly to the baffleboard. My reason for saying so is this. With many units when the volume of sound reproduced is great, very considerable vibration is set up. This must necessarily be communicated to the cone chassis and therefore to the baffleboard. The baffleboard is bound to have a natural frequency of its own and if the chassis is attached directly to it a resonance peak is most likely to be noticed whenever this frequency is reproduced by the loud-speaker unit.

I find it preferable on the whole to mount

the cone chassis on a support of its own so that it is quite independent of the baffleboard. The drawing indicates how this is done. The mount for the chassis is made quite simply from three pieces of 1 in. white wood fixed together so as to form a square "U." The chassis is secured to the front edges of the uprights by screws passed through the holes provided in it. The baffleboard is provided with a base attached to it by brackets and to this base



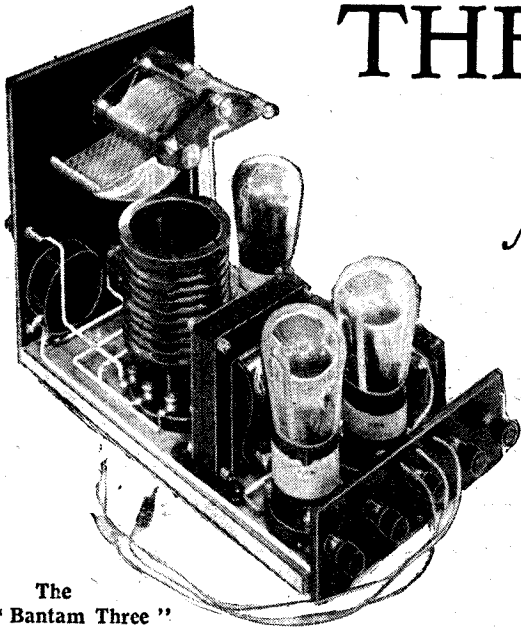
"Thermion's" own method of mounting the unit

the wooden frame holding the cone chassis is fixed. Care is taken that the rim of the cone chassis does not touch the baffleboard; to prevent vibrations from being transmitted to it indirectly a pad of felt or rubber sponge is placed between the bottom of the wooden frame and the baseboard.

The supporting frame can be made in a few minutes and the job is well worth while,
(Continued on page 756)

THE "BANTAM" CROWS LOUDLY

An account of some amazing results obtained with a low-price three-valver



The "Bantam Three"

I HAVE been using your coils, plug-in and six-pin type, for some time and have found them very efficient. My present set, the 'Bantam Three,' incorporates your dual coil. Although I have been a short-wave enthusiast for the last five years, I have never had the same degree of success as I had during the past week, using one of your ultra-short-wave coils.

"I am still using the 'Bantam Three' on the short waves, simply by removing the dual coil and putting in the short-waver, without interfering with the circuit.

"Last Sunday evening, my wife and I listened to a church service broadcast from KDKA; the reception was excellent, considering that the aerial is old and badly screened.

On the Short Waves

"Last Tuesday night I had another go on the short waves, and the General Electric Co's station at Schenectady came over as plain as 2LO. The same night I picked up a very powerful carrier which turned out to be the New York end of the transatlantic wireless telephone service, the operator was calling London.

"To be quite sure that this was no freak reception, I was on the short waves again on Wednesday and last night, and on both occasions I succeeded in picking up one or more American stations, not to mention G5SW and hundreds of morse, amateur and commercial stations."

This striking letter was sent by a north London reader to Messrs. Turner & Co., the manufacturers of the Tunewell dual-range coil specified for the original "Bantam Three."

The "Bantam," one of the most successful sets which AMATEUR WIRELESS has ever published, was not specifically designed for the short waves, and it is therefore with the greatest interest that we publish this letter giving details of amazing short-wave reception on this simple three-valver.

As a matter of fact, the "Bantam" was first described at the end of last year, in AMATEUR WIRELESS No. 341. It attained immediate success because it opened up a new style of reception. The "Bantam" was the first "three" in which the designers had attempted to economise space, without sacrificing efficiency. The cabinet measures only 7½ in. by 8½ in. by 10 in. ! Notwithstanding these Lilliputian measurements, the set incorporates the popular detector, R.C. and transformer circuit, while long- and short-wave reception is possible, simply by the movement of a switch on the panel and, as our north London reader shows, ultra short-wave reception is extraordinarily good. We therefore think it opportune to reproduce the circuit diagram of this little three-valver, which really crows for itself ! If you contemplate making it up then get the blueprint, which you will need when you start constructional work. This print, No. 160, can be obtained price 1s. post free, from the Blueprint Department, AMATEUR WIRELESS, 58-61 Fetter Lane, London, E.C.4. It really will be found invaluable not only to beginners, but to experienced constructors for it is a full-size combined wiring diagram and drilling template.

The panel carries a .0005 tuning condenser, .0001 reaction condenser, filament rheostat and wave-change switch. On the baseboard are the following: dual-range coil-holder, L.F. transformer, R.C. unit, H.F. choke, grid condenser and leak and the three valve holders. The little terminal strip at the back, measuring 2 in. by 6 in. (cut from a panel of 9 in. by 6 in.) carries terminals for L.S.+ and L.S.—, H.T.+ , H.T.—, and L.T.+ . The L.T.— lead is connected to the H.T.— terminal.

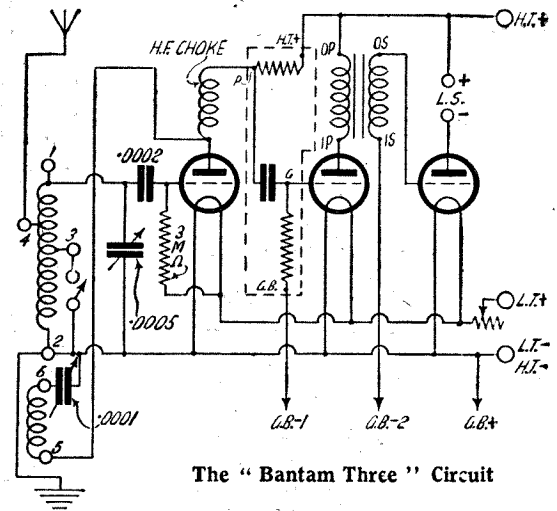
The blueprint can be used as a template and guide for drilling the panel and mounting the components. In addition it shows the positions and connections of each of the leads. When mounting the components it is advisable to leave the aerial condenser till a later stage, when wiring has been commenced. When the places have been marked on panel and baseboard, screw down the dual-range coil holder, transformer and the three valve holders. Attach the panel to the baseboard, but leave

the terminal strip unattached for the moment.

At this stage the following components can be wired up without difficulty; reaction condenser, wave-change switch, rheostat, coil base, transformer and valve holders. In some cases the wiring cannot actually be completed, but sufficient wire should be left attached to the accessible terminals, so that when the remainder of the components are added, the various circuits can be completed.

Next, add by degrees and in this order, the grid condenser and leak, H.F. choke, R.C. unit, terminal strip and finally the aerial condenser. Make a final check of all wiring when the job is finished, and there you have the "Bantam" all ready to crow for you on the long or short waves, or even the "wavelets."

It is a receiver to be most thoroughly



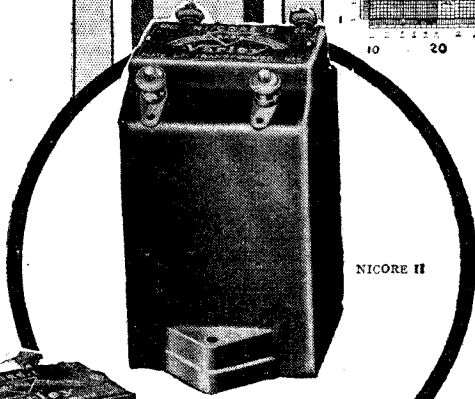
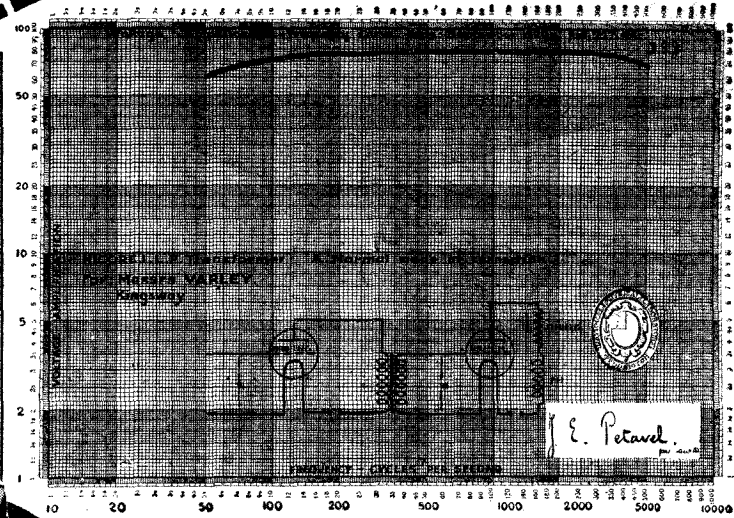
The "Bantam Three" Circuit

recommended, for its small size, the compactness of its layout and the shortness of its wiring are all conducive to the greatest efficiency.

Colombia, the country said to have the world's worst radio climate, has just opened its first broadcasting station. Colombia is situated in the hottest corner of the Caribbean territory with difficult natural conditions.

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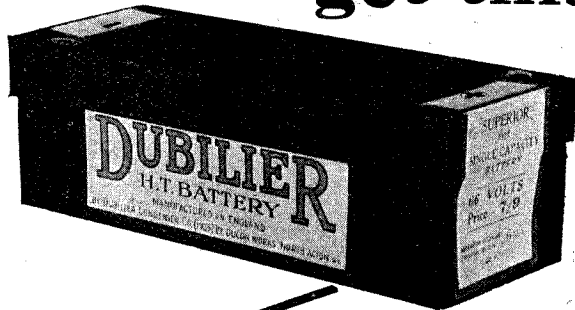
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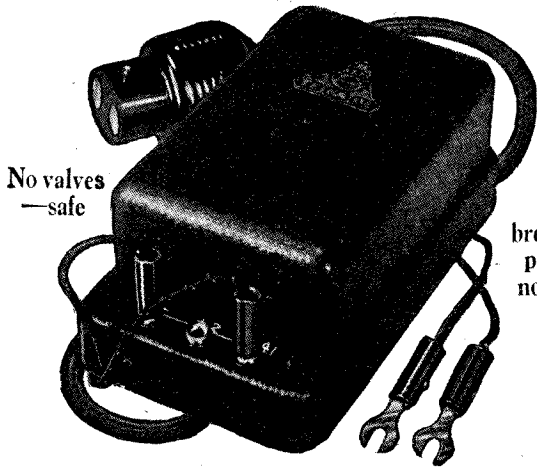
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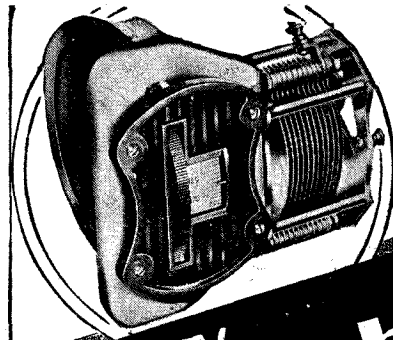
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TROLITAX

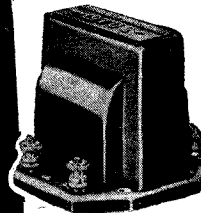
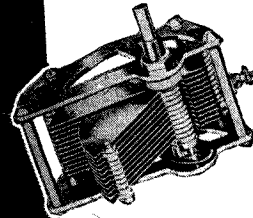
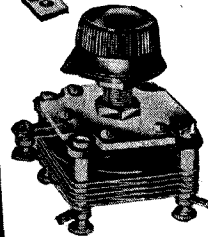
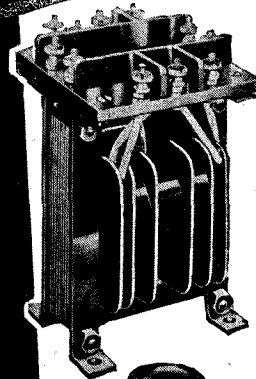
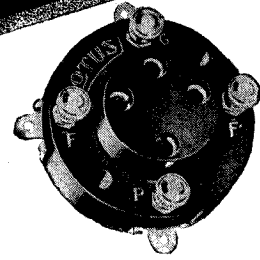
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In a set built with Lotus units every component pulls its weight. Their close, clean fit, sound connections and infallible accuracy produce a set which is easily and quickly assembled and gives the highest efficiency.

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Face to face with sudden death . . . in mid-ocean . . . men rely on efficient **Marconi Valves**

Four days out of Liverpool. Smoke pours from hold! Cargo ablaze! Frantic S.O.S. wirelessly *through Marconi Valves.*

. . . Hundred miles away, trans-Atlantic liner alters course. Full steam ahead! At last . . . look-out reports clouds of smoke on horizon. One hour later . . . cargo steamer abandoned. Crew rescued *thanks to Marconi Valves.*

. . . Marconi Valves are used in majority of principal passenger-carrying ships of British Merchant Navy. For unfailing service, wide range, long life. *They will improve your radio set.* Give you clearer tone, fuller volume. Cost no more. Use less current. Fit any set.



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The first and greatest name in wireless

On Your Wavelength!

Metal Panels

THE metal panel has become very popular during the last few months and it is highly probable that the next Radio Exhibition will see the final exit of the ebonite panel. The ebonite panel was very useful in its day, especially when all kinds of coils were hung around the front of one's set. It was so easy to drill and, when new, looked exceedingly "posh." However, exposure to strong light soon discoloured the beautiful blackness of the ebonite, and the prevention of hand-capacity effects necessitated the use of special internal screening.

When Mains are Used

Screened-grid valves, high-efficiency H.F. circuits and the tendency towards one-dial control have all contributed to the demise of the ebonite front or top panel. Users of metal panels who work their H.T. or filaments from D.C. mains should take care, especially if the positive main is earthed. In this case, the filament, H.T. negative and metal panel will all be two hundred volts or so above earth potential, so that if the floor is damp or you happen to be touching a water pipe or central-heating radiator, you will "collect" an unpleasant shock. In such cases, it is wise to put the L.T. accumulator (if used) in some place where it cannot be touched accidentally, and to cover the front of the metal panel with leatherette or some material that combines fair insulation with good appearance.

D.C. mains which are "positive earthed" are a nuisance to the radio user. Smoothing troubles are complicated, shocks are possible, extra condensers of high insulation must be inserted in aerial and earth leads, and other troubles crop up. D.C. mains with the positive side earthed are sufficiently unpleasant to warrant the use of H.T. accumulators.

America in Daylight

I wonder if readers often receive the low-wave American stations in daylight. When listening to a friend's set the other afternoon I was surprised when he tuned in 2XAD on 22 metres about half an hour before sunset. Speech was plainly audible fifty yards away from his moving-coil loud-speaker, although fading was very marked.

Sunset is well known as a very critical period for long-distance reception. There are many who hold that distant reception at this time is very difficult; yet I have often been able to receive distant stations at good strength with increasing clearness as it became darker. I noticed that when 2XAD was tuned in again at 11.30 p.m. the strength was no greater. I expect readers have had similar experiences.

A Puzzie

A friend, who is so bitten with "ultra-short-waveitis" that he regards anything over 20 metres as enormously long, tells me that he is at his wits' end just now. For some time past he has been endeavouring to construct a receiving set that will enable him to get down to 5 metres. Though he has removed the caps from his valves and done everything possible to cut down stray capacities to a minimum, he still finds that his single-turn tuning coil won't let him get below 6.8 metres. Can anybody extend a helping hand? I cannot, for I have never tried to get below 10 metres, which seems quite far enough down the scale for ordinary purposes. It is easy enough to get down so far, but the difficulties increase by leaps and bounds when you try to make a further reduction.

Work for the Grid Battery

One might suppose that the grid battery if under no load would last practically for ever. There are a good many reasons why it doesn't do so. In the first place, we have to remember that during reception very high peak voltages occasionally reach the grid of the low-frequency valves, carrying the grid potential over to the positive side and allowing grid current to flow momentarily. The battery may therefore come in for a certain amount of actual work. Secondly, no dry-cell battery is perfectly insulated; there are always small leakages taking place, particularly over the sealing at the top if this is allowed to become covered with a coating of dust. Thirdly, what is known as local action takes place inside the cells, with the result that the electrolyte is slowly impoverished and that the pot of the cell is eaten away. Fourthly, the electrolyte dries up in time. It has often been laid down that a grid battery should last nine months. One cannot be sure that it hasn't spent some time in stock when it is purchased. Half its nine months of life may, in fact, have been spent in the shop. My advice to readers is to make a special point of testing the grid battery cell by cell at the end of three months and to look it over at least once a month after that.

Eliminators

It is really astonishing, I think, to find what big strides have been made with eliminators and mains-driven receiving sets. I say "astonishing" because there is one very big handicap in this country. To begin with, less than 40 per cent. of British houses have electric light. Then those that are so provided have all kinds of different current supplies. "All kinds!" you say. "What's the fellow talking about? Some have A.C., of course, and

some D.C." Yes, dear reader; but the A.C. voltages are different in different places, and so is the periodicity of the current. And when we come to D.C. we find voltages ranging from 60 to over 200, and some of the so-called D.C. served up by antiquated plants has a horrid wobble in it. So, instead of being able to concentrate on one form of eliminator, the designer must make several, and this, of course, might be expected to cramp his style rather badly. But our manufacturers have risen superior to all difficulties, and we can say proudly that our eliminators and mains-driven sets are as good as can be found in any part of the world. This year's designs show a distinct advance on previous models, and we have now reached a time when the no-trouble receiving set is reality and not an impossible vision.

Beauty by Wireless

One of the American stations, I read, has added to its staff a beautician. . . . A *what?* A beautician, spelled exactly just like that. A beautician, I gather, is a lady who conducts what is described as a "good looks workshop." The station appears to have fitted her up with a suitable workshop, for I read that on a certain day she will broadcast the result of her laboratory experiments with sun-tan complexions, both natural and applied. Apparently she also answers questions by radio. This, I should think, must be a little embarrassing. Children love the Aunts and Uncles who call them by name and tell them to look in the coal-scuttle, but I should simply hate the whole world to hear: "Thermion, dear, the best way of curing the pimple on your nose, which you find so distressing, is to etc., etc." Still, I think that we really ought to have beauticians over here, for I am sure that it would be thrilling to learn how to acquire a sun-tan complexion, whether natural or applied. And don't you think that we poor men get rather left out in the cold in the matter of these beauty talks? I am sure that something ought to be done for us, for most of us stand far more in need of it than do the members of what for some queer reason is called the weaker sex.

A Safety-first Point

Here is a little safety-first point to which I would like to call readers' attention. Quite frequently I go to houses which are wired so as to enable the loud-speaker to be used in a number of rooms and find that there is no output transformer or filter circuit in the receiving set. In such cases, of course, the entire plate current flows through the extension wires on its way from the battery to the plate of the last valve. Now, modern output valves

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On Your Wavelength! (continued)

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demand high voltages, and frequently a very big dry-cell battery or an accumulator is used for supplying the necessary current. It may come as a surprise to some readers to know that on short-circuit a super-capacity dry battery will pass from 10 to 15 amperes for a short time. An accumulator H.T. battery will pass considerably more. Now, 150 volts at 10 amperes is $1\frac{1}{2}$ kilowatts, or as much power as is used in working a bigish electric radiator. A short circuit, then, might be productive of distinctly serious results.

The Television Position in the U.S.A.

The science of television has proved a very popular one for journalists and in every country we find opinions offered, criticisms made, defamatory remarks passed, etc., both about television as a whole and the various systems in particular. Unfortunately, many of the articles published are from individuals who are either out of touch with recent progress or who have failed to grasp the full significance of the developments now taking place in all parts of the world. On the other hand, one comes across reasoned analysis from those who can speak with authority and it was therefore refreshing to read the remarks of the Chairman of the Television Committee of the U.S.A. Radio Manufacturers' Association, as it gives the American point of view and incidentally proves that they are somewhat behind England in their development of the art.

He states that the present trend indicates that the first means of obtaining subject matter will be through the use of talking films, and bases his reasoning on the fact that films can easily be made of interest, can be readily handled, and permit of simplicity on the transmitting side. Then again, the sound can be taken directly from the side track on the film and thus permit of an easy simultaneous transmission.

Television or Tele-talkies?

The consensus of opinion in England seems to point to rather a different outlook, for the authorities concerned favour real television as being of paramount importance with tele-talkies as a second consideration. It will be interesting, therefore, to see which has the greatest public appeal. After dealing with the television receivers themselves and pointing out the advantages accruing from the allocation of a wider sideband frequency to television transmissions, he turns his attention to synchronising. To my mind this is the crux of the whole situation, and since Baird has recently successfully demonstrated and disclosed details of his automatic synchronising, I was rather astounded to learn that in America no satisfactory solution of this side of the question is

forthcoming. So far their only means of holding the picture steady is by the use of the *constant frequency* of the electric light current over wide areas, but of course this, even at the best, is very limited in its application and provides no universal solution to the problems.

Synchronising Unsatisfactory

He states that as the science progresses this method will be unsatisfactory, and in view of this there are plans now in hand to transmit on a separate wavelength a frequency standard to which transmitter and

signal would complicate matters enormously and do more to de-commercialise the project than anything else. On this score alone, then, we can pride ourselves on being ahead of the Americans, and this is a matter for congratulation to our own pioneer.

For Short-wavers

One of the difficulties in getting to know one's way about with the short-wave set has always been the lack of reliable calibration signals. The R.S.G.B. has always been very good in this matter, and they are now instituting a fresh series of calibration signals which will probably be of the utmost value to readers. On the second and fourth Sundays of each month the Society's Cambridge station will send out calibration signals at 10 and 10.5 a.m. At 9.58 a.m. the letter X will be followed by a telephonic announcement that the service is about to start. At 10 o'clock will come RSGB, RSGB de G5YK in morse, followed by a two-minute dash on 42.75 metres. At 10.5 a.m. the procedure will be repeated, and the wavelength will then be 41.38 metres. Anyone who has a short-wave set should check up its calibration by means of these signals. On other days at other times there are certain transmissions whose wavelengths can be relied upon. Amongst these are Döberitz on 67.25 metres, the Eiffel Tower on 32.5 metres, the relays of WGY, PCJ, and the Dutch stations at Bandoeng in Java. The American and Dutch stations mentioned are crystal controlled, so that there is no variation in the wavelength.

Another Point of View

Does the inclusion of reasonably controlled advertising lead to the production of better programmes? My talks with Americans rather lead me to gather that it does so over in their country. In the States no receiving licence is necessary, and therefore the broadcasting companies receive no subsidy except from radio manufacturers; but, for all that, they have enormous incomes. These are obtained in two ways. Some stations devote certain periods of the day to advertisers' announcements (leasing the use of the microphone at so many dollars a minute, or possibly a second!); others have agreements with various big concerns who agree to provide an hour's entertainment once a week or oftener. If you listen-in to American stations on your short-wave set you will often come across one of these hours. At the beginning of it the announcer says that the entertainment about to be given is provided by the So-and-So Company, whose products are well known. That is all. There then follows an absolutely first-rate programme, at no cost whatever to the broadcasting concern.

THERMION.

WIRELESS TIT-BITS**Earn Your Half-guinea!**

EVERYBODY has a wireless Tit-bit of some kind or other. Everybody knows at least one interesting and possibly humorous incident or experience which would make good reading for his fellow readers. So we are inviting you to write down your wireless Tit-bit and send it to us. Don't make it long, but do your best to make it interesting and readable.

We shall publish as many of these Tit-bits as possible in the Christmas number of **AMATEUR WIRELESS**, and for every Tit-bit published we shall have pleasure in paying half a guinea.

Of course, your Tit-bit must be original; it must be your own and not copied from any publication.

Please write it on one side of the paper only and see that it reaches us not later than Monday, November 25; you can send it as much earlier as you like.

Now, please set to work. Remember that your Tit-bit, if published in our pages, will afford pleasure to your fellow readers of **AMATEUR WIRELESS**, and that, quite apart from the half a guinea, is worth achieving.

Address your envelope to:

"WIRELESS TIT-BIT,"

"Amateur Wireless,"

58-61 Fetter Lane,

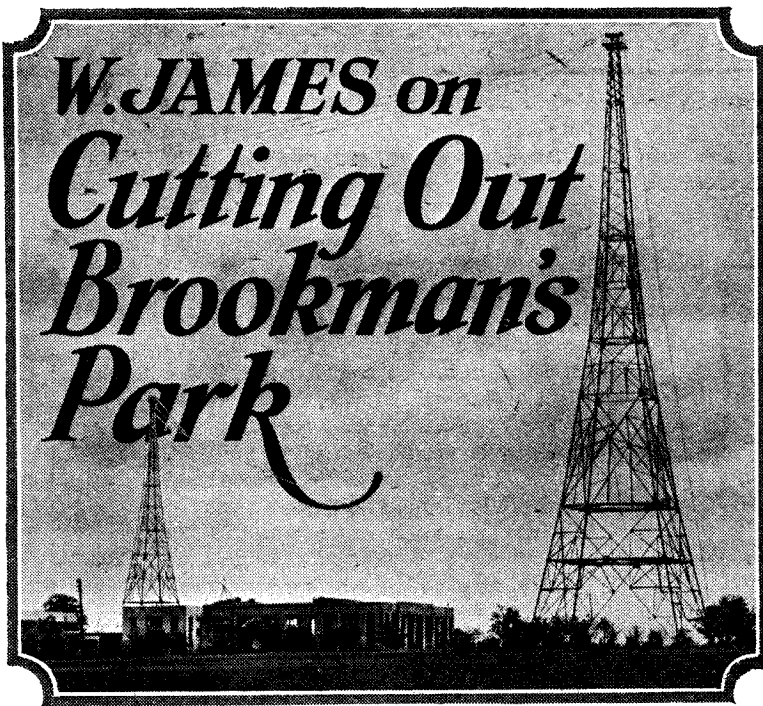
London, E.C.4.

receiver alike can be tuned in order to hold them in exact electrical step. A little reflection will show that this is rather illogical. Concentration on the reduction of the channels needed is surely preferable to any extension. At present in England the Baird system, with its own automatic synchronising, needs two channels, one for speech and one for picture, and we can, no doubt, look forward to the day when both these can be sent out on one wavelength, with, perhaps, differing methods of modulation to be separated at the receiver. The addition of a third to the existing two channels for the purpose of a synchronising

THOSE who were unable to take advantage of the test transmissions of London's new regional transmitter no doubt experienced something of a surprise when they switched on their sets a short while ago.

Some of those who normally take the London programme wondered why the volume was less than normal, but from the reports which have reached me, and my own tests in various districts, the majority are experiencing stronger signals. In fact, in many instances the new station is heard over the greater part of the medium wavelength tuning range.

This is, of course, due to two factors. The first, and probably by far the most important, is the greatly increased power of the new station in comparison with that of the old, whilst the second is the actual position of the transmitter. Thus we find that, although those listeners who used to have a very strong signal because of their good position with respect to the old



Suggestions for Making Sets More Selective

be troubled to such an extent. The fact remains, though, that many sets must be modified to suit the present conditions, and the question arises as to the cheapest and least troublesome ways of improving selectivity.

distant stations that it is desired to hear must not be too seriously reduced or the quality is bound to be poor. The earth, too, must, of course, be examined and made good if necessary. Many earth circuits are not the best that can be arranged either with regard to shortness or the effectiveness of the actual earth.

Having experimented in this direction, attention should be given to the set, and it is here, perhaps, that the greatest improvement is to be effected. Fig. 1a is a plain aerial circuit that may be improved by the addition of a fixed condenser C_1 , as in Fig. 1b. This condenser may be of .0002 or .0001 microfarad—the smaller its capacity, the sharper will the circuit tune and, let it not be forgotten, the greater the reduction in signal strength. A semi-variable condenser would be of advantage here, as one never can tell how much the signals will be cut down by a .0001-microfarad fixed condenser.

The point is emphasised because of what

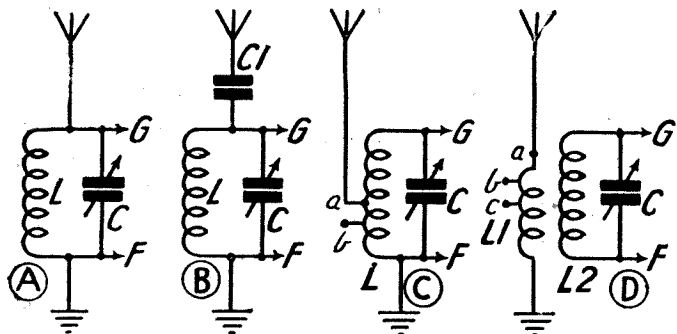


Fig. 1. Modifications that can be made to the aerial circuit

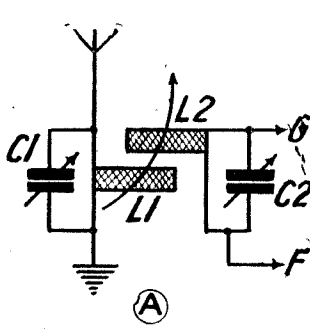


Fig. 2. Two types of coupled circuit

London transmitter in Oxford Street now receive less strength, many others are getting good signals for the first time.

Those who are receiving a signal of too great strength are, of course, in trouble, because they cannot bring in without interference a more distant station, such as Daventry 5GB, in London. In fact, it is correct to state that numbers of listeners can no longer hear a distant station on the medium wavelength band whilst Brookmans Park is broadcasting.

This is a sad state of affairs. As London listeners look to 5GB for their alternative programme, this station is received at such little strength in comparison with Brookmans Park by those instances which we are considering that it cannot be regarded as an alternative to London at all. If both transmitters at Brookmans Park were working a far different state of affairs would exist. London listeners would not

An amateur who is troubled should first examine his aerial and earth. Reduce the length of the top part of the aerial by a few yards and test the set, remembering all the time that the volume of the more

use is it seriously weakening the signals in order to obtain fair selectivity? Those having two-valve sets should remember this point.

Sets may also be improved by connecting the aerial to a point on the coil, as in Fig. 1c, instead of to the top, as in Fig. 1a. This method is to be preferred to employing a further condenser. One should note that point B is more selective than point A.

Some aerial circuits have a separate primary coil, as Fig. 1d. Then it is only necessary to tap down the coil to improve selectivity, and probably reduce signal strength as well, if the tap is made too low down, as at c, for instance. The tuning is more selective when the aerial is joined to B than A.

In order to avoid a distinct falling off in strength whilst improving selectivity, a coupled circuit, as in Fig. 2, may be tried. Fig. 2a shows the rather old-fashioned plug-

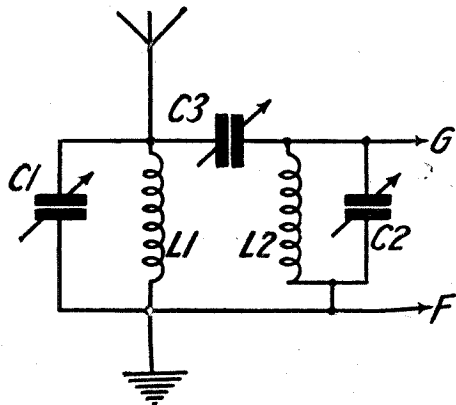


Fig. 3. A more selective coupled circuit

W. JAMES Tells You How To Make Your Set More Selective

in coil type tuner, but the scheme can be applied with modern parts and good results will be obtained. There are two tuning condensers of .0005 microfarad each

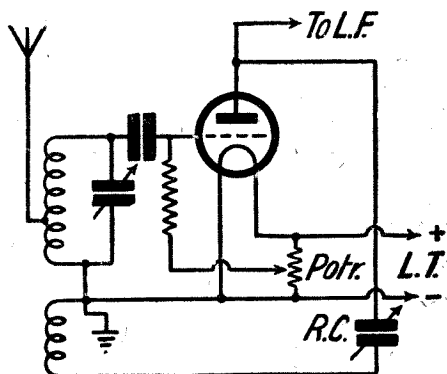


Fig. 4. Position of potentiometer in grid-leak circuit

and two coils, L1 and L2. They have to be so mounted that their relative positions can be altered. It is not necessary that they be fitted in a two-way coil holder—they may be fixed in position to provide the best average results.

Thus, even though the coil in the set is of the single-layer type, this scheme may readily be adopted.

A different arrangement is shown in Fig. 2b, where the aerial coil L1 is divided, a part only being used to couple with coil L2. This small coil may comprise a few turns of wire wrapped round the grid coil, the best number of turns being found by trial.

A more simple circuit, and one that is effective, is given in Fig. 3. Here the aerial circuit C1 L1 is connected to the grid circuit C2 L2 by a very small condenser C3—a balancing condenser will do. The two coils must be well separated and C3 must be very small for sharp tuning. This scheme may be applied to many sets without difficulty, as the circuit C1 L1 may be fitted outside the set. Condenser C1 should have a capacity of .0005 microfarad and coil L1 may be of the same size as that used in the set for C2.

The sharpness of the tuning is improved by reducing the capacity of C3, and must be small or the tuning of one circuit will greatly affect that of the other.

A further scheme is shown in Fig. 4, where a potentiometer is connected in the grid-leak circuit. Many types are to be obtained at little cost, and one will usually be found to improve selectivity, quality and the smoothness of the reaction circuit.

Those who have a three-valve set (D. and two L.F.) may, of course, use a scheme which actually cuts down the strength, as

there is often a margin to spare, but those having a two-valve set are not so fortunate and have, therefore, to proceed with greater care.

When the set has a stage of high-frequency amplification the sharpness of tuning may be improved by providing the grid of the H.F. valve with a negative bias. A fixed condenser of .002 microfarad and a grid leak of 1 megohm may have to be included, as in Fig. 5, at C and R, which shows a typical grid circuit. Many sets of this type have a filament resistance control, which is useful, but when no H.F. volume control is fitted the grid bias should be used. It is also advisable to adjust the screen voltage, as it greatly affects the performance of a set. An adjustable resistance may with advantage be joined in the screen high-tension wire when the best is required from the set, but, as a rule, a voltage that is satisfactory from the points of view of volume and selectivity may be found.

The circuit of Fig. 6 is recommended to experimenters as it includes a coupled circuit and anode-bend detection. Fixed condenser C1 stops direct currents passing through the coil L1 to earth, and the circuits L1 C2 and L2 C3 are, of course,

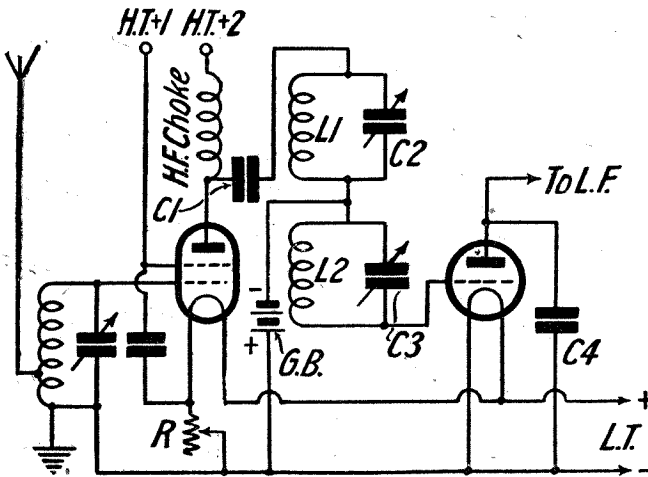


Fig. 6. A recommended selective circuit

similar in size. Selectivity and volume may be adjusted to suit average conditions by setting the position of coil L1 with respect to L2.

Condenser C4 must not be overlooked and is always needed with an anode rectifier. This circuit is a very selective one. Volume is controlled by resistance R, which also provides the grid of the first valve with a negative bias.

When it is not possible to alter the set a tuned circuit may with advantage be connected either between the aerial and the aerial terminal or to the aerial and earth terminals. Such a tuned circuit is usually known as a wavetrap, and comprises a variable condenser of .0005 micro-

farad and a tapped coil or even a coil of the same pattern as the existing aerial coil. This circuit is tuned to the wavelength of the station which is interfering and reduces

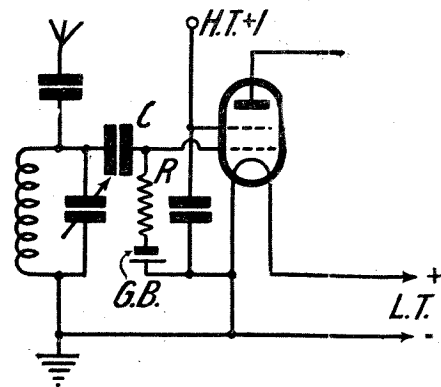


Fig. 5. A modification in an H.F. stage

its strength by minimising the signal reaching the aerial.

Many types are available and easily made. Sometimes they are quite effective, but very often the strength of the station desired is reduced. With careful tuning, however, a wavetrap may be of great assistance. Particular care must be taken not to place the coil of the wavetrap too near the aerial or other coil in the set, and do not forget that the tuning may be altered by a fair amount.

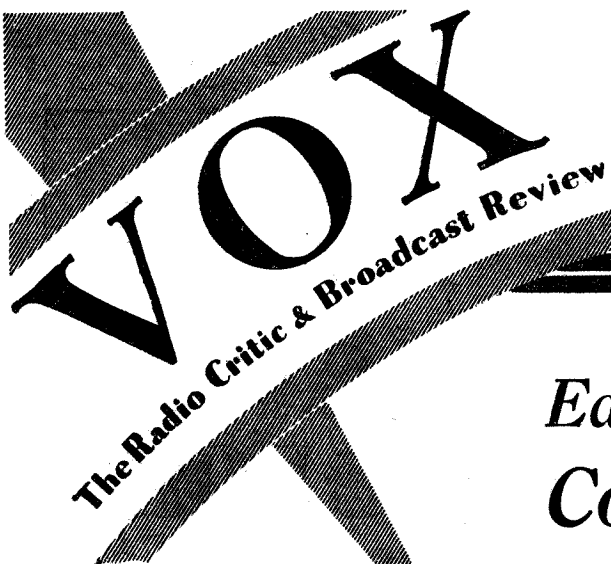
TUNING ON THE MEDIUM WAVES

IN a set adapted for both long- and short-wave reception one usually finds considerable difficulty in separating out stations below 200 metres, owing to the fact that the same tuning condenser is used on both sides of the wavelength switch. So long as the condenser is in circuit with the long-wave inductance, all is

plain sailing. When, however, the short-wave coil is tuned by the same condenser, there is not enough capacity range to separate out those stations which fall near the zero mark.

In order to overcome this difficulty, according to a recent invention the tuning condenser is made in two separate parts, both mounted on the same spindle. For long-wave working both condenser sections are used in parallel. When the set is switched over to the short-wave range, one section of the condenser is automatically cut out of circuit. The full sweep of the dial is now available on the smaller capacity, so that tuning on the shorter waves becomes much more open.

B. M.



VOX
The Radio Critic & Broadcast Review

Edited by
Compton Mackenzie

Number 1 now ready
On Sale To-morrow
Friday, November 8th

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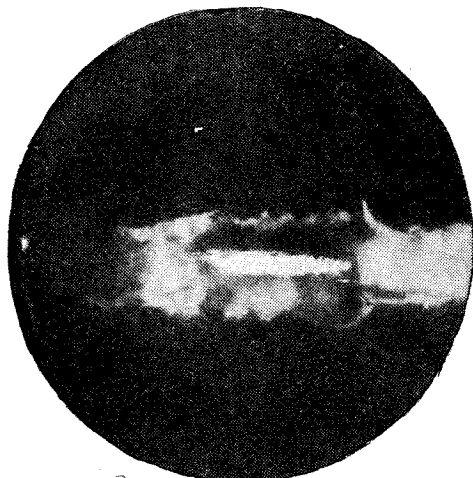
The issue of November 16th will contain the first article in a new series by Mr. Sydney Moseley on "THE TRUTH ABOUT TELEVISION," and an article by Captain P. P. Eckersley on "The Regional Scheme."

The first issue of "VOX," the new weekly devoted to wireless topics, will be on sale on Friday, November 8th.

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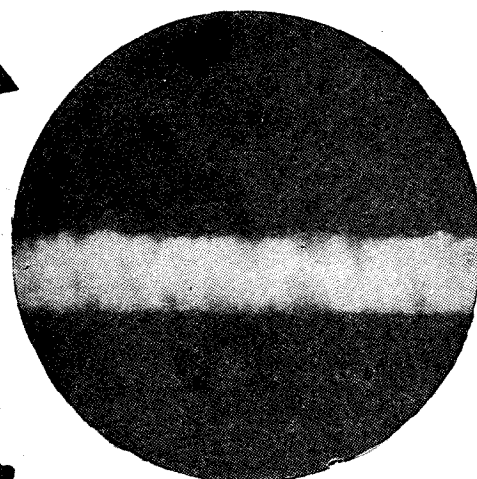
Reproduction from an untouched microphotograph showing part of the filament of a badly coated valve before use, showing a serious gap in the coating. A gap such as this starts the valve off in its life with a poor performance. The valve then prematurely fails.

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THE PENTODE * * AS A * * DETECTOR

The possibility of using a pentode valve as a detector will be new to many readers. In this article J. H. REYNER indicates the advantages of so doing, and in a later issue it is proposed to give details of a practical "pentector" receiver

THE detector valve in a modern wireless receiver is a very vital point and one which affects the whole performance of the receiver. If the detector is not sensitive, then the reception of distant stations is impaired. If, on the other hand, the detector is made sensitive at the expense of the grid swing, it will overload very easily on a local station, and particularly will it give very unpleasant results if used anywhere near a regional transmitter. Finally, whatever arrangements are made, there is always the damping imposed by the detector on the tuned circuit, which may be small or large according to the circumstances.

Detector-stage Efficiency

With the standard three-electrode detector, which most of us use to-day, it is not possible to obtain the various desirable features at one and the same time. If we require sensitivity we must use a grid detector which is not capable of handling a large input unless we design the circuit constants specifically for this purpose. If we do this, then we have immediately lost the sensitivity. Moreover, we are seriously handicapped with the grid detector owing to the very heavy damping produced in the circuit by the presence of the grid current.

The anode-bend detector, on the other hand, is nothing like as sensitive, even although the detector damping is very much less. What is more, even with this detector we have to utilise different circuit constants, according to whether we require sensitivity or capability for handling large volume.

In short, the detector stage is a most unsatisfactory portion of a modern receiver, and it is surprising that this question has not received greater attention than it has. It is the most fruitful line of development and will repay research. In the circumstances, it is not surprising that one is always on the look out for new methods of detection, and the possibility of using the pentode as a detector has occurred to many investigators.

The screen-grid valve suggests itself at first, but its characteristics are not suitable and, moreover, the uneven nature of the

characteristic, due to the secondary emission effect, renders its operation possible only over a limited range. The pentode valve includes a fifth electrode in the form of a third grid, so placed as to counteract the negative emission, in consequence of which one obtains a characteristic similar to that of an ordinary L.F. valve, but

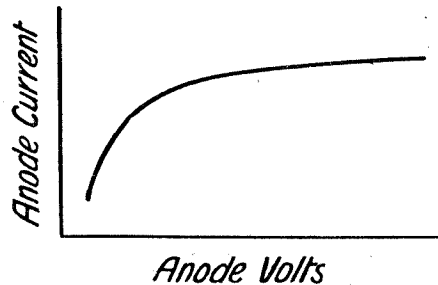


Fig. 1. Typical pentode characteristic

having a much higher amplification than is customarily possible.

The requirements in an anode-bend detector are high amplification factor and as low an impedance as possible. Consider, for example, 2-volt valves. We should use for anode bend a PM1A valve having a resistance of 72,000 ohms with an amplification factor of 36. Such a valve would only handle fairly small signals, but it will serve for purposes of comparison. The corresponding 2-volt pentode has a resistance of 62,500 ohms and an amplification factor of 82. Thus we have rather lower A.C. resistance with between two and three times the amplification factor; so

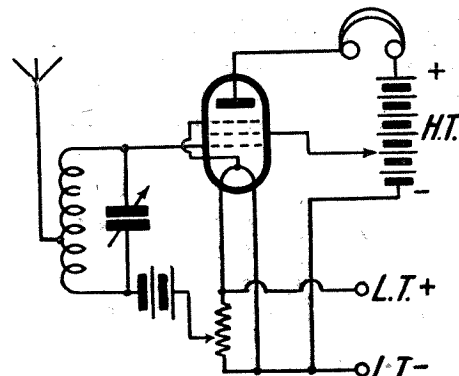


Fig. 2. Simple pentode circuit

that we might reasonably expect to obtain at least twice, and possibly three times, the sensitivity. Whether this is practicable or not is a matter which must be put to the test, and the correct position for obtaining the necessary results must be determined by experiment.

Several experiments have been conducted at the Furzehill Laboratories in order to devise circuits suitable for use with this class of detector, and sets operating on this principle will shortly be published in these columns. At the same time, acknowledgment is due to A. L. M. Sowerby, who has recently published a very useful review on the subject together with much useful data in this connection. It is proposed in this article to discuss briefly the conditions under which the pentode can be used as a detector rather than to go into any elaborate discussion of the theory and then to lead up to the introduction of the new AMATEUR WIRELESS "pentector" sets.

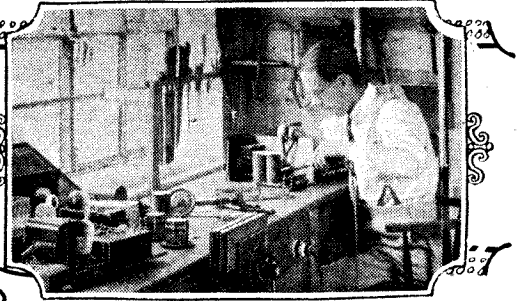
Pentode Advantages

One important advantage of the pentode detector is that with the normal anode voltages customarily in use, the anode current is not greatly affected by the actual value of the anode voltage. This is due to the typical characteristic of the pentode and screen-grid class of valve which is as shown in Fig. 1. This property proves valuable for the following reason. With the ordinary anode-bend detector the valve is biased to give a very small current. When a positive signal is applied to the grid the anode current increases, and this causes a voltage drop in the external anode circuit, which in turn reduces the anode voltage. With the ordinary valve this tends to reduce the anode current so that the increase in anode current due to the applied signal is not so great as it would be if this effect did not exist. With the pentode detector the anode voltage changes, but this does not appreciably alter the anode current, so that the full effect of the grid change is obtained.

The next point to determine is the best operating condition for the valve, and experiment shows that this is obtained

(Continued on page 754)

My Wireless Den



Weekly Tips—Constructional and Theoretical—by W. JAMES

A Strange Trouble

A FEW days ago I had an interesting experience with a set having a shielded valve stage of high-frequency amplification. The tuning had become very sharp, reaction was fierce, and the volume much below normal.

As a matter of fact, the results from this particular set had never been up to standard. Its owner always had the feeling that something was not quite right—yet the connections were correct and the parts themselves seemed to be satisfactory. All seemed in order, but a closer inspection would have revealed a dry joint in the coil unit.

Actually, the grid end of the aerial coil was not making a good contact. It locked all right, but a light touch moved the wire away from the soldering tag provided. When the wire had been properly soldered, the set behaved normally.

I always look for a bad contact when the tuning seems excessively sharp and the reaction is fierce, as they are nearly always due to a high resistance in the grid circuit which is, therefore, not properly loading the circuit. The annoying part about a fault of this description is that signals are still heard. Were the circuit broken completely at one point, no signals would come through and it would be easier to trace the fault.

Intermittent contacts and high-resistance joints usually take a little finding, and the best procedure to adopt is to commence with the aerial coil and to test every joint or contact, using, if possible, a milliammeter and dry battery. When a meter is not available, the wires should be gently pulled.

A Powerful Set

Now and again I receive an inquiry for an extra powerful set for use in a district where the signals appear to be somewhat weak in comparison with other parts. There are many such districts where, for example, Daventry 5XX is not heard at full loud-speaker strength on a good three-valve set.

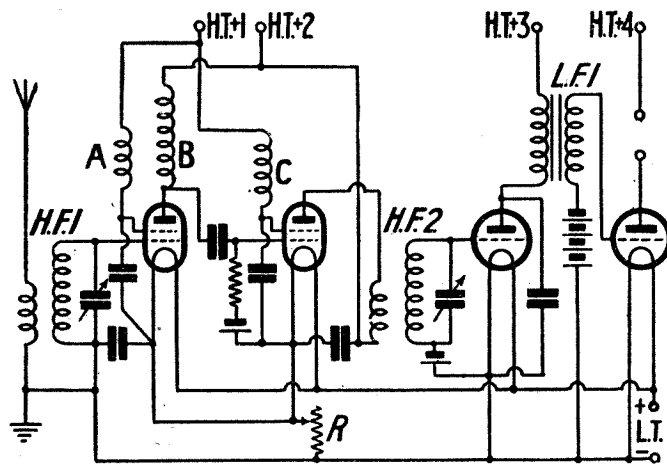
Selectivity is clearly not a matter of first importance in such cases, and it is,

therefore, possible to add a stage to improve volume without regard to selectivity. At the same time, however, the tuning must be considered, and I therefore recommend the adoption of a further choke-coupled stage as indicated in the accompanying figure. Here we have one tuned and one untuned stage of high frequency—a combination which provides much greater magnification than a single stage.

In the circuit is a high-frequency transformer to couple the aerial to the first valve (H.F.1) and an intervalve transformer (H.F.2) to couple the second H.F. valve

long waves. The tuning over the 1,000 to 2,000 metres band should not be so sharp that a clear space is heard between Daventry 5XX and Zeesen, for instance, as although their wavelengths are 1,554 and 1,635 metres respectively, the kilocycle separation is only 9.5.

Radio Paris, working on 1,725 metres, is only 19 kilocycles from Daventry, and will, therefore, interfere unless the tuning is sharp. But if the tuning is so sharp that they may be separated without a fair amount of reaction, the tuning is too sharp and quality suffers.



Circuit of a really powerful four-valver

and the detector. Choking coils A and C are small coils of 600 ohms, and choke B is, of course, of standard pattern. Volume is controlled by the rheostat R, and the L.F. coupling is a transformer, L.F.1. The high-frequency transformers may be the 1930 Binowave when reaction is available. No reaction is shown in the circuit, but it may easily be added.

Anode-bend detection is shown, but here again the more sensitive leaky-grid may be used when the maximum volume is needed and the selectivity is of no great importance.

Sharp Tuning and Strength

A fairly common fault with selective sets is, I find, that the volume is much less than normal. The craze for selectivity, using only two tuned circuits, is definitely harmful, as sets are produced to meet the demand and quality suffers.

This is particularly noticeable on the

Using and Misusing the Rheostat

The filament-resistance method of controlling the amount of high-frequency magnification, provided by a stage having an ordinary valve is, of course, not applicable when the filament of the valve is heated by an alternating current. But there is a simple method which may be applied to shielded valves of any type.

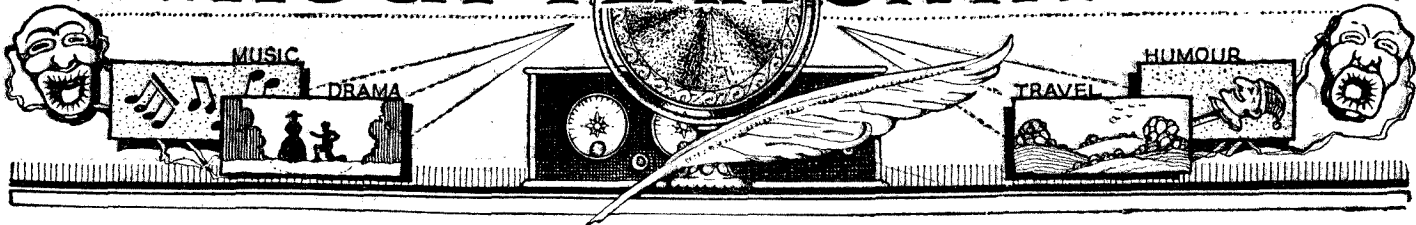
It consists of an adjustable resistance connected between the high tension and the shield of the valve. This resistance is used to fix the voltage at a suitable value, and may be adjusted to provide a range of voltages. Most shielded valves show a reduction in impedance and magnification factor when the voltage is increased above normal and, of course, these factors increase when the voltage is reduced.

The adjustable resistance is, therefore, used to control the voltage and hence the electrical characteristics of the valve. They, in turn, vary the amount of the magnification.

The only disadvantage of this method is that the anode current may be increased by 2 or 3 milliamperes when the amount of the resistance included in the screen-grid circuit is reduced.

NEXT WEEK
 Another B.B.C. "Official" Set—
 a Brookman's Park One-Valver
Make Sure of Your Copy

WITHOUT FEAR OR FAVOUR



A Weekly Programme Criticism by Sydney A. Moseley

YOU may remember that I recently asked why we did not hear some of the good songs from "Sans Gene," by Carlyle. I was interested to hear Eric Marshall sing "Gentlemen of France."

I must confess I am always on my guard when this sort of thing is announced:—

"... And now Miss Ethel Bartlett and Rae Robinson are going to play a special piece by Bax" (or some other modern composer), "which was specially written for them and dedicated to them."

After hearing the first part I asked myself whether Bax was being kind to them or whether they were being kind to us.

I have formed what I may term "The Listener's Club," composed of all sorts of "brows," which meet sometimes to discuss the programmes.

Here, for instance, are a few diversified views to go on with.

A man we call "The General":—

"Until a certain evening not long ago, my knowledge of Norway was comparatively limited. Then along came the B.B.C. with a Norwegian national programme—designated, I suppose, to give us an insight into the musical soul of the people of Norway. The impression given me was that the Norwegians must be the most miserable, pessimistic people on

earth. Have they no humour in their lives? According to the Savoy Hill programme wallahs, they have not. At times I am inclined to think that the Savoy gentlemen themselves conform to this classification."

A flapper:—

"I listened to the film criticism by Mr. Ivor Brown. Although his chat was clear, unbiased, and comparatively free from that 'I know all' attitude which seems to be common to some of the other broadcast critics, I'm afraid that most of his time was wasted. First of all, he devoted too much time to individual films. Secondly, and more important, is the fact that he chose the wrong films for his criticism. Most of his talk was devoted to a comparatively minor film which will not be released generally until next June!

"Then he spoke about a talkie which has been shown already at most of the popular cinemas. Finally, he went on to another film which is having a 'try-out' in the West End, and will then be forgotten until its general release some time in 1930.

"Mr. Brown should realise that his criticism should be for the ears of the many, and not for the few who don't mind paying 8s. 6d. for a seat in a West End cinema."

Thus Silas:—

"Gee! Two solid hours of G.B.S.! I wonder how many listeners really sat it all out? *Captain Brassbound's Conversion* certainly was a gem of the kind we do not often get, but it was not for the masses, and therefore should not have taken up so much of one evening. One new feature about this play which earned my admiration and appreciation was the fact that those (at times) thorough nuisances—the 'effects people'—had a night off and left us in peace."

A musician:—

"Miss Gertrude Peppercorn could do justice to much more distinguished piano-forte music than Schumann's "Wald-scenen." This composition is, to my mind, one of Schumann's worst. To hear it played—no matter how clever the pianist—reminds one of the early days of the moving picture, when depressed solo pianists

tinkled out this sort of stuff on equally depressed pianos."

A dance fan:—

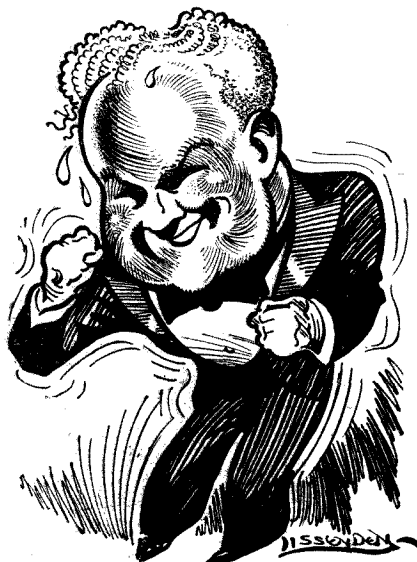
"What a queer idea to put Leonard Henry (or anybody else) in front of the microphone during a dance-music transmission!

"These broadcasts start late enough, as it is, if one can judge by the number of letters on the subject; in fact, they start so late that those who remain awake long enough to hear them do so because they definitely want to hear dance music. As a syncopation fan, I feel definitely annoyed with the intruder, no matter how many funny things he says."

All of which shows a keen critical faculty; but, in my view, much 'too negative. Listening to these views, you would think the B.B.C. never put on anything worth while; which, of course, is *not* the case.

The B.B.C. could easily make out a good defence. Good criticism should have its light and shade, and should not be wholly destructive.

When *Airy Nothings* was broadcast I remarked that the title was most fitting. Now, having heard *More Airy Nothings*, I should like to say once again how apt are some of these titles!

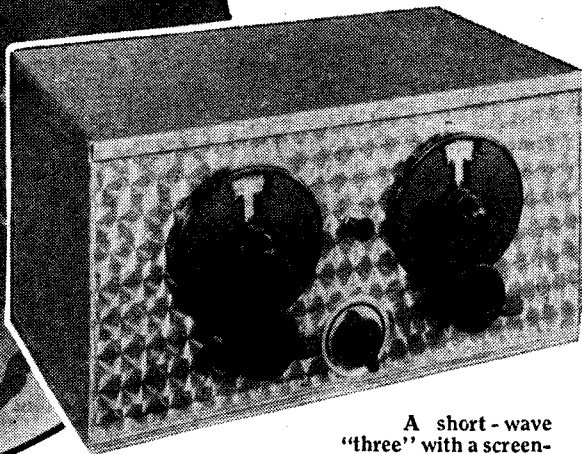
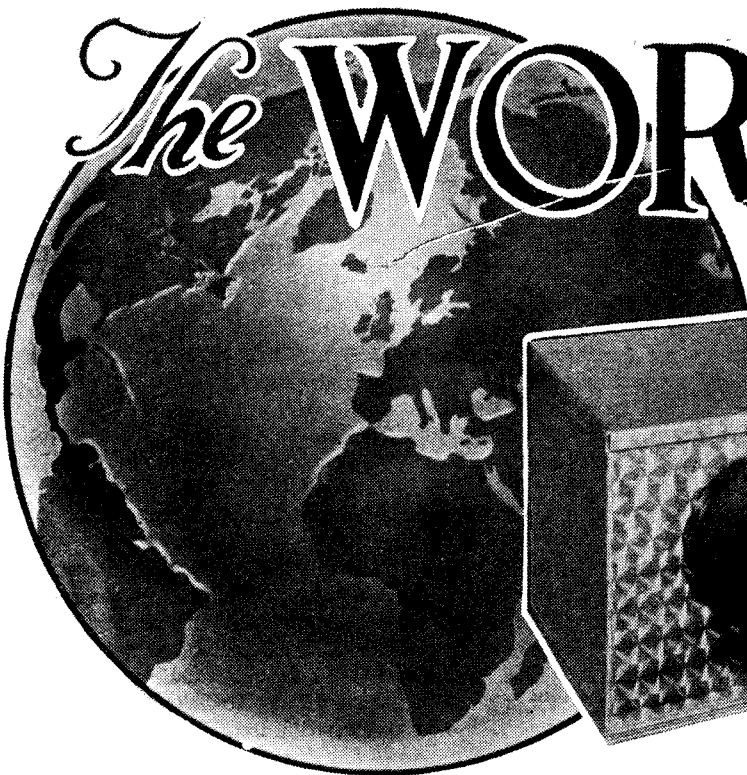


Jack Hylton—through Lissenden's eyes



A caricature of Bobbie Comber

The WORLD-WIDE



A short-wave "three" with a screen-grid H.F. Stage!

THE long dark evenings are here. Conditions are ideal for reception. The advent of winter makes one more than ever anxious to stay indoors and "tinker" with the wireless set. Congestion—and Brookmans Park—on the medium waveband make normal broadcast reception not an entirely perfect thing for the very keen enthusiast.

In brief, conditions are just ideal for

short-wave work. If you go down to the wavelets you can span phenomenal distances by the kindly aid of some freak Heavyside layer reflecting effect which exerts its beneficent influence only apparently on wavelengths below about 100 metres.

Time was when short-wave stations were not particularly worth while receiving because they were commercially controlled so that only "dots and dashes" were receivable from the European *postes* and, on occasions, a few of the bigger-power American broadcasters might be heard.

Stations

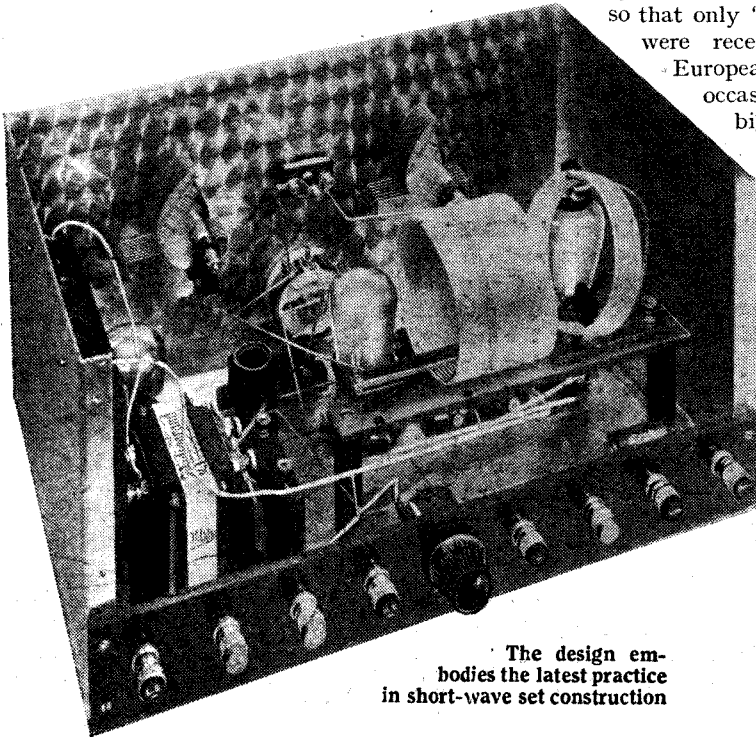
But now, if you take a glance down any list of short-wavers, you will find plenty of good targets at which to aim, and some don't need much hitting.

For instance, a casual glance down an abbreviated list gives East Pittsburg, W 8 X K (62.5 metres), the Eiffel Tower

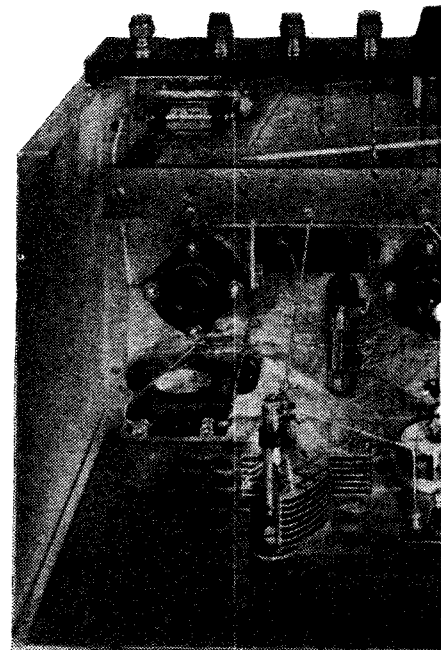
(32.5 metres), our old friends the 10-kilowatt W2XAF at Schenectady and the 25-kilowatt PCJ (Hilversum), which latter broadcasts in practically every European language.

Lower down the scale still are our own 5SW, which works daily except Saturdays and Sundays on 25.53 metres, W8XK at East Pittsburg on 25.25 metres, W2XAD, the old Schenectady transatlantic companion now on 19.56 metres and that marvellous giant 40-kilowatts ultra-short-waver Huizen (Holland) which works on 16.8 metres and which you can hear between 3 and 5 p.m. on almost any day of the week.

Mind you, that is by no means the total sum of average short-wave reception. There are the more distant fellows to add spice, for instance, Bandoeng (Java), the Canadians such as CJRX (Winnipeg) and the Australians, such as 6AG at Perth. You will agree that all these are really worth getting, and telephony station jamming is a thing yet to be experienced to any great extent on the short waves! Admitted that the possession of short-



The design embodies the latest practice in short-wave set construction



Particular attention has been

Short Wave THREE

wave apparatus opens up an entirely new gamut of stations to be logged, the question naturally arises which is the best way to receive them.

There are two courses available. Either one may temporarily adapt the ordinary broadcast receiver for short-wave working; or an entirely separate set may be made up. The first course is certainly not one to be turned down without feeling that it deserves further thought.

Short-wave Adaptors

As a matter of fact it was only a little while ago in AMATEUR WIRELESS No. 360 that a short-wave adaptor was described by means of which many ordinary types of broadcast set may be used on the short waves. This adaptor unit consisted essentially of a detector valve, with short-wave tuning apparatus, the whole replacing the detector unit of the broadcast set.

For sets of other types, such as the "Cossor Melody Maker" (old type) employing an H.F. valve, special coils are available so that by simply plugging in these new coils the H.F. stage may be worked on the short waves with a very satisfactory degree of efficiency.

But—and this is the point—the adaptation of the broadcast receiver to short-

conditions, it isn't necessary to sit up until the early hours of the morning. The Americans and the Dutchmen can generally be well received just after dinner time in the evening, and that is usually the time when the broadcast receiver is needed to be going all out. The possession of an entirely separate receiver for the short waves overcomes this snag. True, the aerial and earth are being monopolised by the broadcast set, if both are to be in action at the same time, but only a very small aerial is needed for short-wave working; often quite good results are obtained with an indoor aerial.

Dual Purpose

This present "World-Wide Three" opens up a new era in short-wave reception. It is, if such a thing can be possible, a dual-purpose short-waver. First, it is essentially the short-wave set for the enthusiast; this point will be proved a little later on when the technical whys and wherefores of the circuit are discussed. Second, it is comparatively such an easy outfit to operate, and it is so easy to log on it a wide batch of short-wavers, that no broadcast listener need have any fear of making it up and failing to get really good results.

The reasons for the results which may confidently be expected with this set are well shown from the circuit shown on page 734. The most striking fact is that a screen-grid valve is employed. The fact is striking because it is only a matter of just under a year since we could say in all good faith that for the average man H.F. amplification was certainly not a useful proposition for short-wave working. Several factors have contributed towards the downfall of this theory. The production of even more efficient screen-grid valves (that is, a greater emission with a

reduced internal electrode capacity) has been primarily responsible. The second factor has been the experience which has been gained in the "A.W." laboratory during the last season in trying out very many types of short-wave receiver.

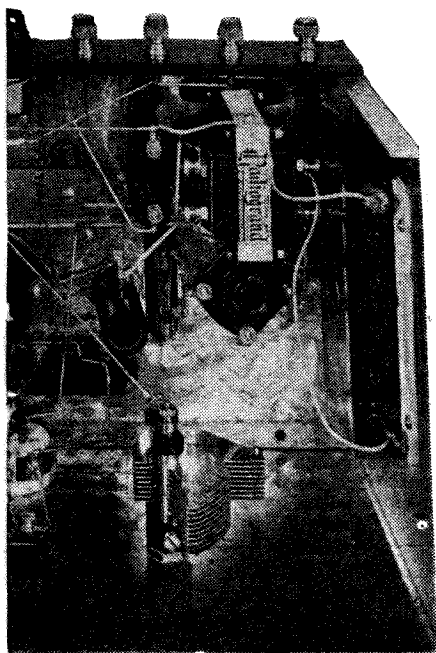
This "World-Wide Three" is the final result and every amateur who makes it up can feel confidently assured that the design is so modern that he will not be called upon to modify in any way for some years to come. The "World-Wide Three" is a happy compromise between the not-so-efficient receiver, consisting of one detector stage and two or perhaps three low-frequency stages, and the far more ambitious, expensive and rather tricky short-wave super-het set.

The Circuit

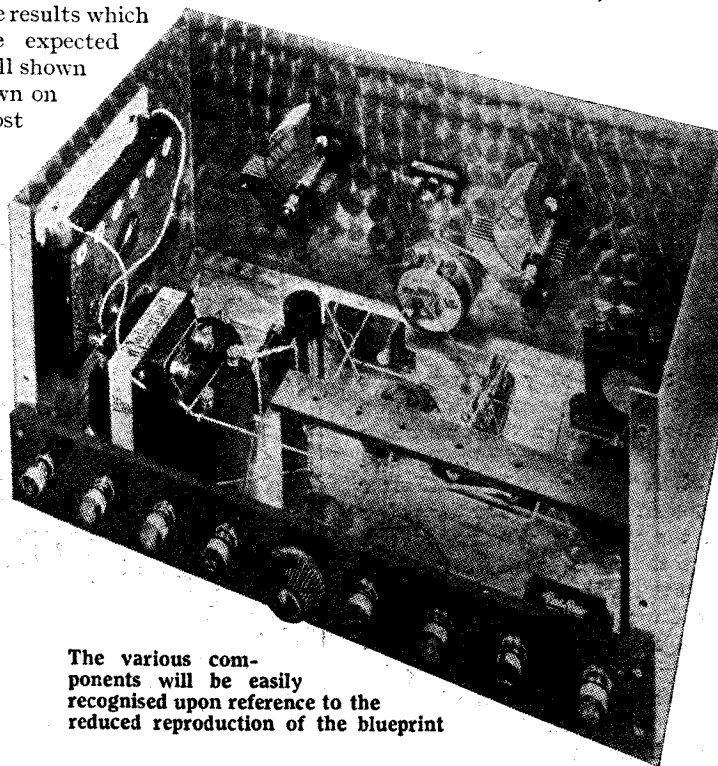
Neither of these remarks must be taken as a condemnation of the circuits concerned; the "det. and L.F." combination has been very popular in amateur hands in the last three or four years for short-wave working and the short-wave super-het. is still used extensively by the B.B.C. But this new set with one screen-grid stage is certainly a step forward in the right direction and is an advance on the det. and one L.F. arrangement.

This rather lengthy preamble is necessary to the introduction of the technical points of the circuit, because most readers naturally expect a promise of performance, and a reason, before being asked to delve into technicalities.

The set is an all-metal one, because so



paid to the layout and wiring



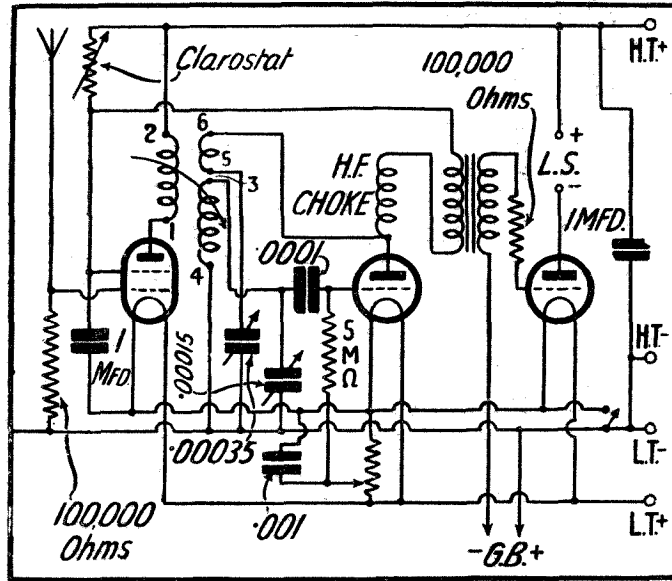
The various components will be easily recognised upon reference to the reduced reproduction of the blueprint

"THE WORLD-WIDE SHORT-WAVE THREE" (Continued from preceding page)

much trouble is experienced through lack of shielding unless the whole cabinet is of metal. The H.F. stage is arranged very

Components

Special stout aluminium cabinet, 14 in. by 7 in., complete with 8-in. baseboard



The Circuit

much in the normal manner, a loose-coupled transformer being employed for intervalve coupling.

The grid circuit of the screen-grid valve is rendered aperiodic by shunting a 100,000 ohms fixed resistance between aerial and earth. This method of using a screen-grid amplifier on the short waves is most effective. The primary winding of the H.F. transformer is also aperiodic, the secondary being tuned by a .00015 variable condenser. The voltage on the screening-grid and detector valve anode is controlled by a variable high-value resistance.

The Detector Circuit

The constants and arrangement of the grid circuit of the detector deserve notice. A .0001-mfd. grid condenser is used and the lower end of a 5-megohm leak is taken to a potentiometer, the winding of which is, of course, placed across the L.T. terminals. This potentiometer is placed on the panel and is a great aid in tuning.

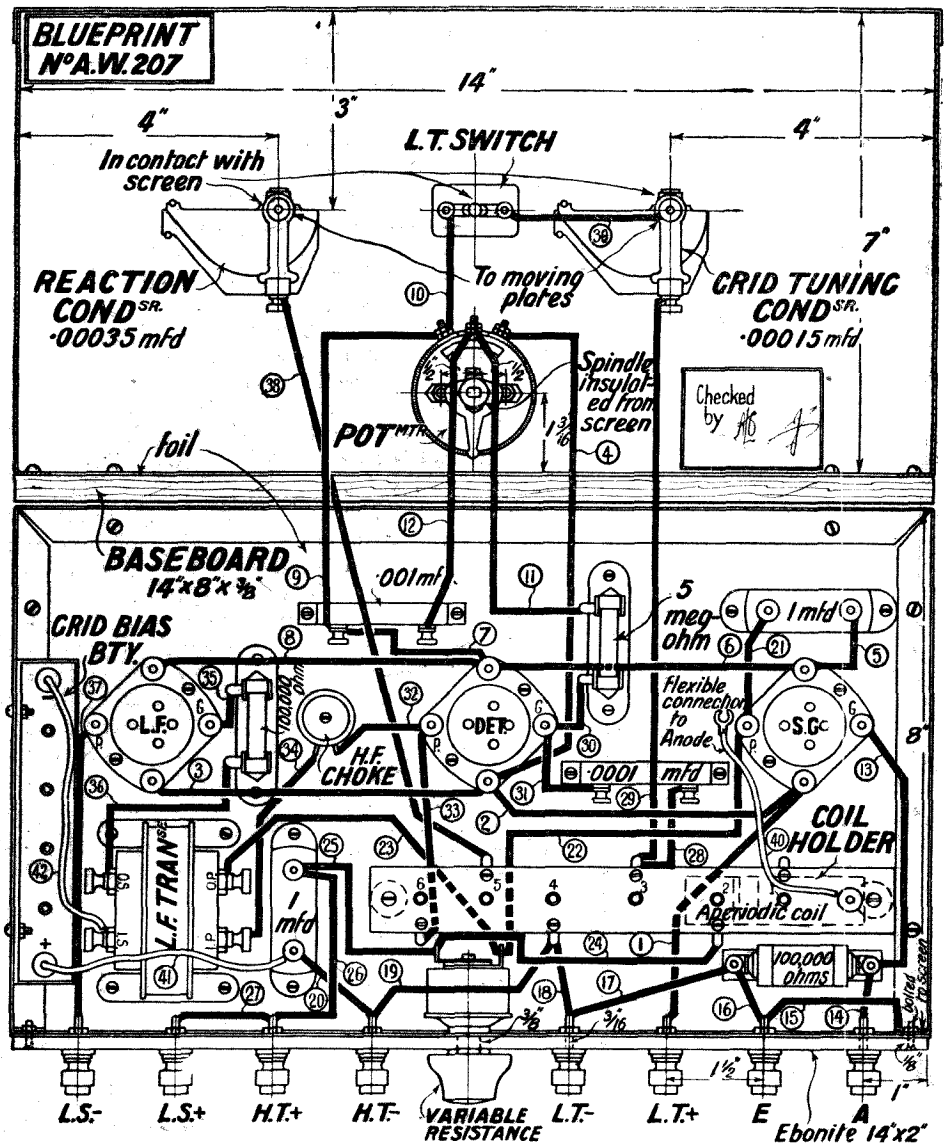
There is nothing very extraordinary about the low-frequency amplification side of the receiver, except to note that a triode and not a pentode is employed, as a standard arrangement. A "Radiogrand" transformer is used to couple the detector to the power valve and the primary winding is not connected to the maximum H.T. positive terminal, but to the screening-grid tapping, so that the detector anode voltage is the same, minus the drop across the transformer primary as that on the screening grid.

The parts shown in the following list will be needed for the construction of the "World-Wide Three":

A full-size Blueprint of this wiring diagram can be obtained from the offices of "A.W." price 1/-

- .00015-mfd. short-wave variable condenser (Formo, Cyldon, Burndept, Jackson).
- .00035-mfd. variable condenser (Formo, Cyldon, Burndept, Jackson).
- 400-ohm panel-mounting potentiometer (Igranic, Lissen).
- Push-pull filament switch (Bulgin, Lotus, Trix).
- Three valve holders (Benjamin, Vibrolders, Lotus, W.B., Formo).
- Two 1-mfd. fixed condensers (Lissen, Dubilier, T.C.C.).
- .001-mfd. fixed condenser (Lissen, Dubilier, T.C.C., Graham-Farish, Watmel).
- .0001-mfd. fixed condenser (Lissen, Dubilier, T.C.C., Graham-Farish, Watmel).
- 100,000-ohm grid resistance (Lissen, Graham-Farish, Ediswan).
- Two grid-leak holders (Bulgin, Lissen, Ediswan, Dubilier).
- Short-wave high-frequency choke (Igranic, Wearite, Watmel, Parex).
- Complete set of short-wave coils, with base (Colvern).
- Low-frequency transformer ratio 5-1, (Telsen "Radiogrand," Lissen, Varley, Brownie).
- Ebonite strip, 14 in. by 2 in. (Raymond).
- Variable resistance, 100 ohms to 5 megohms (Clarostat "Standard," Volustat, Regenstat).
- 100,000 ohms wire-wound resistance and holder (Ready-Radio, Dubilier, Lissen).
- Eight terminals marked: Aerial, Earth, L.T.+, L.T.-, H.T.-, H.T.+, L.S.+, L.S.- (Belling-Lee, Eastick, Burton).

(Continued on page 744)



THE POWER PENTODE

YOU CAN DRIVE OFF BATTERIES BECAUSE IT ONLY TAKES 7 MILLIAMPS!

You want more power—the new Lissen Power Pentode Valve will give it to you. Your 2-valve set will give you strong loud-speaker signals when you fit a Lissen Power Pentode; distant stations that previously you could only hear on headphones now you hear at fine loud-speaker strength. In fact when you put the Lissen Power Pentode into any set with one stage of L.F. amplification it becomes at once tremendously more powerful.

Ask for a Lissen Power Pentode, and see how this new valve transforms your set.

LISSEN

POWER PENTODE

17¹/₆

(2 VOLT)

The ONLY PENTODE VALVE ON THE MARKET THAT IS ECONOMICAL IN BATTERY CONSUMPTION.

Most good radio dealers now stock the following types: (2 volt.)

H.210 R.C. and H.F., 10/6

H.L.210 General Purpose, 10/6

L.210 L.F. Amplifier 1st stage, 10/6

P.220 Power Valve, 12/6

P.T.225 Power Pentode, 17/6

All other types available shortly.

No need to alter your receiver—you simply make a connection from the terminal of the Lissen Power Pentode Valve to the highest H.T. tapping you are using on your battery—just a piece of flexible wire connection. It seems like four times the volume you get when you put this new Lissen Power Pentode in your set without further change.

LISSEN LIMITED
 WORPLE ROAD, ISLEWORTH,
 MIDDLESEX.

Factories also at Richmond (Surrey) and Edmonton. (Managing Director: T. N. Cole.)



"A.W." TESTS OF APPARATUS

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

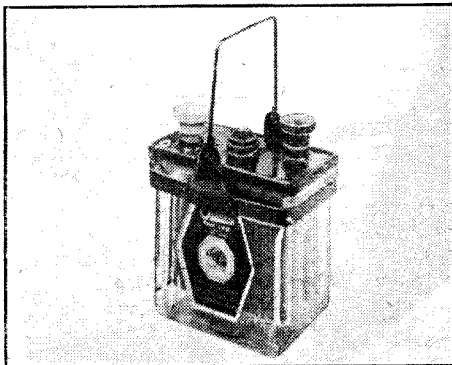
Oldham Accumulator

THE modern two- and three-valve sets are so economical in filament current consumption that there is little necessity to use large-capacity accumulators; in fact, those who have to carry these weighty articles to a charging station naturally prefer a small battery.

Accumulator manufacturers have therefore concentrated on the smaller-type cells, and by the use of specially-formed plates are producing batteries capable of standing up to small discharges for months on end. This is exactly what the amateur requires since he may only use his wireless set at infrequent periods.

We have recently tested a small two-volt Oldham accumulator with a rated capacity of 10 ampere hours actual. The two sets of plates are mounted in a glass container having overall dimensions of 3¼ in. by 3 in. by 6 in. high. The terminals fitted are substantial in size and one can rely on obtaining a satisfactory grip if by any chance corrosion should occur.

This accumulator is intended to be filled with acid and on leaving for twenty-four hours should be in suitable condition for use; in fairness to the battery, however, we discharged it first and then charged it again at the rated current value. A continuous discharge of a ¼-amp. was then taken until the battery had fallen to 1.8 volts; this occurred after approximately sixty-eight hours test. Although the battery was rated at 10 ampere hours, it will be seen from the figures that we obtained as much as 17 ampere hours on the small discharge of .25 amps. which after all, is approximately that taken by a two- or three-valve set.



Oldham accumulator with carrier

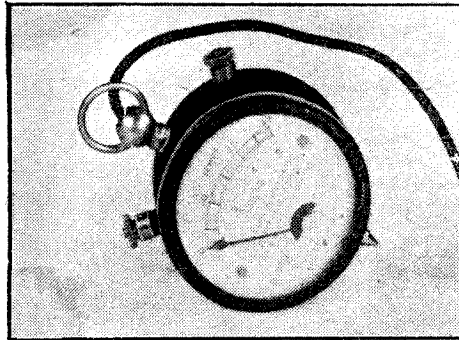
As one would expect from an Oldham product, the general construction of this battery is sound and it should give long and reliable service. The makers are Oldham & Son, Denton, nr. Manchester.

Handy Triple-purpose Meter

THERE are three test meters which the wireless amateur most often needs; he requires a voltmeter for measuring the low tension, a voltmeter for measuring the high tension, and a milliammeter for checking the milliamper consumption and testing whether the final valve is overloading. To combine these three meters in one instrument selling at 8s. 6d. is an achievement attained on the Wates voltmeter, marketed by the Standard Wet Battery Co., Ltd., 184-188 Shaftesbury Avenue, W.C.2.

One range extends from 0-6 volts, and the other from 0-150 volts. The additional terminals on the meter are used when measuring the anode-current consumption, which may be measured up to 30 milliamps, a useful range for normal purposes.

This meter is sufficiently correct for the needs of the average user who does not require a precision instrument, the average accuracy being about 5 per cent. The price is, of course, very reasonable. On the volt-



Wates pocket test meter

age readings, the resistance per volt is 33 ohms. Therefore, when measuring a 100-volt H.T. battery, the current consumption will be approximately 20 milliamps. As a milliammeter, the resistance is 200 ohms, and it would therefore seem advisable to bypass it with a condenser when it is connected in the H.T. supply, otherwise the resistance may cause back coupling and distortion, and so invalidate the reading.

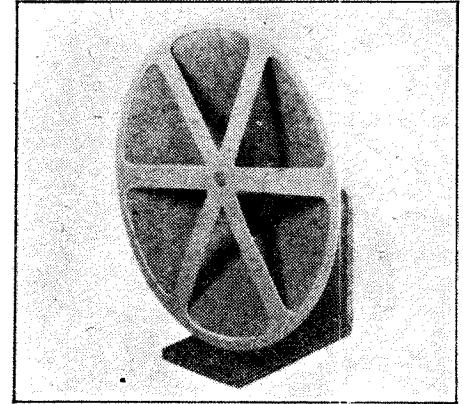
The instrument is well finished and should appeal to readers.

Novel Cone Kit

THE tendency of progress is towards simplicity and this is a maxim which, in general, can be applied to wireless. In the case of cone loud-speakers, the modern tendency is to float the diaphragm at the periphery but this does not necessarily entail the use of such flexible materials as leather or silk.

This week, we have tested a Sovereign

cone kit which is the very essence of simplicity. It comprises merely a piece of cone paper with a cardboard spider. The cone should be cut out by following with



J. R. cone kit partly assembled

a pair of scissors the full black line marked on the paper and then overlapped to form the correct shape after which it may be stuck together with the aid of seccotine or glue and finally stuck to the cardboard spider. This spider is fixed to some chassis or cabinet at the centre and is sufficiently flexible to float the diaphragm. The scheme is both ingenious and effective, whilst the constructional work may be carried out by anyone who has no knowledge whatsoever of wireless or tools.

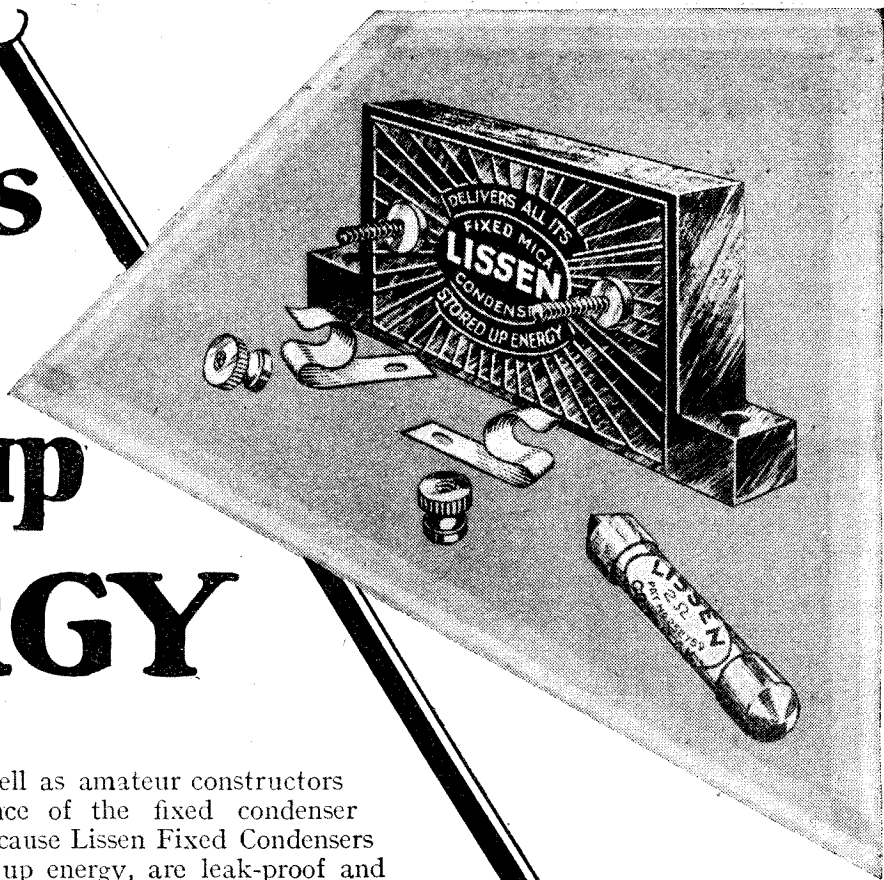
The cone can be completed ready for use in approximately one hour and fitted into a suitable cabinet with a good speaker unit will give quite satisfactory results. The paper has evidently been chosen to afford sufficient rigidity for the diaphragm and yet remain non-resonant in character.

The price of this kit is 3s., and it can be recommended to constructors.

The makers are the P. R. Wireless Co., of 6-8 Rosebery Avenue, E.C.1.

Another rumour!—At the close of the Motor Show at Olympia, there was a rumour current that a prominent French motor-car manufacturing concern was putting down vast plans for the mass production of a cheap three-valver to sell in this country at a very "cut" price. It is not possible for us to mention names, of course, but unquestionably there is no truth in the story. Probably the "wireless-set panel" appearance of the fascia boards of many foreign cars nowadays gave strength to the tale. Incidentally, there was at least one British car—in the luxury class, of course—fitted with a self-contained portable set.

Delivers all its stored up ENERGY



Serious experimenters as well as amateur constructors who realize the importance of the fixed condenser are turning to Lissen, because Lissen Fixed Condensers deliver all their stored up energy, are leak-proof and are accurate within 5% of their specified values.

YOU CANNOT AFFORD TO IGNORE CRITICAL AND ACCURATE VALUES

In almost every circuit volume and purity depends upon the precise making of a fixed condenser and a fixed grid leak. Select these from the Lissen range and you will get the utmost from your receiver. Any radio dealer will supply you with the correct values of Lissen Condensers and Lissen Grid Leaks.



LISSEN FIXED CONDENSER

Holds its charge and delivers it without leak or loss. In any R.C.C. circuit, the condensers you use should be absolutely leak-proof, otherwise 50 per cent of volume will be lost. Lissen condensers never leak, never vary, and they are accurate to within 5 per cent. of their marked capacity. '0001 to '001, price, each 1/- '002 to '006, price, each, 1/6. '01, 2/- each.

LISSEN FIXED GRID LEAKS

These resistances are absolutely unvarying, no matter what the conditions or the current load. All values, each 1/- With terminals, 1/3 each.

LISSEN R.C.C. UNIT

Embodies a .01 condenser, which delivers all its stored-up energy and resistances that will never vary, no matter what the current load, interchangeability of resistance values. Price 4/-

LISSEN

LISSEN LIMITED Worples Road, Isleworth, Middlesex. Factories also at Richmond (Surrey) and Edmonton. (Managing Director: T. N. Cole)

Advertisers Appreciate Mention of "A.W." with Your Order

OPERATING THE "MUSIC LEADER"

Below are some notes on the operation of the extremely efficient self-contained four-valver which was the subject of a Free Blueprint presented with No. 384

THE "Music Leader" is the transportable receiver, constructional details of which have been given in the three previous issues of AMATEUR WIRELESS. The purpose of the "Music Leader," as explained in "A.W." No. 384, is to provide indoor reception without the necessity for unsightly wires, poles and other fixings in the garden.

There is a big difference between the "Music Leader," which is an indoor transportable, and one of the many AMATEUR WIRELESS outdoor portables which have been described during the summer season. For most purposes a portable has to be designed with lightness in weight as a prime factor always in view, and successful working over a long period may have to be sacrificed to this end.

On the other hand a transportable does not need to be very light. It needs, usually, to be carried from room to room or from one side of the room to the other. Avoidupois is therefore not of paramount importance. H.T. batteries and the accumulator have the greatest influence on the total weight of a receiver and, conversely, on the success it will work over a long useful period.

Plenty of Battery Space

In the "Music Leader" there is ample space for batteries of a suitable size. A photograph on this page shows a view of the interior taken from the back and this is a distinct guide to the battery space available. One of the merits of the linden-diaphragm loud-speaker, as used in the "Music Leader," is that it takes up very little space in depth. Consequently, the major part of the battery compartment, measuring approximately 15 in. by 9 in. by 7½ in. is available for the housing of suitable H.T., L.T., and G.B. As shown in the photograph, it is quite possible to place in the battery compartment two 60-volt units of the popular portable type, a 9-volt grid-bias battery or even one having a larger maximum voltage value and a very large accumulator, preferably of the non-spillable type. It would even be possible to place an eliminator in the battery compartment, provided that it was adequately shielded.

Frankly, however, this is not really to be advised, unless the eliminator is for use with D.C. mains and the mains are adequately smoothed, because interference is most likely to be experienced and this will quite spoil the reception. Of course, whenever the public mains supply is available it is recommended that an eliminator should

be employed in preference to any other source of H.T. supply.

In the event of an eliminator being used with the "Music Leader" it is no difficult matter to carry the H.T. battery flexes

the H.T. tapping and according to the make of valve used should vary between 75 and 90 volts.

With most low-frequency and power valves a grid-bias battery having a maximum value of 9 volts will provide an adequate range, only if a mains eliminator and a super-power valve are used will a large G.B. battery be needed.

For the first tapping, G.B.1, 1½ to 3 volts will be needed, while 7½ to 9 volts should be applied to the second tapping, G.B.2.

When operating it will be found impossible to keep the two main tuning condensers very largely in step, although at the two extreme ends of the scale the readings will not exactly correspond. The right-hand condenser tunes the frame aerial and the left-hand condenser is the H.F. tuning control. Usually the left-hand condenser will be found to give the sharpest tuning.

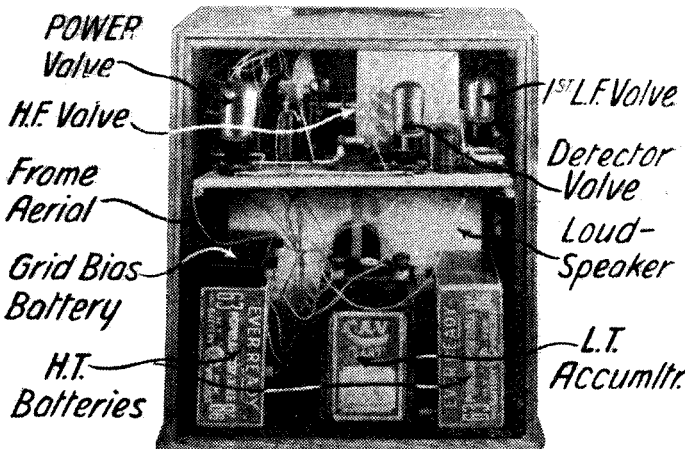
A Selective Set

In order to get the utmost selectivity, advantage should be taken of the selective properties of the frame aerial. The set should always be turned so that a line drawn along the frame aerial winding is pointing towards the station which it is desired to receive. Conversely, if it is desired to cut the station out, then turning the receiver so that the frame aerial axis is at right angles to the direction of the station will result in an effective "silent point" from this transmitter.

A point which should be particularly noted by London readers is that when turning the "Music Leader" so that its frame is at right angles to Brookmans Park, the direction is then most favourable for the reception of foreign stations, and with the "Music Leader" it should be possible to put up a "leading" list of "D.X.-ers" despite the alleged wipe-out of Brookmans Park.

When you have made up the "Music Leader" let us know the results you get. We were so confident with the original model that we had no hesitation in making it form the subject of the free blueprint which was given with AMATEUR WIRELESS No. 384.

And we want to know your verdict!



This photograph will make clear the many excellent features of this successful receiver

from the set unit to a socket at the back of the cabinet. Then the cabinet itself can house the accumulator and grid-bias battery and the eliminator may be kept down near the mains plug, being connected by a length of multiple flex when required.

So far as valves are concerned, a normal four-electrode screen-grid valve should be used in the H.F. stage; if all the batteries are to be self-contained, it is recommended that 2-volt valves should be used throughout because in this way the size of the necessary accumulator is reduced.

Valves to Use

The detector valve should preferably be of the DEH type, or where a valve range is marked by general names only, then a general purpose valve having an impedance of approximately 30 to 50,000 ohms should be employed.

The L.F. valve should have a lower impedance, somewhat in the neighbourhood of 10 to 15,000 ohms and a valve of the DEH class is eminently suitable.

For the final stage, a valve having a low-impedance of approximately 5,000 ohms, such as the DEP and numerous other valves of the "P" variety should be used.

A maximum H.T. voltage of at least 120 is recommended and this value should be applied to the H.T. tapping, H.T.4. A value of 80-100 volts should be applied to tapping H.T.3, which provides the anode voltage to the first L.F. valve. Approximately the same voltage will be found suitable for the H.T.2 tapping which is connected to the anode circuit of the detector and the H.F. valve. The screening grid voltage is applied through

HALF A GUINEA—is being paid for wireless Titbits. Turn to page 724 for full details

Absolute silence for the all-important pause—

The hush that comes before the downward sweep of the conductor's baton is all-important; it gives time to gather the instruments together for the burst of melody and it adds contrast to the intensity of the succeeding sound. These pauses are used to fine effect by great musicians and the silent background which you get when you use Lissen Transformers gives you amplification which is inimitably fine. Notice how the notes of music and the words of song and speech stand out in sharp stereoscopic relief when you use Lissen Transformers. In every circuit you can employ them—no matter what else is specified. They have brought a vast improvement to radio reproduction.

The LISSEN SUPER TRANSFORMER

This Super LISSEN Transformer is made in two ratios, $3\frac{1}{2}$ to 1 and also $2\frac{1}{2}$ to 1. The $3\frac{1}{2}$ to 1 is suitable for use in either the first or the second stage of an L.F. amplifier, or can be used in cascade for both stages, and with practically any valve. The $2\frac{1}{2}$ to 1 transformer is suitable for use after a high-impedance rectifier valve without fear of distortion or loss of high notes and overtones. The price **19/-** is the same for both ratios

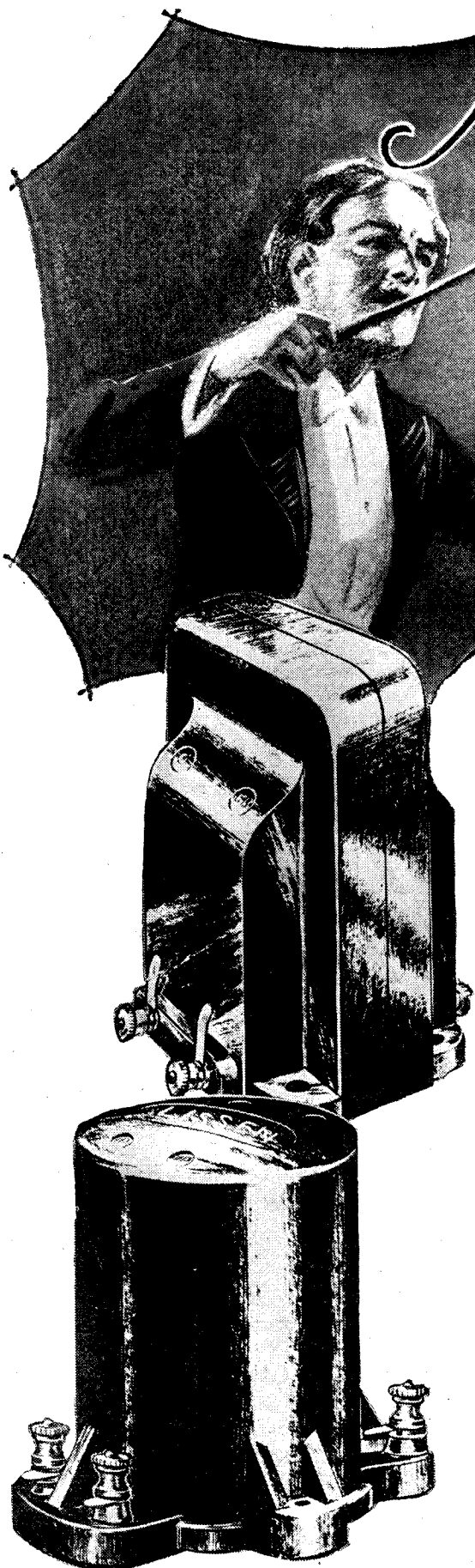
The famous 8/6 LISSEN TRANSFORMER is still supreme in price and will never break down—

The famous 8/6 LISSEN Transformer is suitable for all ordinary purposes, and its huge sale proves it still supreme value. It continues to earn high praise as "the transformer that never breaks down." **8/6** Turns ratio 3 to 1. Resistance ratio 4 to 1

LISSEN

TRANSFORMERS

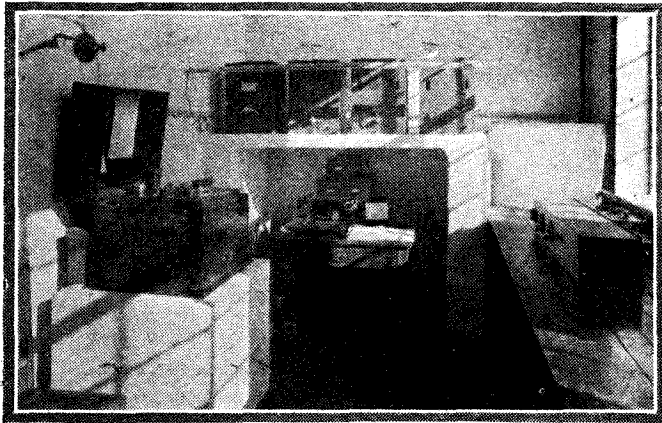
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To Ensure Speedy Delivery, Mention "A.W." to Advertisers

THE B.B.C.'s NEW TEST STATION *(Continued from page 714)*

different jobs of relaying and frequency testing. Two aerial masts have been erected, carrying single-wire aerials, but



A corner of the wavemeter-testing room

five aerials will be the total when the station is finished.

Cavity walls have been provided to ensure that the interior of the buildings is not subject to sudden temperature changes. That was the great snag at Keston; an engineer might get a frequency-tester nicely checked up during the morning, after much peering at meters, calculation, and mild "cussing," only to find, when he wanted to make frequency tests after

lunch, that it had gone out of tune owing to a temperature change; that kind of thing is no good when serious work is attempted, as for the

frequency testing for the Union Internationale de Radio-diffusion.

At Tatsfield the cavity walls and effective electric and hot-water radiators ensure a temperature maintained to within a few degrees Fahrenheit. The sub-standard used for frequency testing is supported on a four-tier iron stand rigidly bolted to the concrete

floor; concrete pillars are used for supporting other parts of the apparatus, so temperature changes and vibration won't affect results.

The receiving and relaying gear is contained in the second room, and, apart from the apparatus brought from Keston, a number of new sets have been installed. There will be a total of ten sets, five of them for short-wave working. I am not yet able to publish the types of circuits which will

be employed. It is quite likely, however, that an idea mooted at Keston, namely, of using four or five sets on one aerial simultaneously—each tuned in to a *different* relaying wavelength—in order to minimise fading from some of the American transmitters, will form the subject of some interesting experiments to be carried out.

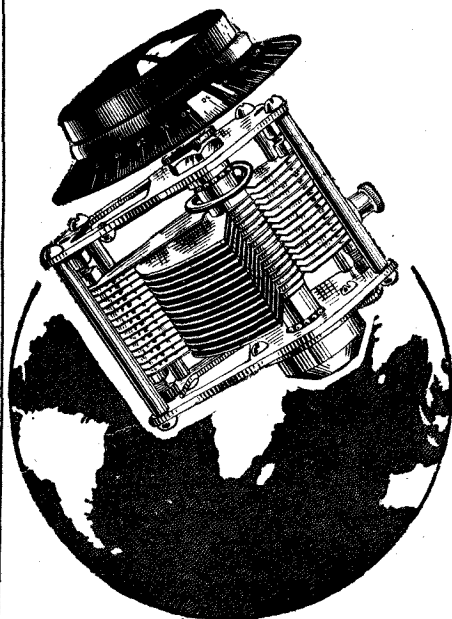
Tatsfield's Tests

The frequency-testing work carried out at Tatsfield is most interesting, even to those who haven't the vaguest idea of what is being done. The purpose of the testing, of course, is to check up the Brussels wavemeters, upon the accuracy of which depends the success of the new Prague wavelength plan. Accurate wavemeters have been designed by the Technical Committee of the U.I.R., and are made at the Brussels University.

It is interesting to note that the final frequency standard at Tatsfield has an accuracy of one part in 100,000, and measurements are made every day to obtain a correction factor.

A thing which disappoints me about Tatsfield is the neatness: essential, I suppose, to any *poste* which has to carry out accurate work, but so non-typical of the average amateur station as to be almost discouraging!

Turn the world your way!



The effect of placing Polar Condensers behind your panel is equivalent to turning the world round the way you want it.

The combination of Slow Motion and Direct Drive, as fitted to Polar Condensers, is the surest method of quickly bringing in those evasive stations.

THE POLAR "IDEAL"

This is one of the most popular types of condensers because it can be used most effectively with practically any modern circuit.

PRICES:

.0005, 12/6 .00035, 12/3 .0003, 12/-

Supplied fitted with the POLAR DRUM CONTROL Complete with Escutcheon and fixing screws for 2/6 extra.

Write for the new Polar Catalogue A/W in which the full range of Polar Condensers is illustrated and described.

Read this letter:

Headingley, Leeds.
Oct. 4, 1929

"Dear Sirs,
"A few words of appreciation for your 'Polar Ideal' condenser. I scrapped my old ones (another make) and placed two of your .0005 behind my panel together with .0001 Polar Volcon.

"The results after which were really and truly gratifying. They certainly 'turn the world your way.'

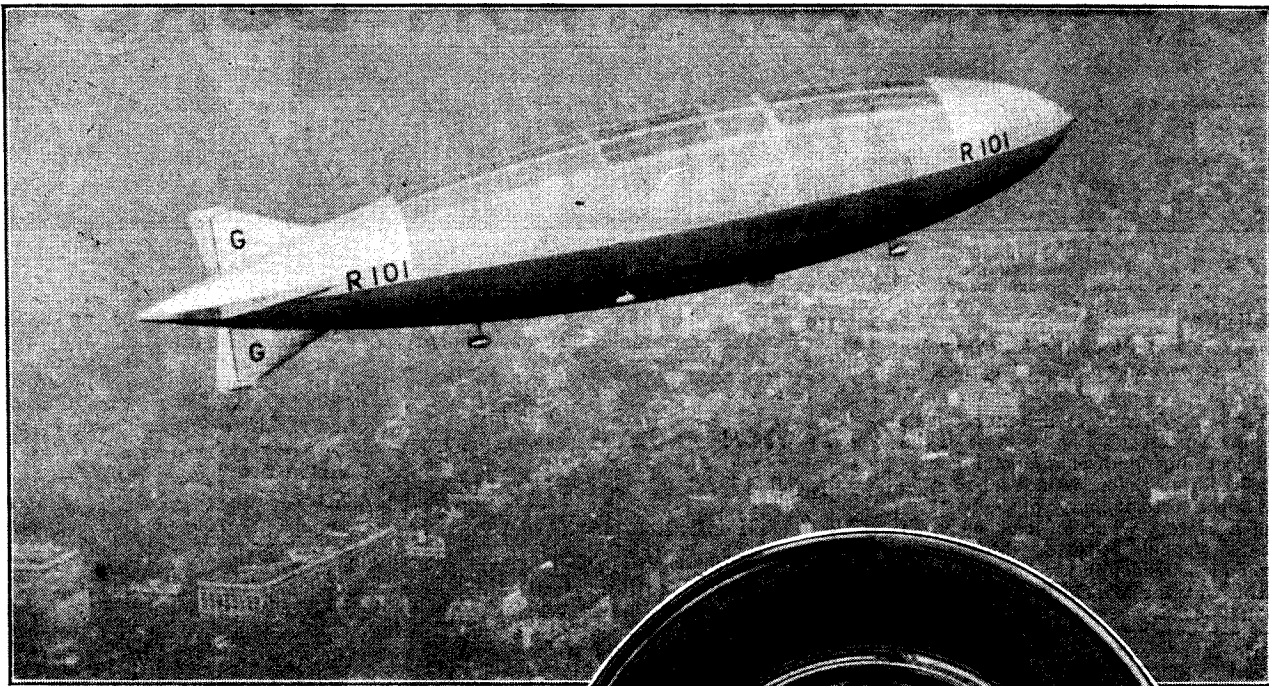
"The slow motion is of velvety smoothness and the condensers have, in my case, brought in stations hitherto feeble or unheard.

"My hearty congratulations to your products.

"Yours faithfully,"

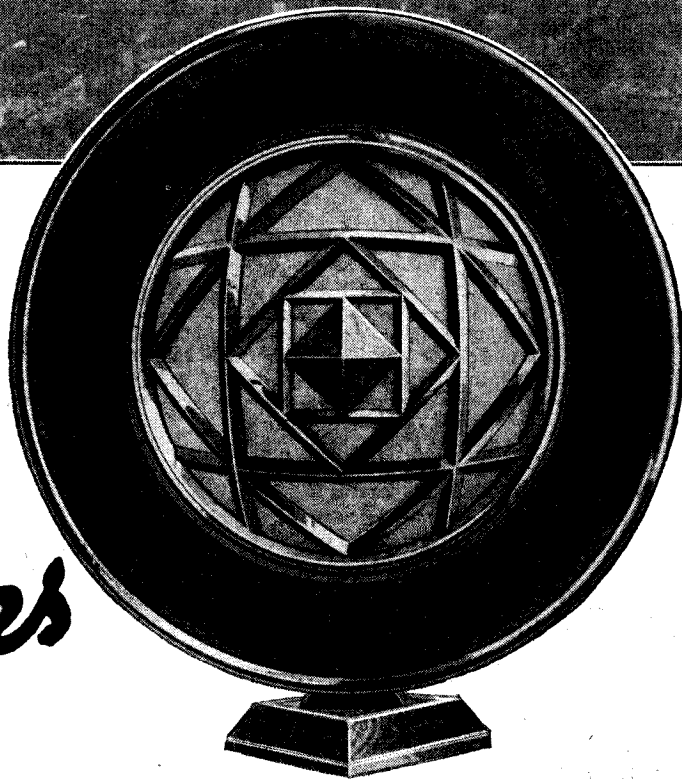
(The original letter may be inspected at our offices.)

WINGROVE & ROGERS, Ltd., 188/9 Strand, London, W.C.2



R101 Britains New Giant Dirigible

*The
two
invincibles*



**KINGS
OF THE
ETHER!**

**BLUE SPOT
101
£4.4.0**

F. A. HUGHES & CO., LIMITED, 204-6 Gt. Portland Street, London, W.1. Telephone: Museum 8630 (4 lines)
Distributors for Northern England, Scotland and North Wales:—H. C. Rawson (Sheffield & London), Ltd., 100 London Road, Sheffield (Telephone: Sheffield 26006); 22 St. Mary's Parsonage, Manchester (Telephone: Manchester City 3329.)

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

OUR INFORMATION BUREAU



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, 53/54 Fetter Lane, London, E.C.4

Testing Batteries.

Q.—What is meant by testing batteries when "on load"? Cannot they be tested "off load"?
—L. (Barking).

A.—After being disconnected from a circuit for some time a battery picks up some of the voltage it lost during discharge and consequently a reading taken is not a reliable indication of the state of charge of the battery. By testing a battery when on load we mean that the battery should be tested whilst it is in use and when it has been in use for some little time. In this way the real state of the battery can be found.—L. C.

Atmospheric Interference.

Q.—I am greatly troubled by atmospheric interference in this country and do not wish to restrict my reception of distant stations because of this. Is there a way of overcoming the difficulty without considerably affecting my reception of stations outside Africa? I use a very efficient outdoor aerial.—L. J. (Cape Town).

A.—The higher and more efficient the aerial you use the greater will be the amount of interference you experience from atmospheric disturbances. Underground aerials minimise this

form of trouble, but they also considerably restrict the receiving range. In our opinion

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.

the most practical solution to the difficulty is to make use of a powerful receiver in conjunction with a frame aerial. The advent of

screened-grid valves opens up a field for research in this direction and we would strongly recommend you to try out a receiver in which there are two stages of screened-grid H.F. amplification, as a means of accomplishing that required.—A. L.

"Talisman Two"

Q.—I have constructed the "Talisman Two" receiver and in testing out I have come to the conclusion that there must be a mistake in the wiring. After the set has been switched on for some minutes the tuning coil gets warm and begins to smoke. Needless to say, I have not received any signals so far. Can you tell me if a mistake occurred in the wiring plan, or can you advise me where I may have gone wrong?—G. F. (London).

A.—We are of the opinion that you have not used the special insulated grid-leak clip which is attached to one side of the grid condenser. If you will refer to the list of components, you will see that a special grid condenser with series parallel clip is advised. Omission to make use of this special attachment will lead to the short-circuiting of the accumulator through the dual-wavelength tuning coil.—L. C.

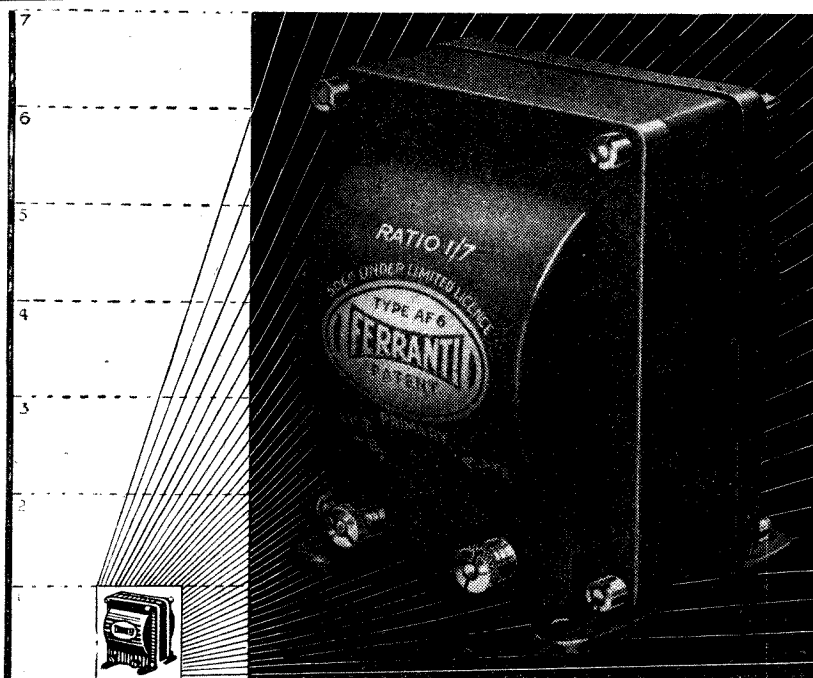
ONE TO SEVEN

THE BIG-RATIO TRANSFORMER that has already set the Radio world talking of the new possibilities there are in receivers employing one stage only of L.F. amplification.

It is well known that "higher ratio" is synonymous with "greater amplification," and the Ferranti research laboratories have now provided the means whereby the extra amplification can be secured without that serious loss in quality which has been hitherto so detrimental.

The Ferranti AF6 transformer is particularly suitable for sets of the SG3 type. The new ratio is not intended for use in receivers employing more than ONE stage of L.F.

PRICE - 30/-



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M.P.A. COMPONENTS —BEST IN RADIO!



**MADE TO A STANDARD THAT
SETS A STANDARD!**

M.P.A. ELIMINATORS

Wide research and experience are behind these new components. Every Eliminator is tested to over 1,000 volts A.C. for breakdown and complies in every way with I.E.E. regulations.

UNIVERSAL MODEL A.C.—For input voltages from 200-250 volts. Supplies H.T., in 6 tappings from 200/60 volts, output at 200 volts 50 m.a., L.T. (A.C. 4 v.—4 amps.). Grid Bias in 20 one-volt steps. (Exclusive of Marconi Royalties). **Price £12. 10. 0**

GENERAL PURPOSE MODEL A.C.—For input voltages from 200-250 volts. Supplies H.T. in 6 tappings from 200/60 volts—output at 200 volts, 50 m.a. L.T. for ordinary (D.C.) valves variable 2/6 volts, and Grid Bias, 20 one-volt steps. (Exclusive of Marconi Royalties). **Price £16. 16. 0**

POWER MODEL A.C.—For Public Address Systems and Power Amplifiers. For input voltages from 200-250 volts. Supplies H.T. 400 volts and six for 200/60 volts. Output at 400 volts, 100 m.a. Output at 200 volts, 45 m.a. L.T., (A.C.) valves, 4 volt, and 6 volt. Grid Bias, 20 one-volt steps and one variable supply to 150 volts. (Exclusive of Marconi Royalties). **Price £23. 0. 0**

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Power Smoothing Choke (Type SM/500).
EXCEPTIONAL EFFICIENCY! FIRST-CLASS WORKMANSHIP!
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Maximum inductance at full load. No increase in temperature. Comply with I.E.E. regulations. Tested to over 1,000 volts A.C. for breakdown.

"A" Series: Carrying Capacity		"B" Series: Carrying Capacity	
20 Henries	.. 170 m.a.	30 Henries	.. 55 m.a.
50 Henries	.. 90 m.a.	50 Henries	.. 28 m.a.
150 Henries	.. 55 m.a.	150 Henries	.. 12 m.a.

Price 37/6 **Price 25/-**

M.P.A. MAINS TRANSFORMERS

High efficiency with first-class workmanship. Tested to over 1,000 volts A.C. for breakdown. Comply with I.E.E. Regulations in every respect. Blueprint of suggested circuit supplied with each transformer.

AM1/50.—Primary tapped for all A.C. voltages. Secondary 200+200 volts. Full wave. 45 milliamps output. Filament-heating, 2 volts+2 volts—4 amps. output. 2.5 volts+2.5 volts, 2 amps output. **Price 65/-**

AM1/100.—Primary tapped for all A.C. voltages. Secondary 400+400 volts full wave, 100 milliamps output. 200+200, 45 m.a. For G.B. or intermediate or both. Filament heating 4+4 volts—3 amps. output, 2+2 volts—3 amps. output, 2.5+2.5 volts—2 amps. output, 2.5+2.5 volts—2 amps. output. **Price 105/-**

M.P.A. CHANGE OVER SWITCHES

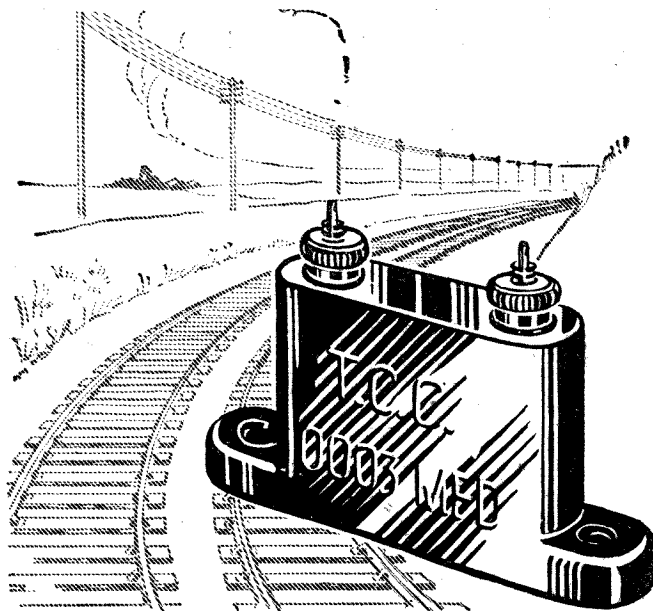
SILVER-GOLD ALLOY CONTACTS. HIGH-CLASS PRECISION WORKMANSHIP. Rotary cam switches of very low capacity. Positive contact in each position. Highly efficient.

TYPE "A"—3-pole 2-way switch with additional adjustable pair of contacts. Ideal for radio gramophone combinations **Price 9/-**
TYPE "B"—3-pole 2-way switch **Price 7/6**
TYPE "C"—2-pole 2-way switch **Price 6/6**

M.P.A. POTENTIAL DIVIDER

For H.T. and G.B. supply. Another product of the M.P.A. Research Laboratory. 20,000 ohms resistance for Grid Bias and 2,000 ohms (heavy duty) for H.T. supply. 8 values H.T., 20 tappings G.B. in one-volt steps. Carrying 50 m.a. on H.T. tappings. **Price 7/6**

STANDARDS



RAILWAY TRACKS and T.C.C.

ALL British railway tracks are of standard width or "gauge." To complete a journey without frequent changes—to run to schedule, to permit interlinking of the various groups, and to avoid chaos generally standardisation is essential.

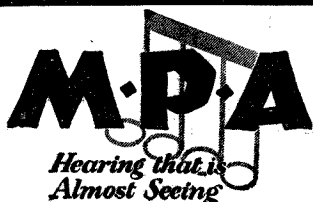
It's the same with condensers—only by adhering to a definite standard can perfect working be assured. There can, however, be only one standard, and where condensers are concerned that standard is T.C.C. Whenever you see a condenser marked T.C.C. you know that it is a condenser designed and built to a standard—with a degree of accuracy and dependability approached by no other. It is, in a word, the standard by which all other condensers are judged.

Illustrated above is a .0003 mfd. T.C.C. Upright Type Mica Condenser. Price 1/6 each. Other capacities in this type are made from .0001 mfd. to .25 mfd. Prices 1/6 to 18/-.



Advt. Telegraph Condenser Co. Ltd., Wales Farm Road, N. Acton, London, W.3.

2112



M.P.A. products above £5 can be purchased on easy deferred terms. Ask your dealer to-day.
M.P.A. Wireless, Ltd., Dept.
19, Radio Works, High Road,
Chiswick, W.4.

Please Mention "A.W." When Corresponding with Advertisers

"The World-Wide Short-Wave Three"

(Continued from page 734)

9-volt grid battery, with flap for securing in cabinet (Siemens, Ever-Ready).

1 ft. of flex (Lewcoflex).

Two wander plugs, marked: G.B.+ and G.B.- (Belling-Lee).

Two vernier dials (Igranite Indigraph with micrometer adjustment, Burndept, Burton).

The receiver, being of the all-metal type, its construction naturally differs somewhat from that of the more conventional ebonite panel and baseboard type of set. For this reason the blueprint is of paramount importance. A print has been specially prepared for this short-waver and there are numerous points in it which will assist constructors, particularly those not well acquainted with a small amount of metal work. A reproduction of the print is given on p. 734, but the full-size edition may be obtained, price 1s., post free, from the Blueprint Department of AMATEUR WIRELESS, 58-61 Fetter Lane, London, E.C.4. Just ask for blueprint; no correspondence is needed.

In next week's issue full constructional details will be given so that anyone with the aid of the usual set construction tools—a screwdriver, a few drills, a pair of pliers and a soldering iron, can make up the

"World-Wide Three" and get the results we claim.

The set is of rather striking appearance, owing to its all-metal construction and to the "instrument-maker" appearance of the panel. For this reason, seeing that the set is displayed as are other "A.W." sets, in the Somerset Street windows of Messrs. Selfridge and Co., Ltd., London readers are advised to see it for themselves and to note the way in which the neat all-metal construction is carried out without introducing any work above the capabilities of the average constructor.

THE PROPOSED SWISS BROADCASTING NET

DEFINITE plans have now been drawn up by the Swiss Posts and Telegraphs for the reorganisation of the broadcasting system. As the French, German, and Italian languages are used in that country, three separate high-power transmitters will be required. The German station will be erected at Muenster, in the neighbourhood of Lake Sempach, at about 20 kilometres to the north-west of Lucerne; its power will be 25 kilowatts and the wavelength 459 metres. The transmitter will

be fed by the Berne, Zurich, and Basle studios. The second high-power transmitter to provide a service to the French-speaking cantons is already under construction at Soffens, in a north-easterly direction from Lausanne. In this case the normal power will be 12½ kilowatts, with the possibility of doubling the energy if required. The transmitter will be connected by landline to the existing Geneva and Lausanne studios, and the station will operate on 403 metres. For the Italian-speaking population it is proposed to build a 3-kilowatt transmitter on the summit of Mount Cenero, lying in a triangle bounded by Lugano, Locarno, and Bellinzona; the wavelength to be used is 760 metres.

In addition to the three high-power transmitters, 1-kilowatt relay stations will be provided for Geneva, Berne, Basle, St. Gall, Zurich, Sion, and Covie.

In the new scheme all transmitters will be erected and operated by the Posts and Telegraphs administrations, the programmes being supplied by two separate companies, to which monopolies are to be conceded. An entirely new net of cables will link up all studios and broadcasting stations. GRIDDA.

The San Francisco studios of the National Broadcasting Company estimate that £200 worth of new music is added to its library every month. The present value of the library is said to be £5,000.

HELLESEN DRY BATTERIES



"Another Hellekens, please"

DESPITE the results of the last Election, it is safe to say that we Britishers are a Conservative crowd.

When we have found a good thing, something we can trust, something that never lets us down, we stick to it. I do not need a new H.T. Battery at the moment, my present Hellekens has only been in use for three months, but when I do, I shall automatically ask my Dealer for "Another Hellekens, please." And if you like to say that this is largely a matter of sentiment, I can only reply that it is a sentiment that would never have had foundation if I had not proved Hellekens to be such rattling good batteries, and I'm only one of thousands who think the same.

PRICES	
Standard Capacity.	
"Wiray" 9-volt Grid Bias Type	2/-
"Wirin" 60-volt H.T. Type	10/6
"Wirup" 99-volt H.T. Type	18/-
"Wisol" 108-volt H.T. Type	20/-
Treble Capacity.	
"Kolin" 60-volt H.T. Type	19/-
"Kolup" 99-volt H.T. Type	32/6

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"1930" LOG (MID-LINE) CONDENSER

As specified for the MUSIC LEADER described in this issue.

In four Capacities

.0005	4/6	Each
.00035		
.00025		
.00015		

*Double spacing of vanes for Ultra Short-wave work. As used for the "World-Wide Short-Wave Set" described in this issue.

The Finest
VERNIER DIAL
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MECHANICALLY PERFECT. POSITIVE BRASS CONTACT drive on SOLID BRASS SCALE ensuring smooth movement, with absolutely NO BACK-LASH. ROBUST in Construction and Trouble Free. SMALL. EXTREMELY ELEGANT. EFFICIENT.

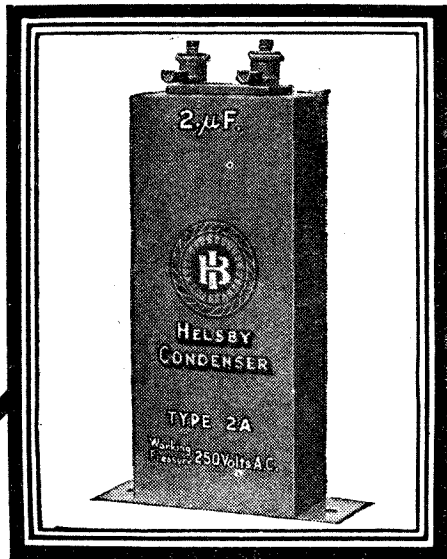
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You cannot afford to use any but the best Condenser in an eliminator circuit.

HESBY CONDENSERS

are made and guaranteed by a firm with 30 years' experience in condenser making, from small telephone and radio condensers to Power Condensers weighing upwards of 2 tons.

Guaranteed working voltages :-

Type M	-	-	150 volts D.C.
Type 2A	-	-	350 volts D.C.
Type 3A	-	-	450 volts D.C.
Type 4A	-	-	600 volts D.C.

All HESBY Condensers are vacuum dried and impregnated with a special non-hygroscopic material which renders them moisture proof.

If unobtainable from your dealer write to us giving his name and address.



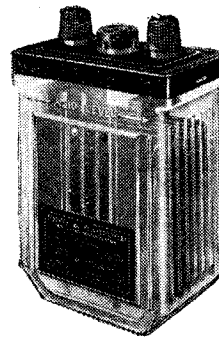
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PRESCOT - LANCS.
Makers of PRESCOT and HESBY cables

GIVE GENEROUSLY FOR YOUR POPPY



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With Indicating Floats
P.G.F.5 20 a.h. 2v. (as illustrated) 11/9
P.G.F.7 30 a.h. 2v. 13/9
P.G.F.9 40 a.h. 2v. 15/9

Non-Indicating
P.G.5 20 a.h. 2v. 9/-
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P.G.9 40 a.h. 2v. 13/-
P.G.11 50 a.h. 2v. 15/-

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A single glance at the Peto & Radford P.G.F. Accumulator tells you whether it is charged, half-charged, or run out. The indicating floats let you see how many more hours of programme you can depend on

as easily as telling the time

Further advantages of the P.G.F. are these. Plates are sturdy. Paste is held in by interlocking grids. Terminals cannot be reversed and have acid-proof glands. The lid is made of Dagenite and is hermetically sealed to the box. And the price is low—only 11/9 for a 2-volt 20 a.h. (true capacity) or 9/- without the indicating feature.

Moreover, the P.G.F., like all Peto & Radford Accumulators, is guaranteed for six months.

Send a postcard for full details of this and other P. & R. Batteries to :-

Peto & Radford, 93 Great Portland Street, London, W.1.

(Telephone : Langham 1473)

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P AND R

London Sales and Repair Depot : 107a Pimlico Road, S.W.1

PETO & RADFORD

ACCUMULATORS

The beginning and the end in

POWER

W.R.I

This announcement is issued by THE NATIONAL ACCUMULATOR CO., LTD.

CAPTAIN ECKERSLEY ON SOLVING BROOKMANS PARK TROUBLES

Facts About the New Station—and Three Useful Hints

"SHORTEN your aerials. Make full use of the long waves. Don't be a knob twiddler."

These are the three basic pieces of advice which Captain P. P. Eckersley gave at a recent demonstration in North-west London, intended to prove that the new regional scheme now in operation at Brookmans Park does not preclude listeners from enjoying foreign-station reception provided a reasonably good but not necessarily expensive set is used.

In a most interesting talk, Captain Eckersley, who, of course, conceived the regional scheme before leaving the B.B.C. to take up a position with the Gramophone Company (H.M.V.), explained to an AMATEUR WIRELESS representative just what listeners should do, and could expect, under the new conditions.

"My Baby"

"I am not making any apology for the regional scheme," said Captain Eckersley. "It is my baby."

"The opening of Brookmans Park has brought about the *expected* widespread complaints which have always followed a change in broadcasting conditions. But changes are inevitable, and an increase of power is essential to ensure adequate service for the majority. It is only in that area immediately surrounding the station that trouble is experienced, and, while sympathising with those in that district, I do not think that their plight is so serious as at first supposed.

"In many cases an effective remedy is a reduction in length of the aerial. With any reasonably efficient receiver this will greatly improve selectivity without causing too serious a loss in range. When the set is obsolescent a little trouble spent on adapting it is surely not too much to look for, and where it is

entirely out of date, the improved results obtainable from a modern receiver—in selectivity, range, and reproduction—would seem to justify the change to a new instrument!"

Captain Eckersley then went on to analyse various types of listener, and lightly poked fun at the man who twiddled knobs and preferred "eighty noises to five programmes." "The knob twiddler," he said, "is a man who wrings from the resonant ether a most extraordinary cacophony of sounds!"

"After all," he continued, "if it were the aim of the broadcasting authority to enable everyone to listen to the foreign transmissions, the best thing would be to shut down altogether. The real responsibility lies in making the local programme so attractive that the enlargement of the service area becomes *welcome*."

Questioned as to the best methods to employ in cases where selectivity is bad, he reiterated his advice to make full use of the long waves. "The stations on the medium waveband are *always* susceptible to interference and fading, and even without Brookmans Park it is only on the long waves that we can obtain reliable reception under service conditions.

Use More Capacity

"Adjustment of the L.-C. values has a very great effect on selectivity, and **it is recommended that less coil and more condenser should be used** in any circuit where sharp tuning is lacking. A long aerial is a great mistake. Obviously if one lived within a few feet from Brookmans Park station, and one had a five-valve set with the aerial practically touching that of the new 2LO, the degree of tuning would be negligible. But, on the other hand, if the aerial were cut down to just a few inches, one would get selectivity; one would get

Brookmans Park, and one would *still* get the foreigners, despite the reduced aerial."

Regarding portable sets, Captain Eckersley stressed the importance of the natural "silent point" of the frame aerial. He explained, further, that most London listeners are in a fortunate position, for when the aerial is turned so that the new regional station is cut out, it is in the best position for the reception of cross-Channel stations.

Choosing the Programmes

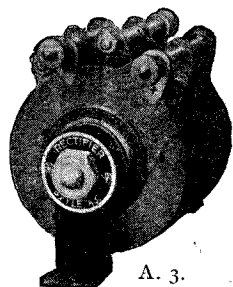
"The greater the service area of Brookmans Park," he said, referring to programmes, "the greater is the responsibility of the B.B.C. The greater, too, is the listener's responsibility, for *he has a most marvellous thing called a switch!*"

The need for alternative programmes had caused him, four years ago, to consider the regional scheme. There was also the fact that the European situation was becoming serious, and foreign jamming was affecting broadcasting.

With the aid of a Marconiphone all-mains four-valver, he then showed how a large batch of foreigners could be received free of interference from Brookmans Park.

We have already explained that Captain Eckersley has taken up a position with the Gramophone Company, the activities of which already cover radio and talking films. Is it possible that, in the distant future, one of the alternative programmes may be given by private enterprise, in friendly co-operation with the B.B.C., who would be providing the other alternative? There are already several great combines in the musical world with equal funds and facilities to the B.B.C.

Such a new phase of British broadcasting, if it came about, would be a vastly interesting experiment. But Captain Eckersley would say nothing of this!



A. 3.

D.C. Output 9 volts.
1 amp.

23/6

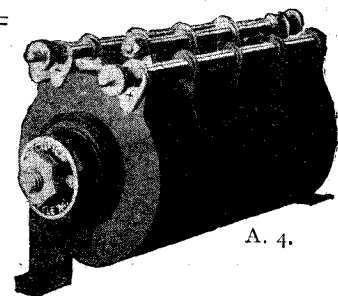
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METAL RECTIFIERS

TYPE A

FOR LOW TENSION D.C.

Send 2d. Stamp for our 32-page book "The All Metal Way 1930," giving full details of these and other units—high and low tension, and full instructions and circuits for making A.C. mains units of all types.



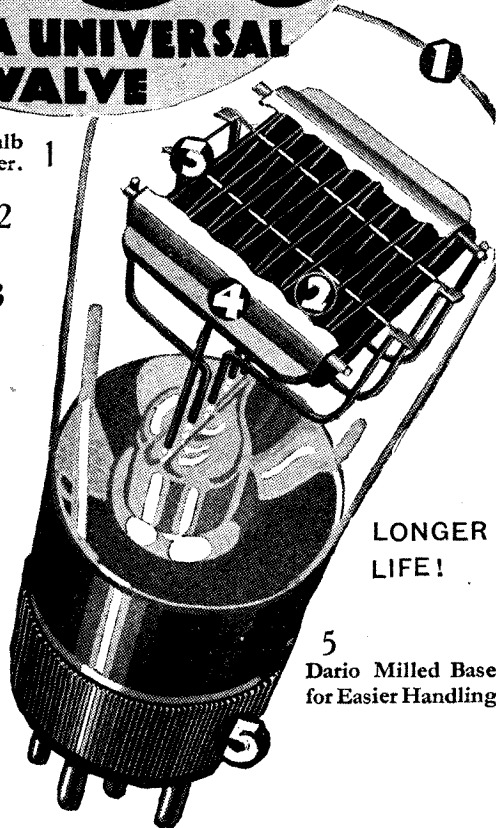
A. 4.

D.C. Output 9 volts
2 amps.

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- 1 New Glass Bulb
Finer yet Tougher.
- 2 New Super
Strength Grid.
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microphonic
Filament
with Special
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Size Anode.
Easier Flow
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1930
TYPES!

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5
Dario Milled Base
for Easier Handling

WRITE FOR FREE FOLDER!

TWO VOLT		
Universal1 amp.	5/6
Resistron1 amp.	5/6
Super H.F.15 amp.	5/6
Super-Power18 amp.	7/6
Hyper-Power3 amp.	9/6
Pentodion3 amp.	18/6

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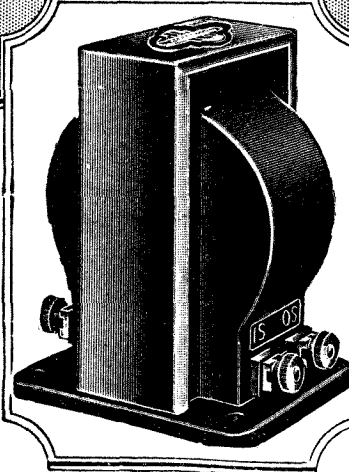
FOUR VOLT		
Universal075 amp.	5/6
Resistron075 amp.	5/6
Super H.F.075 amp.	5/6
Super-Power1 amp.	7/6
Hyper-Power15 amp.	9/6
Pentodion15 amp.	18/6



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538 HIGH ROAD, LEYTONSTONE, LONDON, E.11

IGRANIC



IGRANIC TRANSFORMER

Ratio 1 to 7.2

The IGRANIC ELECTRIC COMPANY, LTD., produced a 1 to 7.2 ratio transformer two and a half years ago for single L.F. stage working.

*The curve was and is still
ahead of all others*

The Igranic Electric Co., Ltd., were also the first to give to the public the real curve of interpretation of transformer performance, viz. voltage amplification plotted against frequency *under load*.

"PRIORITY is the EASIEST THING to DISREGARD" but the name of IGRANIC is invariably associated with pioneer effort and high achievement.

TYPE G, Ratio 1 to 7.2

PRICE 30/-

Get one at your dealer's, or
write direct to Dept. D. 134.



Works BEDFORD

Build your New Set NOW!

PAY AS YOU LISTEN

Why be satisfied with your old set, when for a small monthly payment you can build the very latest set yourself, or bring your old Receiver right up to date. Increase your reception 100%.



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COSSOR 1930 KIT. CASH £8.15.0. Send only 16/6, balance by 11 monthly payments of 16/6.

NEW OSRAM MUSIC MAGNET. CASH £9.0.0. Send only 16/6, bal. by 11 monthly payments of 16/6.

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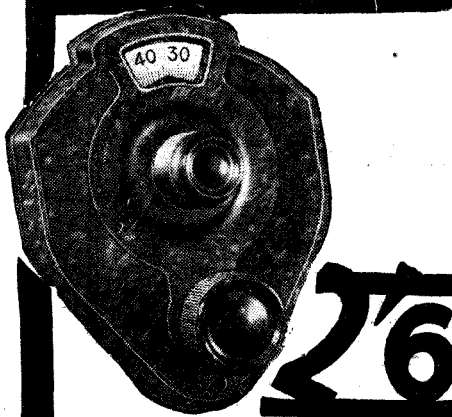
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121 CHEAPSIDE, London, E.C.2

Telephone: National 9846

DOMINION VERNIER DIALS



BROWNIE are now producing 2,000 Dominion Vernier Dials a day. That is why it is possible to offer this high-grade dial at the wonderful price of 2/6.

The mechanism is a special non-backlash design with a reduction ratio which makes fine tuning easy without becoming tedious.

Obtainable from all wireless dealers in beautifully finished plain black or lovely grained mahogany bakelite.

BROWNIE WIRELESS

Nelson Street Works, London, N.W.1

BROADCAST TELEPHONY

Broadcasting stations classified by country and in order of wavelengths. For the purpose of better comparison, the power indicated is *aerial energy*.

Metres	Kilo-cycles	Station and Call Sign	Power (Kw.)	Metres	Kilo-cycles	Station and Call Sign	Power (Kw.)	Metres	Kilo-cycles	Station and Call Sign	Power (Kw.)
GREAT BRITAIN											
25.53	11,751	Chelmsford (5SW)	15.0	*286		Montpelier (PTT)	0.2	*385	779	Genoa (IGE)	1.0
*200	1,500	Leeds (2LS)	0.13	288.5	1,040	Mont de Marsan	0.3	*441	680	Rome (Roma)	3.0
*242	1,238	Belfast (2BE)	1.0	291.4	1,029.3	Radio Lyons	0.5	453	662	Bolzano (IBZ)	0.3
*288.5	1,040	Newcastle (5NO)	1.0	304	956	Limoges (PTT)	0.5	*501	500	Milan (Milano)	7.0
288.5	1,040	Swansea (5SX)	0.13	305.6	901.7	Bordeaux (PTT)	1.0	304	956	Zagreb (Agram)	0.7
288.5	1,040	Stoke-on-Trent (6ST)	0.13	309	970	Agen	0.25	429	004	Belgrade	2.5
288.5	1,040	Sheffield (6LF)	0.13	*314	950	Radio Vitus	1.0	570	527	Ljubljana	2.5
288.5	1,040	Plymouth (5PY)	0.13	329	974	Marseilles (PTT)	0.5	*525	572	Riga	3.0
288.5	1,040	Liverpool (6LV)	0.13	331.4	905	Grenoble (PTT)	0.5	LITHUANIA			
288.5	1,040	Hull (6KH)	0.13	364	824	Paris (Parisien)	0.5	*1,935	755	Kovno	7.0
288.5	1,040	Edinburgh (2EH)	0.85	368	815	Algiers	12.0	NORWAY			
288.5	1,040	Dundee (2DE)	0.13	*381	788	Radio Toulous	8.0	£40	1,250	Rjukan	0.18
288.5	1,040	Bournemouth (6BM)	1.0	411	729	Radio Maroc (Rabat)	2.0	*283	1,058	Notodden	0.05
288.5	1,040	Bradford (2LS)	0.13	447	671	Paris (Ecole Sup. PTT)	3.0	*385	820	Bergen	1.0
*301	995	Aberdeen (2BD)	1.0	468	640	Lyons (PTT)	5.0	*394	961	Frederiksstad	0.7
*310	968	Cardiff (5WA)	1.0	1,350	222	Tunis (Kasbah)	0.6	453	662	Tromsø	0.1
356	842	Brookman's Park 30	1.458	1,458	205.76	Eiffel Tower	12.0	453	662	Alesund	0.3
*377	797	Manchester (2ZY)	1.0	*1,725	174	Radio Paris	12.0	453	662	Porsgrund	0.7
*399	753	Glasgow (5GC)	1.0	GERMANY				493	608	Oslo	1.5
*479	626	Daventry (5GB)	25.0	*218	1,373	Flensburg	0.5	1,071	280	Oslo (testing)	7.3
1,654	293	Daventry (5XX)	25.0	*227	1,310	Cologne	4.0	POLAND			
AUSTRIA											
*246	1,220	Linz	0.5	*234	1,283	Munster	3.0	*313	950	Cracow	0.5
*283	1,058	Innsbruck	0.5	*239	1,250	Nurnberg	2.0	*335	896	Pesen	1.2
*352	851	Graz	7.0	*248	1,220	Kiel	0.85	385	779	Wino	0.5
*453	666	Klagenfurt	0.5	*258	1,184	Cassel	0.25	*408	734	Kattowitz	10.0
*517	581	Vienna	15.0	*268	1,220	Gleitwitz	2.0	*1,411	222.5	Warsaw	8.0
CZECHO-SLOVAKIA											
*263	1,139	Morava-Ostrava	10.0	*270	1,157	Leipzig	1.5	*394	761	Bucharest	12.0
*279	1,079	Bratislava	12.5	*276	1,112	Kaiserslautern	0.25	RUSSIA			
*293	1,022	Kosice	2.0	*278	1,083	Koensigsberg	2.5	*351	855.5	Leningrad	1.0
*342	878	Brunn (Brno)	2.4	*283	1,058	Magdeburg	0.5	*427	702.5	Khar'kov (NKO)	4.0
*457	617	Prague (Praha)	5.0	*283	1,058	Berlin (B.)	0.5	433	621.5	Homel	1.2
BELGIUM											
135.5	1,273.5	Charleroi (LL)	0.25	*283	1,058	Stettin	0.5	*825	364	Moscow (PTT)	20.0
246.1	1,212.8	Schaerbeek-Brussels	0.25	*283	1,058	Dresden	0.25	1,000	237	Tiflis	10.0
250	1,200	Ghent	0.5	*319	941	Bremen	0.35	1,000	300	Leningrad	20.0
270	1,112	Radio Binche	0.1	*319	941	Breslau	0.35	1,100	772.7	Moscow Popoff	40.0
494	1,212	Liege	0.1	*325	923	Stuttgart	1.5	*1,304	230	Khar'kov	4.0
312	961.4	Arlon	0.25	*380	833	Hamburg	1.5	1,481	202.5	Moscow (Kom)	40.0
339	887	Louvain	8.0	*372	809	Frankfurt	1.5	SPAIN			
*509	590	Brussels	1.0	*390	770	Frankfurt	1.5	251	1,703	Almeria (EAJ18)	1.0
DENMARK											
*281	1,067	Copenhagen (Kjobenhavn)	0.75	*418	716	Berlin	1.5	314	956	Oviedo (EAJ19)	0.5
1,153	260	Kalundborg	7.5	*453	662	Danzig	0.25	*340	860	Barcelona (EAJ1)	8.0
ESTHONIA											
*297	1,010	Reval (Tallinn)	0.7	*456	657	Aachen	0.35	*368	815	Seville (EAJ5)	1.5
FINLAND											
*221	1,355	Helsingfors	0.9	*473	635	Langenberg	13.0	403	743	San Sebastian (EAJ3)	0.5
1,796	167	Lathi	40.0	*533	563	Munich	1.5	428	700.9	Madrid (EAJ7)	2.0
FRANCE											
31.65	9,479	Radio Experimental (Paris)	1.0	*560	536	Augsburg	0.25	428	602	Salamanca (EAJ22)	1.0
175	1,714	S. Quentin	0.1	*560	536	Hanover	0.35	465	645	Barcelona (EAJ13)	8.0
211.3	1,220	Beziers	0.1	575	521.7	Freiburg	0.35	SWEDEN			
212.8	1,410	Fecamp (Radio Normandie)	0.5	*1,635	733.5	Zeesen	30.0	231	1,301	Malmö	0.6
237	1,265	Nice (Juan-les-Pins)	0.5	2,100	142	Norddeich	10.0	*257	1,160	Hoerby	10.0
238	1,260	Bordeaux (Radio Sud-Ouest)	1.0	2,290	131			270	1,112	Trollhattan	0.45
*255	1,175	Toulouse (PIT)	1.5	GRAND DUCHY				*322	932	Goeteborg	10.0
*265	1,130	Lille (PTT)	0.7	223	1,340	Luxembourg	3.0	322	932	Falun	0.5
268	1,121	Casablanca	0.5	HOLLAND				*436	689	Stockholm	1.5
268	1,121	Strasbourg	0.3	31.4	9,554	Eindhoven (PCJ)	25.0	*542	554	Sundsvall	0.6
*272	1,103	Rennes (PTT)	0.5	*293	1,004	Hilversum (untl) 5.40 p.m. G.M.T.)	6.5	*770	399	Ostersund	0.6
IRISH FREE STATE											
*225 1,337 Cork (IFS) 1.0											
*413 725 Dublin (2RN) 1.0											
ITALY											
*274 1,004 Turin (Torino) 7.0											
*330.3 908 Naples (Napoli) 1.5											

All wavelengths marked with an asterisk have been allotted according to the Plan de Prague.

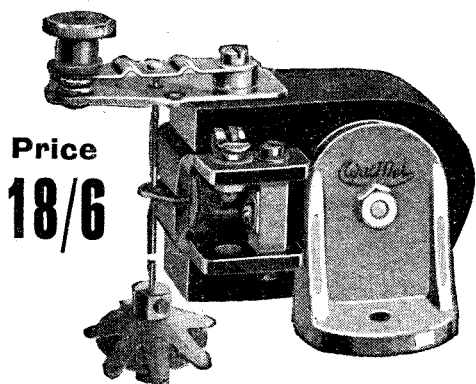
CHIEF EVENTS OF THE WEEK

- LONDON AND DAVENTRY (5XX)**
- Nov. 11 Armistice Day Service and *Journey's End*.
 - 13 *Up to Scratch*, third edition, by Ronald Frankau and his Cabaret Kittens.
 - 14 Peace Commemoration Dinner speeches, relayed from the Guildhall.
- DAVENTRY EXPERIMENTAL (5GB)**
- Nov. 11 Service from the Cenotaph.
 - 16 A vaudeville programme.
- CARDIFF**
- Nov. 10 *The Coming of Arthur*, a cantata by David Evans.
 - 15 A Welsh variety programme.
- MANCHESTER**
- Nov. 14 Hallé concert.

At a recent broadcast in America, Al Jolson, the talkie film star, received the sum of £1,500 for ten minutes' singing. While £150 a minute seems to be pretty fair compensation, it is not quite up to Sir Harry Lauder's mark, who on his recent U.S.A. appearance received £3,000 for broadcasting three songs—£1,000 a song.

Radio Belgique, Brussels, has concluded arrangements with Amsterdam for a regular relay of entertainments from the famous concert-hall in that city. These broadcasts, which took place weekly in October, will also be transmitted from the Belgian station on November 11, 14, 21, and 28.

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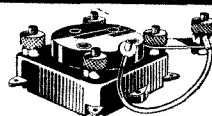
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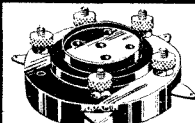
An attractive alternative to the usual Push and Pull type of Switch. All insulated, with indicating "On" and "Off" dial, pointer knob, double contact and suitable for use with panels up to 3/4" thickness. Each **1/9**



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GRAHAM FARISH



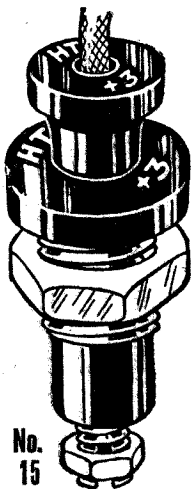
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No. 15

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RADIOGRAMS

A GREAT effort is being made in Paris to secure authority for the erection of a 25-kilowatt transmitter in one of the eastern suburbs, to replace one of the private stations at present operating in the capital. It is stated that the new 10-kilowatt PTT transmitter for the Ecole Supérieure will not be working regularly before January, 1930.

From October 28 last, Radio Toulouse, at 8.45 p.m. G.M.T., has carried out daily transmissions of pictures on the Belin system. A similar service is to be inaugurated by Petit Parisien, Radio L.L. (Paris), and Bordeaux-Sud-Ouest.

WABC, New York, the key station of the Columbia broadcasting system, is to increase its power shortly to 50 kilowatts; it will continue to broadcast on 349 metres. Authority has also been granted to KNX, Los Angeles (Cal.); to work on an equal power. Other 50,000-watt stations in the United States at present operating are WEAJ (New York), WJZ (Roundbrook), WTIC (Hartford, Conn.), WGY (Schenectady), and KDKA (East Pittsburg).

On November 9, Earl Jellicoe will broadcast the annual Poppy Day appeal; a short address will also be given by one of the V.C.'s gathered in London for the dinner given by the Prince of Wales.

We Are Seven is the title of the 2LO birthday programme to be broadcast on its seventh anniversary (November 14). The title has no reference to the number of the artistes taking part in the performance, or to the number of the staff, which is roughly 100 times that figure!

Listeners to 5GB on November 18 will hear one of the favourite concert stars of Paris, namely, Mdlle. Valentine Chaussou, soprano; who will give a recital of old and new French chansonettes.

On November 23, the Birmingham Station Players will present two plays: *A Man of Ideas*, by Miles Malleon, and *Money Makes a Difference*, a well-known West Country comedy.

The "anglicising" of Scottish broadcast programmes is still a sore point across the Border. It is declared to be obvious that ordinary literary criticism for Scottish listeners is one of the programme features which should be relayed from a Scottish station by a Scotsman, while the general news bulletin for the North should be sent out from a Scottish station.

GFA (Air Ministry, London) will transmit henceforth on the short wavelength of 32.29 metres, in addition to the other wavelengths of 4,100, 40.43, and 20.21 metres, which are already in use for the
(Continued on next page)

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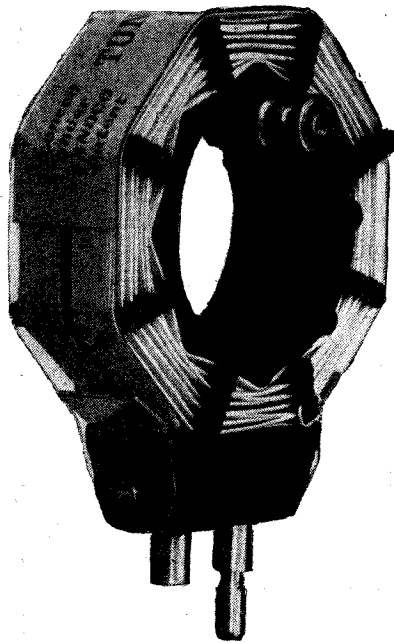
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"RADIOGRAMS"

(Continued)

regular meteorological service carried out by that station.

Radio versions are to be given of two prominent Scots novels, "Huntingtower" and "Weir of Hermiston," in addition to two productions by the Scottish National Theatre, viz., *The Glen is Mine* and a verse play, *Gruach*.

The Spanish station, San Sebastian EAJ8, has been traced as the source of a high-pitched whistle which for some weeks past has been interfering with reception from the Glasgow station.

The new super-power transmitter to be erected in the neighbourhood of Warsaw by the Polish broadcasting authorities will work on 1,111 metres.

The short-wave transmission so frequently picked up by British listeners under the Dutch PHOHI broadcasts on 16.88 metres is that of PLE (Bandoeng) on 15.93 metres. On one or two occasions PLE has relayed the 17-metre transmissions made by PLF (Malabar).

The 20-kilowatt Bangkok (Siam) transmitter, which up to the present has only been used for telegraphic communication with Europe, will shortly undertake the broadcast of musical and other entertainments.

The Berlin Broadcasting Company has concluded arrangements for the relay to the German transmitters of performances from the Paris Opera House.

Many listeners, no doubt, will have picked up the transmissions on 339 metres of the new Belgian broadcasting company, Katholieke Vlaamsche Radio Omroep. Although concerts have been transmitted every Sunday and Thursday from 8.15 to 10.15 p.m., as the Velthem transmitter has not yet officially taken over the duties, the broadcast is carried out from the works of the S.B.R. at Forest, near Brussels. The call in some instances couples the name of the suburb (Forest, pronounced *Four-ay*), with the words "Radio Belgie" or "Radio Omroep K.V.R.O.," and does not always mention either Louvain or Velthem, the small village in its immediate neighbourhood, at which the actual station is installed.

Direct radio telephone communication between New York and Madrid was opened on October 21.

Telephone subscribers of the North-Western Telephone Company at Defiance, Ohio, are now getting radio programmes over their telephones. The radio programme service was started just recently.

A musical programme broadcast from Huizen, Holland, on an extremely short wave was successfully rebroadcast throughout America recently. The programme lasted for about an hour. The Dutch announcer spoke in English.

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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.

Dance Bands

SIR,—I am glad Mr. Moseley mentioned the old Savoy Orpheans under Somers. Yes, those *were* dance bands. What about his symphonic renderings of "No, No, Nannette" and "Rose Marie"? What arrangements, too; also "Langes" arrangement of "Oriental Phantasy"! Today the cry seems to be how few players can be engaged; so we get five or six pitifully trying to sound like a band. Then folks say: "Oh, that horrible jazz!"

Of the list given, I should unhesitatingly put Bertini on top. I was unfortunate enough to write and tell the B.B.C. so.

Finally, I do not know of anything that annoys me or lowers the standard of dance music more than bands (or apologies) that play choruses only. When one hears the lovely arrangements Bertini used to play, it is awful to have to hear *bare* choruses thrashed through again and again—often without change of key, even. I wonder what people would say if they bought a *record* playing all choruses? Yet they put up with it from the B.B.C.

F. E. W. (Hitchin).

Simplicity

SIR,—I was much impressed with a letter published in a recent issue of AMATEUR WIRELESS under the heading "A Plea for Simplicity." Your correspondent "hits the nail" in his remarks concerning the almost prohibitive cost of the up-to-date set (kit or otherwise).

I have a three-valve set, two years old, not factory built, that will give ample volume for a B.T.H. C2 type loud-speaker, on a maximum of 60 volts H.T.

Regarding purity and ease of handling, I believe it to be superior to a well-known S.G. set employing a voltage of 120.

My aerial is not more than 45 ft. in length, and 90 per cent. of this is indoors. **B. (Gosport).**

Are We Progressing?

SIR,—In reply to L.M.B. (Romford), the V24's were G.P. valves of 20,000 ohms resistance and an amplification factor of 6; poor according to modern standards, but remarkably sturdy, and not subject to the tantrums of modern "hot-house" valves. I did not give any particulars of the transformers, for the simple reason that I never knew any; they were lifted *en bloc* from an R.A.F. (?) instrument panel. The proneness of overloading (if any) of the Primax was not in evidence, because I was not, and am not, one of those who think that

quality is dependent upon volume. I have heard M.C. speakers that appeared, at a distance, to be most attractive on orchestral items, but which on speech resembled nothing so much as the "wafflings" of some prehistoric half-man, as one might imagine them: a sure sign that the quality on music was illusory.

Granted that there are amplifiers and speakers capable of giving superior reproduction to the arrangement which I described (which I did not, nor do I, deny), L.M.B. himself says that "they are few and far between." I was naturally referring to the output of the average set, which I still maintain is poor, due to too much theory and too little practice, too much striving after amplification and too little attention to the real value of the final product.

I am prepared to admit that my present set—S.G., det., L.F., and push-pull output, using 150 volts H.T. accumulator, and a special speaker of my own design with balanced armature unit—approaches very near to the old ideal; but it was the manifest disparity between the two sets and the actual results obtained which inspired my previous letter.

P. (London, S.E.).

Interference

SIR,—Regarding "Thermion's" paragraph, "A Heterodyne Question," in AMATEUR WIRELESS of October 19, I find things in my locality quite as bad as his friend finds them from the south coast.

The Prague Plan, from my point of view, is far worse than the older one. Radio Toulouse, as mentioned, is heterodyned, faded, and munched badly. Turin, which I used to receive first class, is blotted out completely; in fact, it is almost impossible to get any station clear on the medium band.

My last set was the "Bantam," on the dial of which I logged twenty-nine foreigners at full loud-speaker strength, clear of all interference. Now, on the "Britain's Favourite Three" (which I consider is an even better set) I cannot log four with any degree of certainty and free from mush, etc.

Now for the titbit. 5GB is smashed to smithereens for about half an hour each night and afterwards messed up with morse. I have had P.O. engineers, and their diagnosis is "German amateur" whose C.W. and gramophone records, etc., cause an appalling wipe-out round about

5GB. Surely something could be done to stop it. B. (Nottingham).

The Regional Scheme

SIR,—I have read the article headed "Is the Regional Scheme Possible?" in a recent issue of AMATEUR WIRELESS, by R. W. Hallows.

This and many other articles I have read which deal with the effect of the Brookmans Park transmitter appear to be written solely by listeners in the London area.

Mr. Hallows stresses the great strength of the new transmitter and the wipe-out effect on Continental stations, and suggests already that a decrease in power is the solution.

Do these writers ever spare a thought to the many listeners in places remote from London, who, like myself, have for years been largely confined to transmissions from 5XX, with occasional rare reception from one or two of the main broadcast-band transmitters, and who have noted as time went on how these stations have been wiped out by the ever-increasing power of Continental stations? How often we have hoped that in time our own stations will increase their power, and so permit us some share of the opportunities that our London friends have enjoyed since wireless transmission began.

Now, after waiting patiently, and incidentally paying just as patiently, to realise some of these advantages, we read that these same London listeners may be prevented from listening-in to a few Continental stations, and that, as outside listeners apparently do not count, the real attempts which the B.B.C. is now making in the interests of all should be squashed almost before they begin.

I would strongly suggest that if Mr. Hallows finds difficulty in tuning-in other stations between 356 and 479 metres without background from either 5GB or Brookmans Park, then his receiver must be decidedly unselective and that it must be just as impossible for him to tune in either of the two English stations mentioned free from interference from the French and German stations working on the wavelengths mentioned.

I suggest, sir, that you invite the opinions of your many readers who live remote from London on these questions and consider this is necessary in fairness to the B.B.C., which is making a genuine attempt to give satisfaction to so many of their listeners who in the past have been handicapped by the low power of our stations on the broadcast band.

I ought, perhaps, to mention that the new transmitter is received here at splendid strength using a five-valve receiver with two H.F., det., and two L.F., although subject to occasional fading and that even while this is being received at full loud-speaker strength it is easily possible to tune in Graz at 352 metres and Stuttgart at 260 metres with only a faint background from Brookmans Park.—H. H. (Carlisle).

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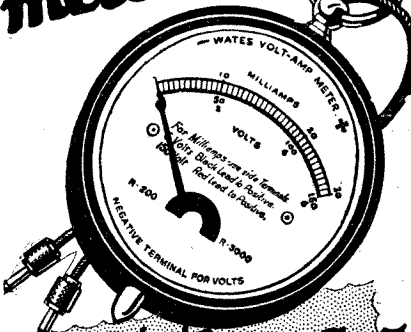
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"THE PENTODE AS A DETECTOR"

(Continued from page 729)

with a relatively small voltage on the detector. This may be obtained in two ways. We may either place the full voltage on the anode of the valve and reduce the voltage on the priming grid or, alternatively, we may reduce the voltage on the whole valve, connecting the priming grid to the anode as usual. Of the two methods, the former is preferable, since it gives us rather sharper characteristics, and a voltage of about 15 volts is found to give suitable results with 100 to 120 volts on the anode. A suitable pentode detector circuit, therefore, is as shown in Fig. 2, and details will be given next week of a simple testing set which may be easily made up.

Sensitive as Leaky-grid

The discussion of the merits of the pentode valve will be continued further next week, when the operation of this testing panel will be described. Some points, however, may be given at this stage to indicate whether the pentode is a desirable detector or not. Experiments indicate that, used under proper conditions, it makes a very suitable class of detector. It has a sensitivity comparable with that of the grid detector, i.e., several times as great as the anode detector. At the same time, it does not introduce anything like as much damping into the tuned circuit preceding it. The damping, indeed, is of the same order as is customarily introduced with an anode-bend detector, so that we have in the pentode an arrangement which enables us to compromise between the two types of circuit and to obtain the sensitivity of the grid detector with the relatively small damping of the anode-bend arrangement.

There is one point which, although comparatively small, is worth making clear. One is accustomed to associate the word pentode with high current consumption. Used as a power valve, this is usually the case, for with the average run of pentodes the current consumption is in the neighbourhood of 20 milliamps. Some readers, therefore, may feel chary of utilising such a valve as a detector, particularly if perhaps they are already using a pentode in the last stage as an output valve.

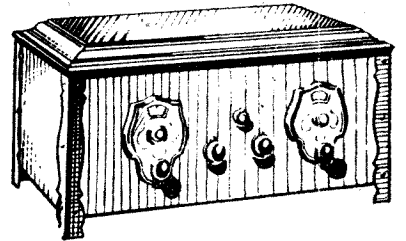
There is no reason for this fear, however, because, in order to use the valve as a detector, we place such a large negative bias on the valve that the current is reduced to something less than 0.1 milliamp. under the steady conditions; so that the pentode detector takes no more current than a grid detector, even allowing for the small current taken by the priming grid.

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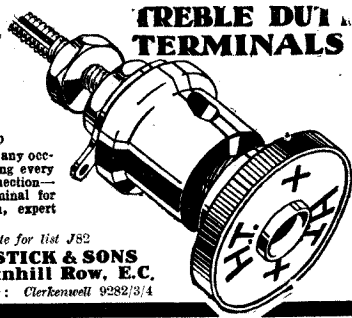
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CASSELL'S 3/6 net

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(Continued from page 717)

for if the chassis is mounted in the way suggested very much better reproduction is obtainable as a rule than when it is fixed directly to the baffleboard.

With units, however, such as the Blue Spot and Wates "Star," vibrations are so powerful that resonances may still be noticeable, due to the vibrations set up in the ring in which the cone is suspended and the struts that connect it to the plate upon which the driving unit is mounted. These can be prevented to a very large extent by taking two pieces of thin india-rubber such as is used in schools, drilling a hole through each and using them as absorbent washers between the driving unit and the frame when the fixing screws are driven in.

It is perhaps inadvisable to leave an air gap between the ring of the cone chassis and the baffleboard, for this may give an opportunity for circulating waves to make their unwelcome way round from the front to the back of the cone. This difficulty is easily overcome by cutting out a ring of thick felt, such as is used for laying under carpets, and glueing it to the back of the baffle.

In a following article various types of driving unit will be considered and we shall see how important it is that the receiving set itself is capable of giving them a fair chance of showing what they can do in the way of reproduction.

The General Electric Co., Ltd., opened a new branch at Magnet House, 3 Campbell Street, Leicester, recently. Mr. W. J. Hodgkins, of the Birmingham branch, has been appointed manager. The telephone number is Central 58778 and the telegraphic address "Electricity."

With reference to the advertisement of the P.D.P. Company in "AMATEUR WIRELESS" for October 26 and November 2, the address of this firm should read 121 Cheap-side, London, E.C.2, and not 21 as inserted.

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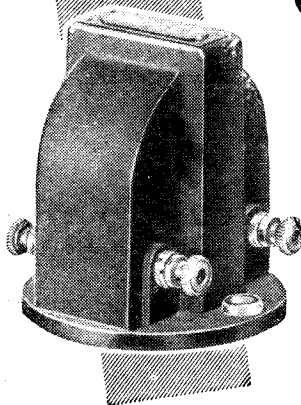
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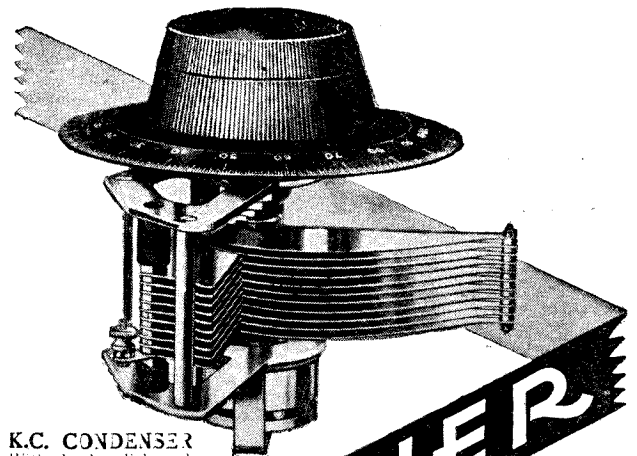


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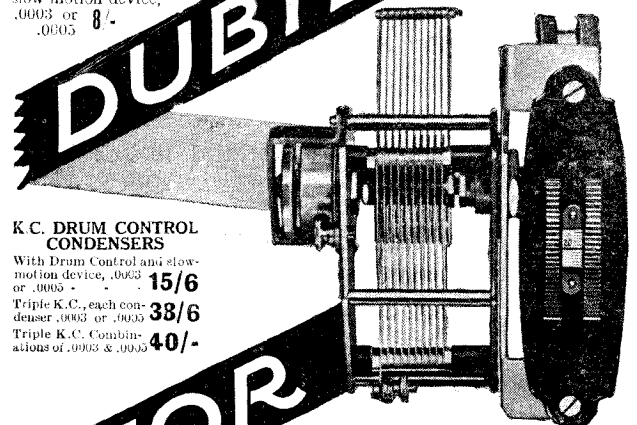
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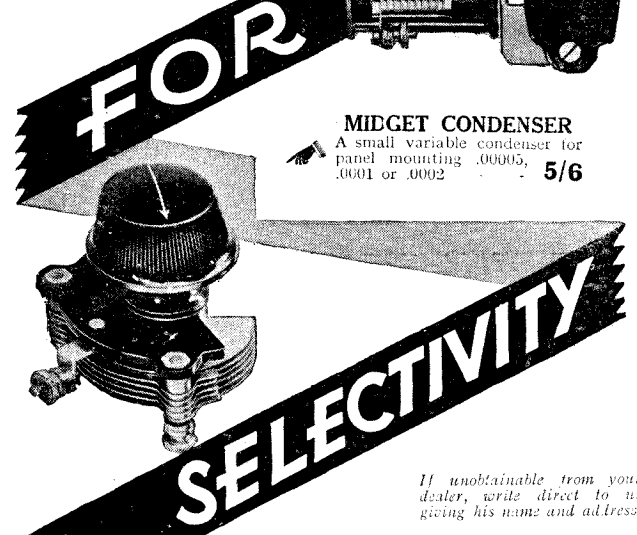
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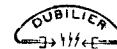
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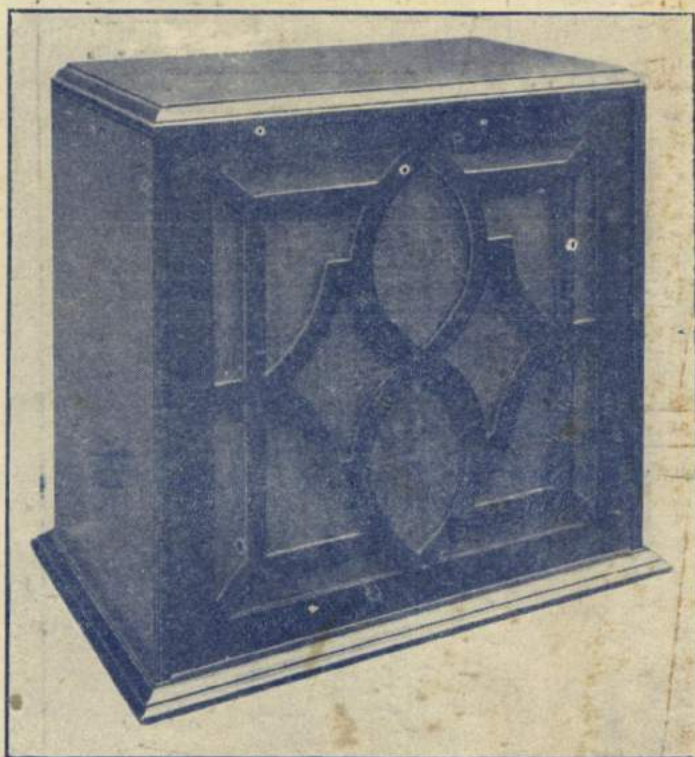
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