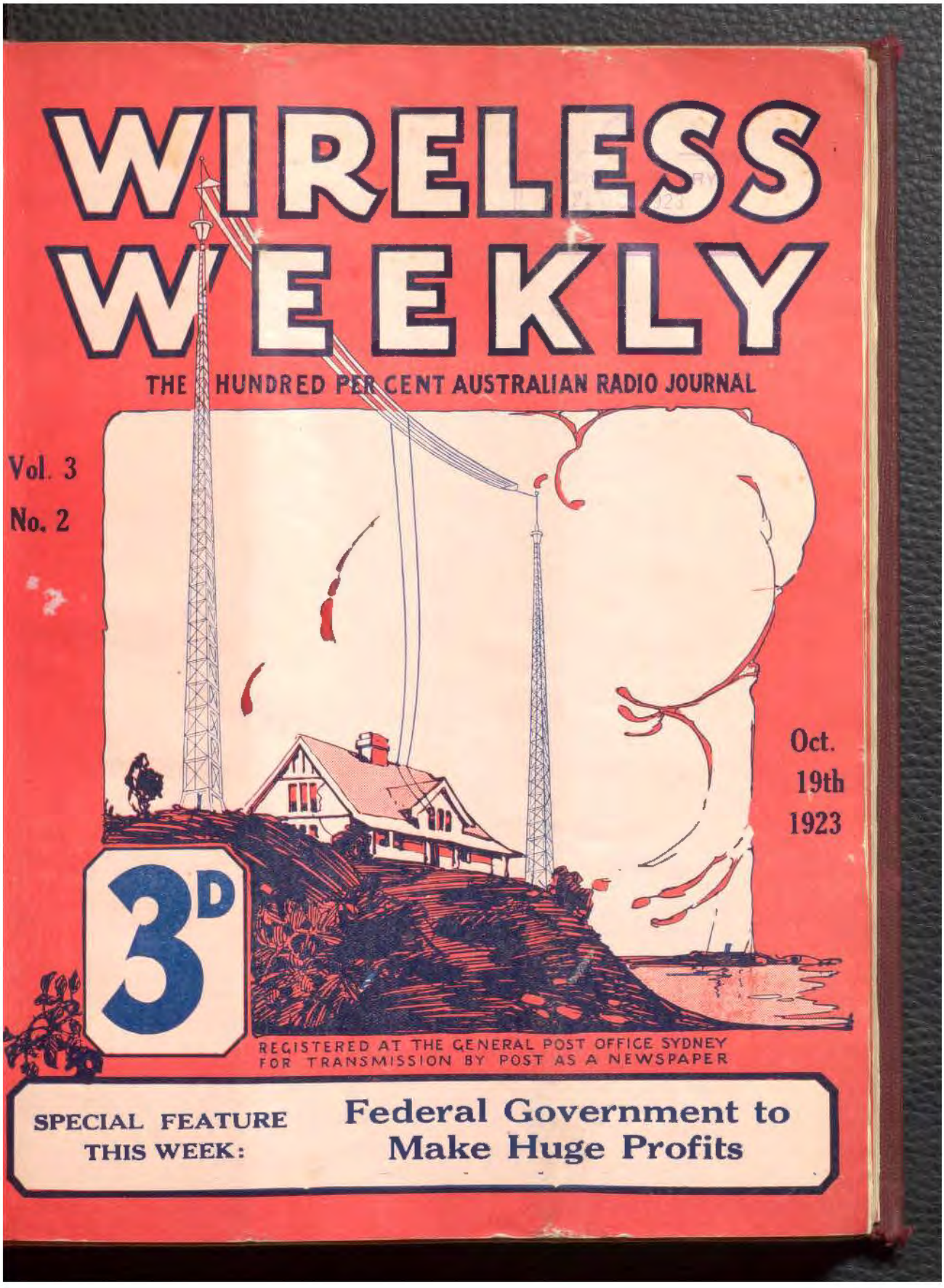
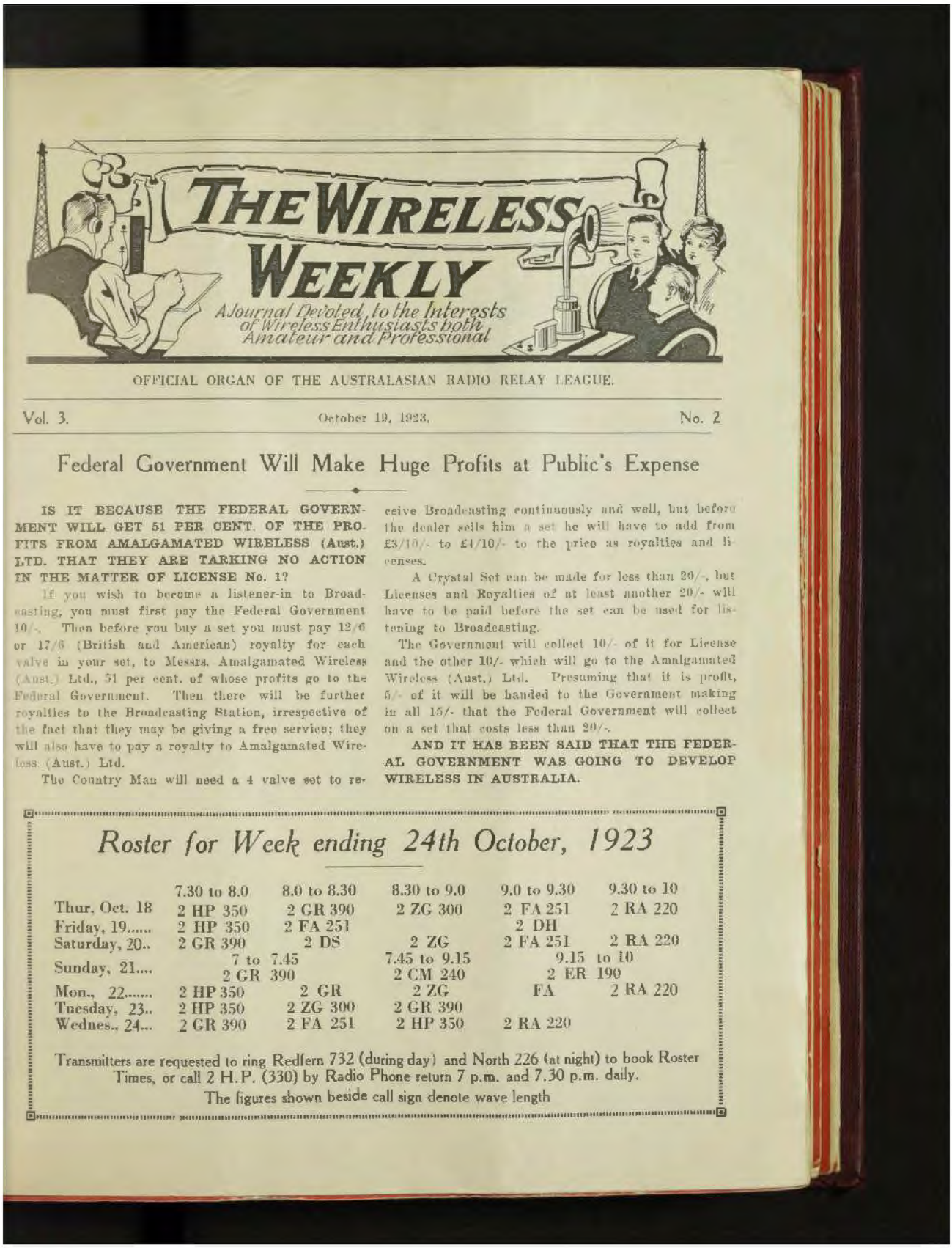




THE WIRELESS WEEKLY

A Journal Devoted to the Interests of Wireless Enthusiasts both Amateur and Professional

OFFICIAL ORGAN OF THE AUSTRALASIAN RADIO RELAY LEAGUE.

Vol. 3. October 19, 1923. No. 2

Federal Government Will Make Huge Profits at Public's Expense

IS IT BECAUSE THE FEDERAL GOVERNMENT WILL GET 51 PER CENT. OF THE PROFITS FROM AMALGAMATED WIRELESS (Aust.) LTD. THAT THEY ARE TARKING NO ACTION IN THE MATTER OF LICENSE No. 1?

If you wish to become a listener-in to Broadcasting, you must first pay the Federal Government 10/-. Then before you buy a set you must pay 12/6 or 17/6 (British and American) royalty for each valve in your set, to Messrs. Amalgamated Wireless (Aust.) Ltd., 51 per cent. of whose profits go to the Federal Government. Then there will be further royalties to the Broadcasting Station, irrespective of the fact that they may be giving a free service; they will also have to pay a royalty to Amalgamated Wireless (Aust.) Ltd.

The Country Man will need a 4 valve set to receive Broadcasting continuously and well, but before the dealer sells him a set he will have to add from £3/10/- to £4/10/- to the price as royalties and licenses.

A Crystal Set can be made for less than 20/-, but Licenses and Royalties of at least another 20/- will have to be paid before the set can be used for listening to Broadcasting.

The Government will collect 10/- of it for License and the other 10/- which will go to the Amalgamated Wireless (Aust.) Ltd. Presuming that it is profit, 5/- of it will be handed to the Government making in all 15/- that the Federal Government will collect on a set that costs less than 20/-.

AND IT HAS BEEN SAID THAT THE FEDERAL GOVERNMENT WAS GOING TO DEVELOP WIRELESS IN AUSTRALIA.

Roster for Week ending 24th October, 1923

	7.30 to 8.0	8.0 to 8.30	8.30 to 9.0	9.0 to 9.30	9.30 to 10
Thur, Oct. 18	2 HP 350	2 GR 390	2 ZG 300	2 FA 251	2 RA 220
Friday, 19.....	2 HP 350	2 FA 251		2 DH	
Saturday, 20..	2 GR 390	2 DS	2 ZG	2 FA 251	2 RA 220
Sunday, 21....	7 to 7.45 2 GR 390		7.45 to 9.15 2 CM 240	9.15 to 10 2 ER 190	
Mon., 22.....	2 HP 350	2 GR	2 ZG	FA	2 RA 220
Tuesday, 23..	2 HP 350	2 ZG 300	2 GR 390		
Wednes., 24...	2 GR 390	2 FA 251	2 HP 350	2 RA 220	

Transmitters are requested to ring Redfern 732 (during day) and North 226 (at night) to book Roster Times, or call 2 H.P. (330) by Radio Phone return 7 p.m. and 7.30 p.m. daily.

The figures shown beside call sign denote wave length

Combined High and Low Frequency Amplifier

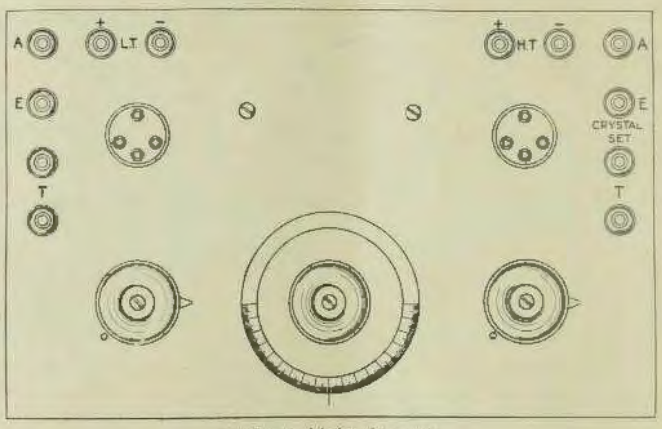
For Adding to a Crystal Receiver

This instrument has been specially designed to meet the requirements of the listener-in, who has become accustomed to the operation of the crystal receiver, and is desirous of experimenting with valve apparatus. The design given is so arranged that it does not become necessary to scrap the crystal set, which is made use of in its entirety.

When the need is felt for an amplifier to be added to a crystal receiver, one is sometimes in doubt as to whether to adopt high or low frequency amplification. In considering the merits of each system it is obvious that while high frequency amplification will extend the range of reception and low frequency will only render somewhat stronger, signals already audible, that a combination of both high and low frequency amplification is necessary to give good reception under varying circumstances.

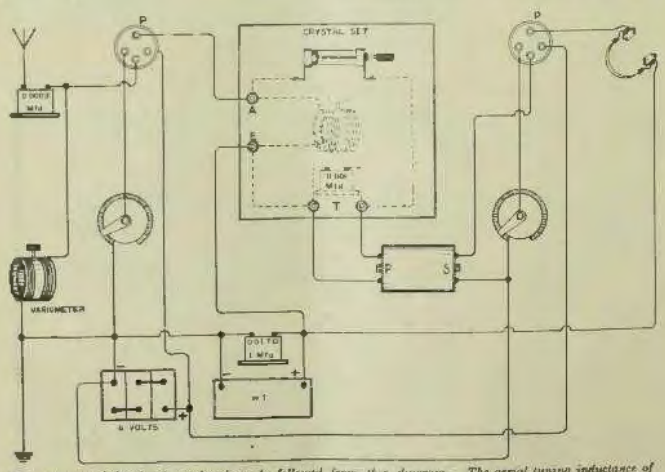
The crystal detector is well known to give better results than a detector valve, whilst the tendency of the high frequency amplifier to be introduced, to self-oscillate, compensates for the absence of any direct reaction coupling.

Thus, the arrangement under description is equal to any three-valve receiver, whilst no alteration is necessary to the tuning circuit of the crystal set.



Scale drawing of the face of the panel.

The principle of the instrument embodies the introduction of a tuned aerial circuit comprising fixed condenser and variometer. A valve is arranged as a high frequency amplifier connected on the tuned anode principle, and makes use of the variometer, or tapped or sliding contact inductance, of the crystal set. The crystal still functions as the rectifier followed by a note magnifier connected up through a low frequency transformer. No attempt is made to feed back for the purpose of producing dual amplification, as it is well known that there is no arrangement capable of easy manipulation in which improvement is obtained in signal strength on wave lengths below 400 metres.



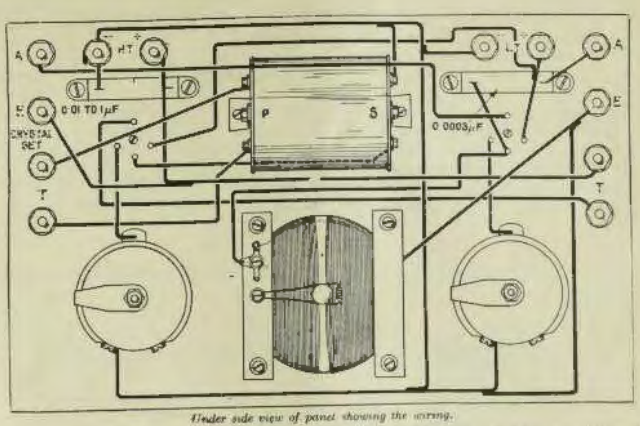
The principle of the circuit employed can be followed from this diagram. The aerial tuning inductance of the crystal receiver is used as the tuned anode coil. If it is not desired to go to the trouble of incorporating the components into a complete instrument they may be set out as shown and secured to a base board.

An ebonite panel 5-16 ins. in thickness is employed to carry the component apparatus and measures 11½ ins. by 7¾ ins. A variometer for aerial tuning is arranged in the centre lower half of the panel, and on either side are the variable filament resistances. Between the valve holders, which are above the resistances, is an intervalve transformer. The latter must be of the highest grade procurable, and it should be ascertained when purchasing that its windings consist of no

less than 30,000 turns. A high step-up ratio is not required, particularly when the primary is connected in series with the crystal detector, as in the present case, and transformers can be procured having a turns ratio of about two to one. The method adopted for attaching the components to the panel is not dealt with as their dimensions, and thus the location of holes, varies according to the types procured. It is quite easy for anyone possessing a hand brace, an assortment of twist drills, and a few taps to effectively mount the components on the panel. In addition to the parts already mentioned two condensers will be required, one having a value of between 0.01 and 1 microfarad and another 0.0003 microfarads and also twelve terminals. In selecting the latter it is advisable to have those of medium size. Small terminals not only to look unsightly on a large panel, but are not convenient for making connections.

Wiring up may be carried out either with No. 20 S.W.G. copper wire (tinned if preferred) and insulating tubing, or with No. 16 or 18 S.W.G. bare wire. The diagram of the under side of the panel only indicates the points between which leads are to be run, and the approximate route they should take, depending of course on the space occupied by the components. If bare No. 16 wire is used, as is an excellent arrangement, careful consideration must be given to the right-angle bends necessary to give good spacing to the wires as they cross over one another. It is better to solder to the terminals (not, of course, the transformer terminals) than to hold the wires under the nuts. Remember that a good hot clean iron is the secret of successful soldering. Do not keep the iron too long in contact with the parts to be soldered, or they will get overheated and burn the panel. If the solder will not run, the iron is either dirty or not hot enough. As each lead is put in, run a pencil line on that lead in the diagram. Suitable box work can be constructed to house the apparatus on the under side of the panel. A fillet along the front and back edges of the inside can be arranged to support the panel just a little raised above the top of the box.

Before connecting up it is necessary to verify the circuit to which the crystal receiver is wired. In a few cases a small fixed condenser



Under side view of panel showing the wiring.

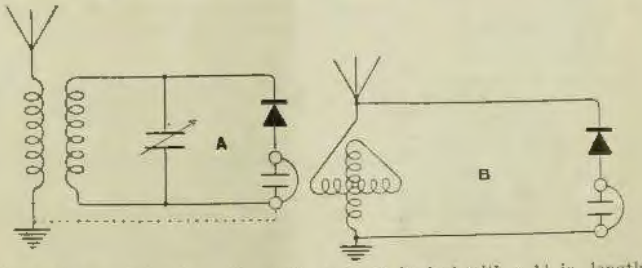
will be found connected between the aerial terminal and the inductance, in which case it must be short-circuited. The crystal and telephone terminals of the crystal set should be connected as shown in the diagram, and if the telephone terminals are not bridged with a small fixed condenser, one having a value of 0.001 microfarad must be connected across the "T" terminals (crystal set) of the amplifier.

The operation of the amplifier in combination with the crystal receiver, is quite simple in view of the fact that there are only two tuning adjustments to be made. These must be varied more or less simultaneously, and a few hours spent in adjusting the outfit will readily reveal the necessary settings for producing really good reception.

A Variometer Loose Coupler.

An Article describing a simple but extremely useful piece of apparatus

Two cardboard formers C and D, each 2 in. long and 2 in. and 2½ in. in diameter respectively, are provided at one end with wooden discs B and E secured to the insides with



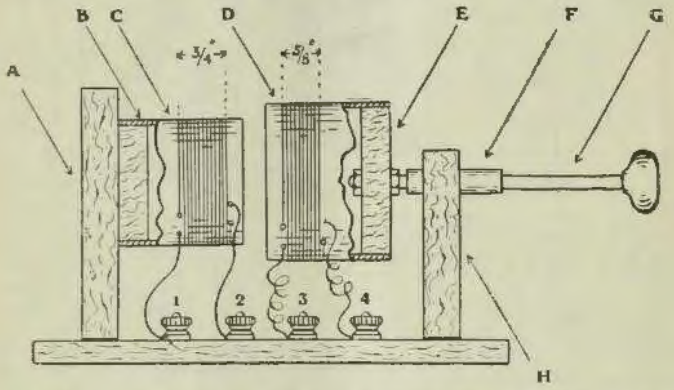
a little glue or by means of small screws.

A hole is drilled through the centre of the larger disc E to accommodate the end of a 3/16 in. round brass rod G which is firmly clamped to same by means of two nuts.

The small disc B is attached to an upright support A, 2½ in. by 4 in. and about ½ in. in thickness. A piece of ¼ in. square wood H, 3 in. long, is drilled through at ¼ in. from the top and bushed with a 1½ in. length of brass tubing F large enough in internal diameter to slide smoothly over the rod. This is made a "friction tight" fit in the wooden support and if necessary it may be smeared with a little secotine

before placing it in position. The rod which is now attached to the pushed through the tubing and a small wooden knob or disc is fitted to the end as shown.

Next prepare a baseboard 7½ in. long by 3½ in. wide and about 3/8 in. in thickness and fit four ordinary terminals along a straight line near one edge. Obtain about six ounces of No. 34 D.C.C. wire and wind on three-quarters of an inch



on the former C, keeping each turn disc E carrying the former D is tight against the next, commencing on the left (nearest support A) and winding in a clockwise direction. Connect the beginning of the winding to terminal No. 1 and the end to No. 2. Wind the other coil in exactly the same way, commencing at terminal No. 3 and finishing at No. 4. Five-eighths of an inch of winding is sufficient for this coil.

It will be necessary to make small spirals or solder on short lengths of soft flexible wire to permit the sliding movement of the coil. Now secure the supports A and H to the baseboard in the approximate position shown in the diagram, and the instrument is complete. Connected as shown it may be used as a loose coupler, the terminals 1 and 2 representing the junctions of the primary coil and 3 and 4 the junctions of the secondary.

In this case the aereial lead-in would be connected to No. 1, the earth lead to No. 2, the crystal cup to No. 3, and one of the phone terminals to No. 4, as shown in circuit diagram A. Better results are sometimes obtained by earthing this terminal as shown by the dotted lines. The variable condenser should have a capacity of .0003 mfds. and it is advisable to provide another of the same capacity across the aerial and earth.

Now if the terminals 2 and 3 are bridged with a piece of copper wire the instrument is instantly converted into a variometer. In this case the aerial lead-in goes to No. 1 terminal and the earth lead to No. 4 as shown in the circuit diagram B.

A small S.P.S.T. switch could be conveniently connected in series with Nos. 3 and 4 terminals.

A MEMORABLE FEAT.

More messages were sent and received in one day than any twenty-four hours radio traffic between the States and any one European country, and on the fifth and last day of voyage the simultaneous duplex sending and receiving outfit was used.

The heat wave was at its height, and atmospheric conditions caused abnormal static. To overcome this, the Cape Cod station was entirely given over to the "Leviathan's" traffic, its usual European activities being diverted to another station. This necessitated increasing the vessel's power and wave length from 2 kilowatts and 1600 metres to 20 kilowatts and 16,600 metres.

The cost of this little diversion was some 2,000,000 dollars. The public, especially in America, was keenly interested in the voyage of the "Leviathan," and therefore Press messages received first attention. Two of the "Leviathan's" lifeboats are completely equipped with radio.

The Management of Crystal Receivers.

HOW TO INCREASE SIGNAL STRENGTH.
(By J. DECOMADE.)

In a valve set the strength of the received signals can be controlled by increasing the number of valve amplifiers in use. If a single valve will give a tolerably clear note in the head-phones, the addition of one or more note amplifiers is always sufficient to increase the volume of sound up to the point of operating a loud-speaker.

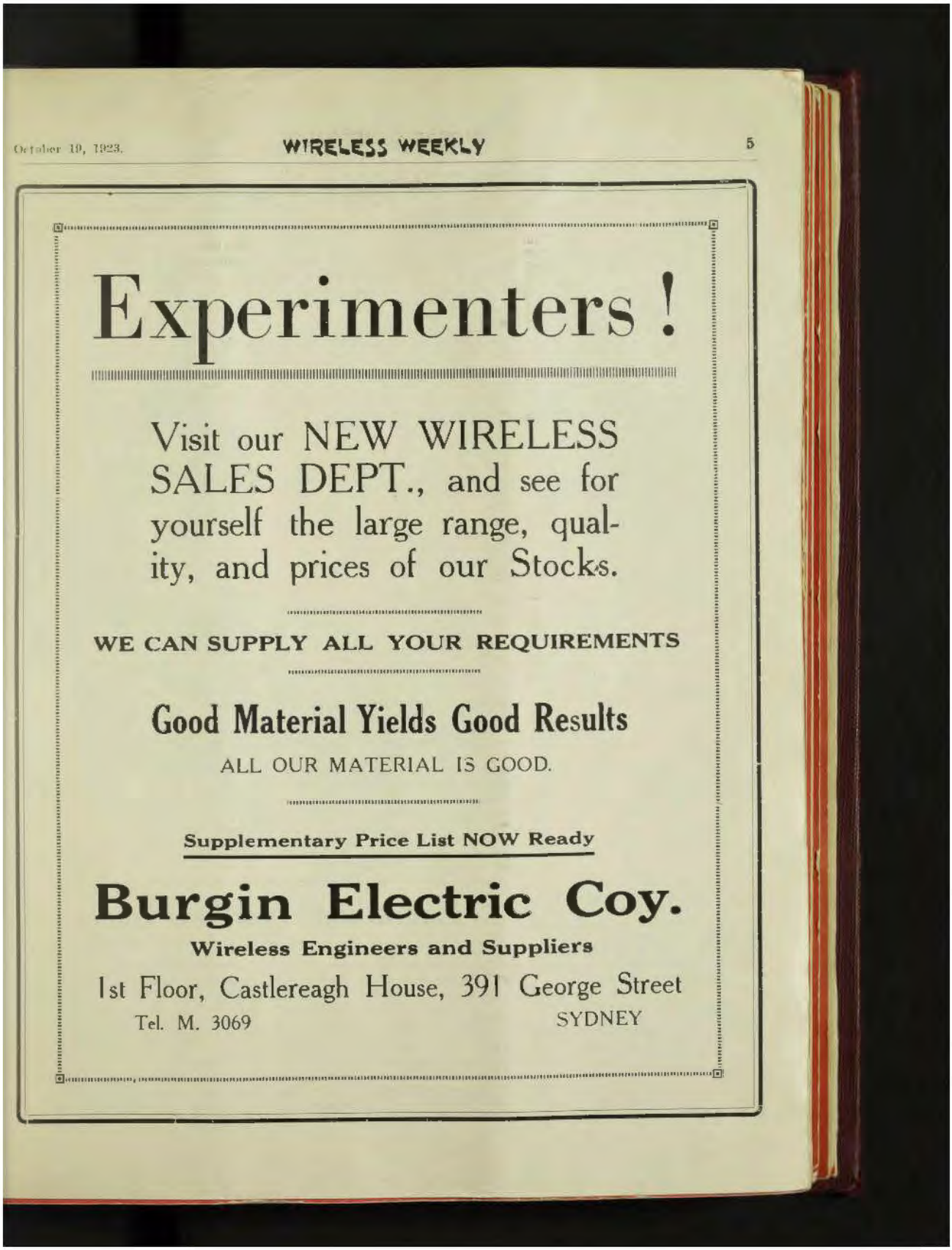
With a crystal set, on the other hand, no amplification is possible. The intensity of sound in the telephones is strictly limited by the actual amount of energy picked up by the receiving aerial. In these circumstances it is obviously important to make the best possible use of whatever energy is available, and to see that none of it is wasted unnecessarily.

In the first place the aerial circuit should be accurately tuned to the signal wave length. Where a wide range tapped inductance coil is used in combination with a variable condenser, care should be taken to short circuit, or, if possible, disconnect the unused end of the coil so as to avoid "dead-end" effect.

For a given wave length the maximum signal strength is obtained when the condenser reading is small. For instance if the signals are first picked up on inductance stud No. 5 with the condenser reading about 120 degrees the switch handle should be moved over Stud No. 6 and the condenser reading brought down to a corresponding lower value, say, 20 degrees or 30 degrees, which can always be done if the inductance coil has a sufficient number of tappings. The reason for this procedure lies in the fact that a crystal is a voltage operated device. Maximum voltage is thrown across the crystal when the aerial circuit contains a large value of inductance shunted by a small value of capacity. The crystal is then operating with optimum efficiency and signal intensity is at its best.

* * *

The variometer type of winding



(without condenser) is undoubtedly the simplest and most efficient tuner for broadcast reception. The essential "tuning capacity" is in this case provided by the mutual electrostatic action between adjacent windings on the coil and is comparatively small in value. The broadcast programme is in most cases the chief item of interest, and although the tuning is "broad," signals will be received with maximum clearness on this type of coil when the latter has just the right amount of inductance and capacity —no more and no less—combined with the minimum of ohmic resistance. Therefore it is advisable to wind a special "fixed" coil solely for use with whatever particular broadcast station is within range. This, of course means that a separate rotary or variable coil must be used when it is desired to pick up other signals, such as ship's Morse or amateur telephony, but it is a simple matter to substitute one tuner for the other when necessary.

With a standard outside aerial 100 feet in length, the London Station, 2L.O, will be received with maximum strength on a "fixed" tuner of this kind made from a disc wound with 40 to 44 turns of No. 24 D.C.C. wire, starting from an inner diameter of 1 1/4 inches. With such a "tuner" there is no superfluous wire in the aerial circuit to add unnecessary resistance, and there is no necessity for any adjustment. It is impossible to specify the exact number of windings required, owing to minor variations in different aerials, even when of standard length. It will, however be found to lie very near to forty turns. The exact adjustment is easily found by adding subsequent turns one at a time.

* * *

Another source of energy loss lies in crystal itself. It is often difficult to know when one has found the most sensitive available spot. If signals are coming through with reasonable strength, one often hesitates to disturb the "catwhisker" for fear of losing the "substance" for a "shadow." For this reason it is a good plan, particularly with Hertzite and similar "soft" crystals, to use a small bundle of very fine wires in place of the usual single "catwhisker." Not only is it easier to strike a sensitive spot with this arrangement, but in most cases it will be found that several of the wires are each feeding separate sensitive spots and are therefore acting in parallel to pass a greater supply of current through to the phones.

With Hertzite a very light contact should be aimed at. In fact very good results can be secured by using a small slice of copper foil resting lightly on the side of the crystal, instead of the ordinary wire "catwhisker."

It is also advisable to wrap the crystal tightly round with tin foil and to pack it firmly in the cup in this fashion. The fastening screws usually provided are frequently insufficient to provide a large surface of contact between the crystal and the cup, and this is essential if the crystal is to rectify with maximum efficiency. Alternatively the crystal may be permanently fixed in the cup by means of Wood's metal. This, however, prevents the crystal from being turned around from time to time in order to expose fresh surfaces to the catwhisker, and from this point of view is not so convenient as the former arrangement.

Next there is the aerial itself. The high potential end should be carefully insulated from the mast or support. It frequently happens that a convenient tree is used in place of a specially erected pole. If this is so particular care should be taken to se that the aerial wire does not make contact, beyond the insulators, with any overhanging branches or leaves. Such contact would be quite sufficient, especially during wet weather, to "earth" most, if not all, of the high frequency signal currents through the wrong end of the aerial, so that practically nothing passes through the crystal and the phones.

There is very little advantage in using a double aerial, unless the available space is restricted. The difference between the signal strength obtainable on a crystal set with a double aerial 80 feet long is in practice about the same as that picked up with a single wire 100 feet in length. Where the full 100 feet stretch is available, a double aerial is only justified when the receiving station is near the limit of crystal reception.

Finally, the "earth" is a frequent source of trouble. Gas-pipe earths are not to be recommended. The joints between adjacent lengths of piping are usually made with red lead which has a high resistance. Connecting the earth lead to a water pipe will usually result in louder signals, but the best method is to use an outside "earth." Quite apart from forming a more efficient aerial circuit, there is the added security that, in case of the aerial being struck by lightning, an outside earth give a discharge path where no damage can ensue.

The cheapest and simplest outside earth plate is made from a piece of old wire netting. Ten or fifteen feet of this is rolled or bundled up into a mass roughly two feet square, and buried about a foot deep in moist earth. If the only ground available is inclined to be dry an occasional bucket of water will improve matters. Four iron spikes should be driven into the ground at each corner of the hole containing the wire netting, and these should be joined together and to the wire netting by copper wire. The earth lead is finally connected to one of the corner spikes by means of a metal clip. An "earth" of this kind can always be depended upon to give excellent results. It is, moreover, easily constructed from materials usually ready to hand or, at all events, easily procurable at a very small cost.

Engraving Radio Panels.

The amateur who constructs his own apparatus is often at a loss for a method of suitably identifying the various terminals and other items on the face of the panel. In the majority of cases where the apparatus has been constructed in a neat and workmanlike manner, the owner is unwilling to try his hand at engraving for fear of spoiling the appearance of his instrument.

When it is remembered that many a receiving set is valued in hours and hours of patient labour, this reluctance is understandable. Of course, the lettering can be marked on by a jeweller or other skilled workman, but this is, in many cases an expense that cannot be undertaken.

With a little practice and given some patience it is within the ability of any amateur who is able to construct his own set to engrave

THE WORLD'S OLDEST WIRELESS MESSAGE

The happy wish to him across the sea.

the panel. As this panel is to be the outward and visible sign of the labour which has been spent on the whole of the apparatus, it is surely worth while giving a little time to it, and thus ensure a workmanlike finish to the complete instrument.

The method described here has been tried with success many times, but in order to ensure neatness on the panel itself, those who experiment with this method are advised to try it out first on scrap pieces of ebonite.

Draw with a lead pencil, preferably a fairly soft one, the required letters or figures on the face of the panel. The actual engraving should be done with a fine steel point, such as the point of a pair of dividers.

The dividers should be wrapped with some material so that they may be held when hot. The point then should be heated in the flame of a spirit lamp.

The letters may then be engraved on the panel, care being taken that the point of the dividers is not made too hot, otherwise the ebonite may be scorched and the finished lettering present an untidy and ragged appearance.

The required heat may best be found by experiment upon spare ebonite before any attempt is made upon the panel itself.

As a rough guide it may be stated that the heat of the steel point should not be more than sufficient to engrave one letter at a time.

In order to draw the letters neatly, make two parallel lines about an eighth of an inch apart as a guide, and space the letters evenly.

A suitable filling can be made by mixing clear gum and powdered white chalk into a smooth paste. This paste should be smeared on the panel around the letters, and before it has time to dry should be rubbed off with a soft cloth. Just sufficient paste should be left in the letters to show up clearly, without the paste being thick enough to remain raised above the panel. This filling should also be practiced on spare pieces of ebonite.

A RADIO WEDDING.

The authorities at the station WOR, Newark, N.J., are eagerly awaiting word from radiophans in the Hawaiian Islands and France. For recently a wedding ceremony was broadcasted from this station, when Colonel King Stanley, a former Indian Scout, was united to Miss Grace A. Raymond. The bridegroom was seventy years of age, whilst the bride was forty-five.

An Exceptional Single Non-Regenerative Tube Set.

This is essentially a home-made set. All details of construction are so fully and clearly presented that any boy novice should have no trouble in making it. It is designed solely for broadcast reception.

The remarkable results obtained with this single circuit tuner are largely due to restricting the wave-length range to the broadcast band through the use of a specially constructed inductance coil designed to minimise losses. The circuit is the conventional one shown in Fig. 1, employing a fixed inductance and

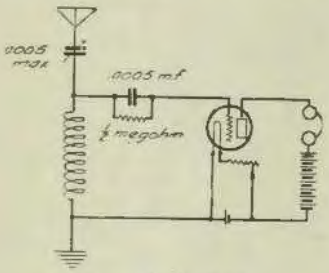


Fig. 1. Circuit Diagram

a variable condenser in series with the antenna, the coil being connected to the ground. The voltage for the grid is taken off the terminals of the inductance coil. Inasmuch as the tube detector is a voltage-operated device and will therefore give better signals the greater the signal voltage applied to the grid, it is preferable to take the voltage from the coil terminals rather than from the condenser. For in the resonance condition of the circuit the high frequency voltage across the inductance is equal to the combined voltages across the series condenser and the antenna capacity. Maximum voltage is thus obtained across the coil rather than across either of the capacities.

The actual proportioning of the condenser and inductance values was based on practical experimental results obtained on a number of average broadcast antennas working on the broadcasting wave lengths. These antennas ranged between 70 and 100 ft. long, about 40 ft. high, all of them being single-wire antennas. It will thus be seen that the receiver is essentially a broadcast receiver. The constructional details of the receiver parts follow:

The inductance coil is fixed in value and has 45 turns of No. 28 enamel wire wound on a 3 in. fibre tube, having a 1/16 in. wall. The coil is wound in a single layer and the ends held in position by drawing the wire through two small holes, No. 56 drill will do, drilled at each side of the winding as shown in Fig. 2. The wire should be held in place by the use of a thin layer of shellac. The ends of the coil

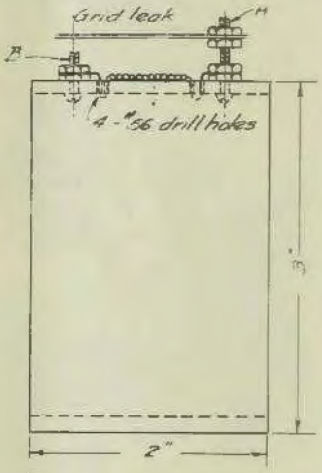


Fig. 2. Inductance Coil with Grid Leak and Condenser Mounting

winding are thoroughly scraped and tinned and then soldered to the posts A and B in Fig. 2. One of

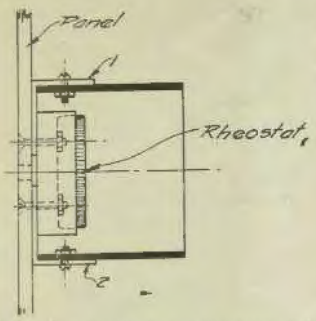


Fig. 3. Panel Mounting of Inductance Coil and Rheostat

these posts, A, is used for mounting the grid leak and condenser as seen in the same drawing. This post A is the common connection between inductance coil and grid leak. The grid condenser should be a 0.0005 microfarads capacity and grid leak should be ½ megohm. Any of the standard combination paraffined paper grid condensers and leaks may be employed.

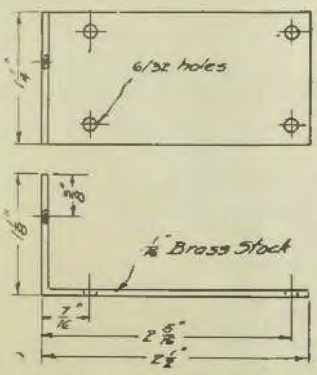


Fig. 5. Bracket for Mounting Tube Socket, 1/16 in. Brass Stock

The antenna series condenser should have a capacity of 0.0005 microfarads maximum. Any of the standard 23-plate condensers may be used for this purpose, care being taken that the condenser is well built, rugged, that it does not have a jumpy movement, and that it is well insulated. The panel is drilled for the condenser in the usual way and the condenser mounted on it.

The filament rheostat is the standard 6-ohm rheostat having a moulded knob with whitened indicator groove in the knob for noting the setting of the rheostat. In order to save space and avoid any extra drilling the rheostat and coil

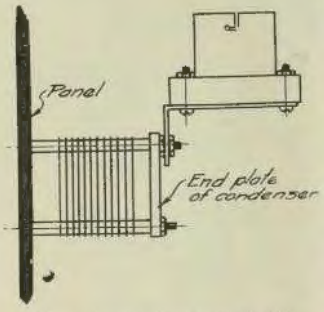


Fig. 6. Socket Mounting on Variable Condenser

were mounted on the panel as a single unit, as shown in Fig. 3. Two pieces of angle brass 1 and 2, details of which are given in Fig. 4 are secured to the sides of the coil by means of two 6/32 R.H. screws and nuts as shown. The rheostat is then placed inside the coil tube and the front end of the rheostat base, which is flat, is brought flush up against the other legs of the angle brass brackets in the manner shown in the sketch. The panel and angle brass are drilled so that the holes correspond with those in the rheostat and flat head 6/32 screws with nuts are used to fasten this combination to the panel. The rheostat is then seen to be inside the coil tube and takes no extra space. It is thus seen that the coil, grid condenser and leak, and rheostat comprise one unit. The mounting of the grid condenser on the brass screw post A provides an electrical connection automatically without the necessity of soldering an extra connection to the coil, which would otherwise be required.

The vacuum tube socket is mounted on one of the variable condenser posts by means of the brass bracket shown in detail in Fig. 5. One leg of the angle brass bracket is secured to one of the condenser posts by means of nuts as shown in Fig. 6, this having been found to be perfectly secure and rugged. The socket is then screwed down to the other side of the brass bracket by means of four screws.

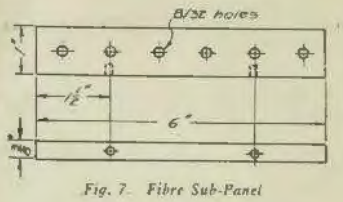


Fig. 7. Fibre Sub-Panel

The telephone binding posts are on the front panel. A sub-panel, made of 3/8 in. black fibre, in accordance with the specifications shown in Fig. 7, was fitted into a recess cut in the back of the cabinet and binding posts for antenna, ground, A and B batteries mounted on it. All connections, excluding telephones, were therefore made in the back of the set. All binding posts are the so-called "Read-Em" binding posts, that is, initialed to facilitate connections, as made by the Marshall-Gerken Co. Fig. 8 shows the rear of the cabinet and the manner in which the sub-panel is set in. The sub-panel is held down to the cabinet base by means of two flat-headed wood screws shown by the sketch.

All the wiring inside the cabinet is made with No. 14 bare copper and all wire connections soldered. The front panel which is made of composition hard rubber, the drilling lay-out which is shown in Fig. 9, is secured to the cabinet by means of

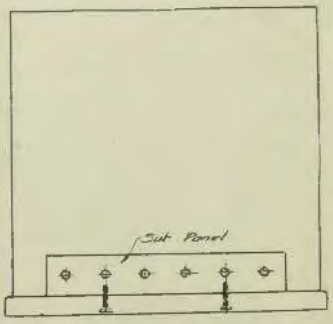


Fig. 8. Sub-Panel Mounting on Rear of Panel

four nickel plated screws screwed into four corner posts. The cabinet is made of birch wood with a walnut finish, and has door on the top, which may be opened by means of the metal ring. The vacuum tube

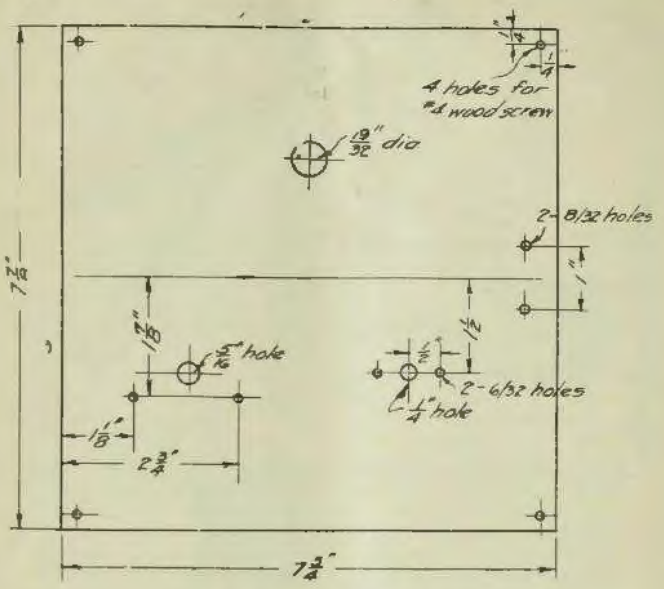


Fig. 9. Drilling Layout of Panel

is inserted into the socket through this door. In the upper centre of the front panel is a ruby jewel of the telephone pilot lamp type as ordinarily employed on telephone switchboards. This is placed directly in front of the tube, the light from the tube being transmitted through the glass lamp. This is an indication of whether the tube is burning and from the brilliancy of the light transmitted through the ruby jewel is an indication of how brilliantly the tube is burning. It also adds to the neatness of the set.

Operation is very simple, there being but two controls: (1) filament current control, and (2) wave length control, on right and left sides of the front panel respectively. The arrow on the panel above the filament control knob indicates the direction of rotation of rheostat for increasing filament current, the word OFF being the position where filament circuit is opened by the rheostat handle. The wave length setting for any particular station wil be indicated by the engraved line directly above the variable condenser dial.

This set brings in all the local broadcasting. It has, however, also given some unusual long distance reception for a single circuit non-regenerative set.

Intervalve Transformers

Continued from previous issue

IRON CIRCUIT.

With the completion of the design of the primary winding, the iron circuit, on which it has to be wound, next claims attention.

The conditions which are impressed upon the iron circuit are, except that the effect is magnetic, identical with those in the primary winding, from which it receives high-frequency magnetic impulses, which are subject to rapid variations, and whose strength depends upon the ampere turns in the coil.

The object of producing these magnetic impulses is to couple tightly the primary to the secondary winding of the transformer, without loss of efficiency. It is essential for pure transformation that such impulses shall be absolutely in synchronism with the current oscillations producing them, and have a wave form identical with that of the current oscillations.

The presence of any form of natural or super-imposed non-synchronous oscillatory magnetic impulses, or of reluctance in the iron circuit to rapid change of flux, or of an uneven rate of change of flux, will cause non-synchronous impulses and distortion of the wave form.

The ideal condition would be an iron circuit having a perfectly straight-line magnetising and demagnetising characteristic curve. Such an iron circuit is a practical impossibility owing to the hysteresis value of the iron, which even in the softest procurable Stalloy iron is appreciable at such a high impulse-frequency. Further, the degree of magnetism of the iron is all important, as too little, or too much iron, will set up ripples in the oscillation curve which at once give distortion.

Considering the case of an iron circuit working on the flat part of the upper end of the magnetising curve, the resultant wave of induction will be flat topped, and will set up a strong harmonic oscillation of three times the fundamental frequency, which will be impressed upon the fundamental oscillation and differ from it in phase by 180 degrees.

Such a condition will not only distort the signal being transmitted from the primary winding to the secondary winding, but will also affect the hysteresis of the iron circuit in so far that it will now have to deal with a secondary flux of treble the frequency of the fundamental flux, and 180 degrees out of phase with it. Such out-of-phase fluxes tend to neutralise the fundamental, and are responsible for the "fringe" on the articulation. Should the iron be worked on the flat portion at the foot of the curve, similar conditions will again present themselves, although in less marked form.

When making calculations for the design of the iron circuit, the magnetic inductance of the iron should be in the neighbourhood of 3,000 lines per sq. cm., which is on the steepest portion of the magnetising curve. At this point rapid changes in the frequency of the magnetic impulses can be obtained with the minimum of distortion or loss of efficiency from hysteresis.

Another source of distortion is from eddy currents in the iron which are eliminated to some extent by laminating the iron circuit. At these high frequencies, however, currents are induced into laminations of, say, 26 S.W.G. iron, of sufficient amplitude to cause ripples in the fundamental oscillations.

It is, therefore, of the greatest importance that when using shell-type laminations there shall not be a complete circuit of iron passing round the coil; but that the laminations to form the shell be in two portions, completely insulated from one another, and further that the laminations should be as thin as is practicable. The actual iron should have high magnetic powers, low hysteresis value, and high resistance.

The Amateur's Position

A Word of Warning

The purpose of this editorial is to point out that in our opinion the amateur should at this time take a very careful survey of the future, and see in what direction events are leading him.

We doubt if any genuine amateur can look back a few years without experiencing a feeling of honest regret at some of the changes which have taken place.

Formerly, the amateur devoted his whole attention to the furtherance and development of wireless, and when there arose the necessity for joint action on the part of amateurs in connection with any threatened encroachment on their rights, all were ready as one body to give the strength which unity alone can give to the voicing of their wishes, with never a thought of allowing private or personal interests to intervene.

Rivalry in enterprise is essential to progress, and healthy rivalry has contributed largely to the development made in the science of wireless; this is just as it should be. Every amateur should compete with other amateurs on the technical side but is there not at present time far too much petty rivalry in what may be described as the politics of wireless?

Instead of each amateur or group of amateurs having at heart, first of all, the welfare of the amateurs as a whole, we find on every side politics in wireless which lead to petty jealousy between individuals and between one amateur society and another. Criticism is resorted to far more readily than a helping hand, with the result that amateurs are drifting further and further apart instead of strengthening the bonds of unity.

If it is our honest desire to help to strengthen the amateur's position, then it is clearly our duty to put our shoulders to the wheel and help instead of standing passively aside to criticise others, who, though we need not wholeheartedly endorse their every action, are nevertheless honestly endeavouring each one "to do his bit."

There is a lesson we may learn from the late war. The outbreak of war found this country divided into political parties, no one of which was alone strong enough for the arduous task which had to be performed. What happened has now become history. Party politics were forgotten, and petty differences of opinion were sunk in the interest of forming a strong government united in effort to meet the emergency. Nobody suggested that every step taken and every action of the Government could meet with universal approval; the one thought which was uppermost was to "get on with the war," and bring it to a victorious conclusion.

If we are to be in a position to assert ourselves and to maintain our freedom it can only be done by presenting a united front, so that our demands shall be made with one voice, expressing the wishes of every amateur throughout the country. Such unity in no way interferes with the freedom of the individual nor of separate groups of individuals. It is essential that each society should be independent as regards its own domestic affairs, but where united effort is called for, every individual and every party must give its support to strengthen the position of the amateur community as a whole.

2CM Registers a Moan

AND RIGHTLY SO!

I wish to appeal to the sporting instincts of some of our most skilful exponents of the gentle valvus howlebus if they have any.

On Saturday night last, between 10 p.m. and midnight, I was endeavouring to carry on traffic with 4AA (New Zealand). One half-hour's transmission was drawn out for two hours owing to interference from about four howling valves, which, owing to their strength, must have been in the Burwood-Strathfield vicinity. These fellows were undoubtedly only listening in on my transmission, for there was no music at that late hour. I appealed to them twice, both in code and 'phone to go to bed and give me a chance to finish, but my appeal fell on deaf ears, or dud aerials.

Doesn't it occur to some of these unsportsmanlike chaps, that many experimenters send out excellent music, and give a considerable amount of their time to entertain such as they, and it is only reasonable to expect that, when one has some long distance Morse to put over, and stays out of bed to do it,

so as not to encroach on the music time, they would at least play the game.

Jack Cureton, 2AY, was at this same time trying to work with a South Australian amateur. Although he is situated less than a mile from 2CM, neither transmitter interfered with the other, yet both of us were held up by these whistlers.

If it is mere curiosity that keeps these birds out of bed, I would gladly send them an extract of all I intend to say when working with an interstate experimenter, together with their replies later on.

Give us a chance, chaps!

ONE OF THE TRUE BELIEVERS.

As an instance of perfect faith in radio this is a good illustration: A U.S.A. radiophan owns a family vault in a well-known cemetery. Of late some person or persons unknown have been defacing this by chipping off words here and there. As usual methods have failed to bring the guilty ones to book, the General Electric Company have received a request to broadcast the fact that fifty dollars will be paid for information leading to the arrest of the malefactors. Evidently he believes in radio as a criminal catcher.

RADIO TO JOIN THE FORCE.

Chicago is considering suggestions put forward by Chief-of-Police Collins to instal radiophone devices to aid the police in their work. Chief Collins has been to a conference held at Buffalo, at which chiefs of all different nations and cities sat. He learned there from a Detroit chief how successfully radio has coped with crime on land and water, and especially the latter.

There was a good deal of rum smuggling, but since the river patrols were equipped with radio receivers and transmitters the culprits have either been caught or given up the game.

Radio is particularly useful when a motor is stolen, for description and license number can be broadcasted so speedily that thief may be caught before he has had time to camouflage his booty. News of motor "hold ups," too, can be disseminated in this way, and even outlying places can thus be on the look-out for suspicious-looking people or conveyances.

Imagination

The pessimistic manufacturer reminds me of the man suffering from asthma. One night he was sleeping in the same room with another fellow and began to struggle for breath.

The other in his anxiety to help him tried, as he thought, to open a glass window in the room. After fumbling in the dark for some time to find the fastening to the window, and failing to do so, he picked up a chair and shattered the glass.

The struggling man immediately heaved a sigh of gratitude. "Oh," he exclaimed, "this fresh air is certainly a lifesaver."

Both men immediately went off to sleep. You can imagine their surprise the next morning when they discovered that the glass broken in the night was not a window at all, but a bookcase door.

It's queer, isn't it, how important thinking is? I know two manufacturers in the same line of business. During the present re-adjustment period, one of these men has been as depressed as it is possible for a man to be without committing suicide, and the other has been just as cheerful as if he didn't have to make any effort whatever to get profitable business.

These men are making almost identically the same product, and the conditions under which they are trying to do business are the same.

One is disgruntled, unhappy, pessimistic. He hopes that business will get better, but he has his doubts.

The other man, knowing that he cannot get business unless he works for it, has thrown himself right into the job of increasing sales, and being a wise fellow, has been thinking creatively instead of negatively.

Many business men who are waiting for better times could do good business right now if they only thought they could.—Thomas Dreier in "Radio Merchandising," New York.

A WIRELESS ELDORADO.

I have discovered where the real wireless vogue reigns supreme. All over London's far-flung suburbs, rich or middle-class or poor, aerials of every imaginable variety are casting their magic webs to catch the flying whisper. But there is one suburb where the aerial is as general and inseparable an adjunct of every roof as its chimney. I happened upon this broadcast suburb when daring the imps of summer, punting up the Thames twenty miles above Richmond. Here was a vast riverside bungalow town—a regular suburban colony of emigrant City folks. And there was never a bungalow without its wireless installation. Obviously such a place is the very spot for an aerial. Remote from London, and essentially Londony, with no amusements save those of the river or the tiny homestead to beguile the long evenings, what more certain than that the bungalow dwellers would rig up their aerials, and listen in to the babble of the great world well lost? Hushed now, during broadcast hours are the gramophones and pianos. No dog barks; no musical comedy contralto warbles. The banjo hangs neglected on the wall. Silence reigns again upon the crowded river banks. "Contiencre omnes—intentaque ora tenebrant."—A writer in the Bristol Times and Mirror.

PUSH PORTABLES.

If your sales of the portable sets don't come up to scratch, try this: Advertise in your local paper the following: "The greatest musical instrument in the world—for campers, canoeists, and out-of-doorsmen. No records to get broken. No strings to snap. No trouble—no expense—and a repertoire only limited by the greatest artists in the world. We've a portable for you—at the right price."

The phraseology is a little strange—but the idea is good. It comes from our bright little contemporary, "Radio Merchandising," N.Y.

LEICHHARDT AND DISTRICT RADIO SOCIETY.

FIRST ANNUAL REPORT. OCTOBER 8th, 1923.

After a preliminary and informal meeting of half a dozen enthusiasts, and a certain amount of advertisement in the press, the inaugural meeting of the Society was held on October 10th, in a spare room of No. 3 Annesley Street, Leichhardt. About 15 attended this first meeting, at which rules and regulations were adopted, and a council elected. From then onward meetings were held weekly, and the first election of members, held on November 7th, resulted in sixteen names being placed upon the register. Monthly meetings have been held regularly since, at each of which fresh applications for membership have been received, and the total has steadily increased from the original 16 to 57 to the end of the financial year. Of course, there have been defections, but they have been comparatively few, only five resignations having been received from a total of 57 members enrolled.

Towards the end of November, the membership had increased to such an extent, and the small room wherein meetings were being held had become so inadequate to accommodate members, that it was decided to take steps to try and secure more commodious premises. The resut was that, on January 9th, the fourth business meeting was held in a larger room at the rear of Victory Hall, Johnstone Street, Annandale. Meetings were held in this room until April 17th, of this year, when another move was made to the present club room.

Coming now to the work done by the Socity during the past twelve months, one finds that it has been considerable. During that time 15 lectures were delivered—12 by members of the society, and 3 by non-members. Buzzer practice was carried out on a number of occasions, and about 12 general discussions were held. Other activities of the society included visits to the experimental transmitting station belonging to Messrs. Amalgamated Wireless, Ltd., several visits to Pennant Hills, a visit to Mr. Chas. Maclurcan's station, and a visit of a small party of members to view a demonstration of colour music at the residence of Mr. Hector. Early in the year members received a visit from Mr. A. Atkinson, Hon. Secretary of the Radio Association of Australia, whose business it was to indicate to members the desirability of joining up with his association. Mr. Atkinson was given a most sympathetic hearing, and the result was that, on June 5th, it was unanimously decided that the society affiliate with the Radio Association of New South Wales, Mr. Thompson being elected as the society's delegate to meetings of that body. Another visitor to a meeting of the society was Mr. Malcolm Perry, who attended the meeting held on January 16th, to explain to members the objects of the Trans-Pacific Tests, to be conducted later in the year. At the meeting held on February 6th, it was decided to enter for these tests, even though the society was not in a position to take an active part in the contest. It was thought that the moral and financial support thus afforded to such an important undertaking, fully justified the action.

A social evening, held on March 20th, was successful, in spite of the inclement weather prevailing at the time. The same can be said of a demonstration held at the Annandale Theatre, on August 30th, when about 1500 people listened to music and speech, received and amplified sufficiently to be audible in all parts of the large hall.

In December last, Mr. Chas. Maclurcan showed his interest in the society to the extent of donating the sum of £1 towards its funds.

On July 31st a demonstration was given before aldermen of the Leichhardt and Annandale Councils, the results obtained being very successful indeed.

In anticipation of a receiving set being built by the society, a very substantial aerial system has been erected on the premises, and a quantity of gear is in hand, it being intended to commence the assembly of same at an early date. The society is already in possession of a crystal set donated by Mr. F. Thompson shortly after its establishment On May 15th last this gentleman was presented with an 8-day clock on the occasion of his wedding as a mark of esteem from his fellow members.

Other activities of the society included the formation of an orchestra and a technical committee.

WILLIAM J. ZECH.
Secretary.

The first annual meeting of the Leichhardt and District Radio Society was held at the club room, 176 Johnston Street, Annandale, on October 8th, when a very busy time was spent by members. Three new members were elected, making a total to date of 55. Amongst other busines stransacted, the past year's activities were reviewed in the secretary's report, which appears elsewhere in this issue. During the meeting a presentation of a handsome leather attache case was made to the Hon. Secretary, Mr. W. J. Zech, as a mark of esteem from his fellow-members, and as a token of appreciation of his services to the society. Mr. Zech was re-elected unopposed to the position of Hon. Secretary, whilst Mr. S. Williams was accorded the same honour with regard to the position of Hon. Treasurer. Other office-bearers elected were as follows:—President, Mr. H. Kirkpatrick; Vice-Presidents, Messrs. T. Gale and F. Thompson; Councillors, Messrs. F. Lett, F. Morrison, T. Gale, and C. Beer; Technical Committee Messrs. F. Thompson, F. Lett, F. Roscoe, and W. Zech, Auditors, Messrs. F. Lett and T. Gale; Social Committee, Messrs. Morrison, Caldwell, Nicholls and Huxter.

On account of the probability of the society losing a number of its most valuable and active members in the event of the society adhering to its decision to hold its meetings on Monday nights in future, a motion was carried reverting to the Tuesday night, which comes into force forthwith, the next meeting being held on Tuesday night next, at 8 p.m.

All inquiries relative to the activities of the Society should be addressed to the Hon. Secretary, Mr. W. J. Zech, 145 Booth Street, Annandale.

DEMONSTRATION OF WIRELESS TELEPHONY AND TELEGRAPHY.

A lecture and demonstration of wireless telephony and telegraphy was given by members of the South Australian Division of the Wireless Institute, on Thursday evening last to the members of the Motor Cycle Club of South Australia.

The meeting opened with a lecture on the production and reception of ether waves, by Mr. J. M. Honnor, A.S.A.S.M., a Vice-President of the South Australian Division.

After the lecture a number of selections were received from the station of Mr. H. L. Austin, 5BN, of Norwood. The Secretary of the Motor Cycle Club announced from Mr. Austin's station the results of trials held the previous Saturday, each item being clearly received and heard distinctly by all in the hall.

Mr. Bland, 5AG, was heard calling some Melbourne experimenter on C.W.. The Victorian station's carrier wave was distinctly heard through the magnavox.

Mr. L. C. Jones was in charge of the receiving set.

The demonstration was given by kind permission of the Chief Manager of Telegraphs and Wireless, Mr. J. Malone.

SOUTH AUSTRALIAN DIVISION OF THE WIRELESS INSTITUTE.

The monthly general meeting of the South Australian Division of the Wireless Institute was held in the Classics Lecture Room, at the Adelaide University, on Wednesday evening last (October 3rd). There was a large attendance, which was presided over by Mr. R. B. Caldwell, the new President.

The minutes of the previous meeting were read and confirmed.

Three applications for membership and one resignation were received.

A circular was received from the Amalgamated Wireless, Ltd., offering to members free licenses to use their patent rights in their experiments.

Correspondence was received from the Victorian Division relative to the new Trans-Pacific Tests, which are to take place this month, while judging by comments there should be a fair number here taking part in these tests.

At the conclusion of the business, Mr. Bland gave an interesting lecture on non-radiating circuits, showing several which are of extreme sensitiveness.

Mr. Edgar, late Assistant Hon. Secretary, who is departing shortly for America, was presented with an address signed by the officers of the Division. Mr. Edgar will represent the South Australian Division of the Wireless Institute in America, forwarding periodically the latest information obtainable regarding radio matters from the United States.

NEW PLANTS FOR MEXICO.

In Mexico City two new broadcasting stations are now open. During recent months countless efforts have been made to obtain permission and concessions to erect these, but always there has been a hitch somewhere, and proceedings were delayed. Locally great enthusiasm prevails, and it is believed that a ready market is now open for the sale of radio sets and parts.

COASTAL RADIO SERVICE. STAFF CHANGES.

Mr. L. Mowlem, radio-telegraphist, Thursday Island Radio, has been transferred to Brisbane Radio.

Mr. A. Harrower, radio-telegraphist, Brisbane Radio, has been transferred to Thursday Island Radio.

KILLARA RADIO CLUB.

The last meeting of the Killara Radio Club was held on September 28th. After the usual club business and code practical, a very enjoyable evening was spent listening in on a three valve set and also in testing a set which member had brought along.

The Club meets every alternate Friday at the Congregational Hall, corner of Florence and Arnold Streets, at 7.30.

Will intending members please communicate with the Secretary, A. H. Gray, "Moylough," Florence Street, Killara. 'Phone J2661.

WIRELESS MUSIC AT NORTH SHORE GRAMMAR SCHOOL FETE.

Quite a successful demonstration of experimental wireless telephony was held at the Church of England Grammar School, North Sydney, on the 6th inst., the occasion being the school's annual garden fete.

The demonstration was carried out by Mr. Evans, of Messrs. Wireless Supplies Ltd., and without doubt more than fulfilled expectations.

Mr. Marsden (2JM), of Edgecliffe, supplied the wireless music, which was received on the school's own aerial, used in conjunction with a two valve "Radak" receiver and Western Electric loud-speaking outfit, which was situated in the library. No trouble was experienced in obtaining full volume, in fact at times the music (despite the noises of the drums and bugles of the carnival outside) was found to be far too loud to be comfortable, and had to be toned down considerably.

Other experimental transmitters heard during the demonstration were 2FA, 2CI, 2RA, and 2HP, all very loud and clear.

CROYDON RADIO CLUB.

The Croydon Radio Club held its usual weekly meeting on Saturday, October 6th, at "Rockleigh," Lang Street, Croydon, 7.30 p.m.

After the usual business, G. Maxwell Coutts gave a lecture on non-regenerative circuits. The lecturer urged experimenters present to confine their experiments to making a non-regenerative circuit as efficient as they could, as the authorities had banned the use of reaction with a single valve. Mr. Keith James drew a circuit showing one valve as a radio frequency amplifier, and the second valve as a detector, with tuned plate by means of a variometer.

Members of the club will be pleased to welcome new members at any meeting.

Particulars can be obtained from the secretary, "Carwell," Highbury Street, Croydon.

NEWCASTLE AMATEURS.

The Newcastle District Radio Club have now lowered their wave length to 220 metres, and have been carrying out some transmitting tests with music, voice and choped C.W. with very satisfactory results. On Thursday night a special test was carried out which resulted in a QSA report from Mr. Burchill, of Western Suburbs Club.

On Wednesday night, Mr. N. P. Olsen (2ZX) gave a special demonstration (transmitting) in connection with a lecture concert held in the Tyrell Hall, Newcastle, under the auspices of the worker's Educational Association. The demonstration was given by permission of the Postmaster - General. There were over 400 people in the hall and the receiving station was operated by Mr. A. Metham with his valve receiver and magnavox. The music and voice was distinctly audible all over the hall, and was loudly applauded by the audience. Mr. Olsen, also Mr. Stewart (Radio Inspector) would be pleased to have any information concerning the spark transmitter who sat on his key all through the demonstration.

2XZ (Olsen, Waratah) may be heard on Saturday and Sunday nights, and almost every night through the week, between 7.30 and 9, and will be pleased to receive reports from any stations hearing his transmissions.

THE BURWOOD RADIO CLUB.

Since 2IX (now 2AY) disbanded, a new club has been formed, known as the Burwood and District Radio Club. There are thirty members to date, and every promise of a large increase of members very shortly.

Interesting lectures, of great use to the beginners are a regular feature of the meetings. Arrangements are also being made for prominent members of other clubs, etc., to lecture and demonstrate. All who are interested may obtain full particulars of time and place of meeting from the Hon. Secretary, H. S. Mellor, Burwood Road, Burwood.

CONCORD RADIO CLUB.

On Thursday, September 27th, the above club held their usual meeting at Langston and Anderson's, Bishop Street, Burwood, at 7.30 p.m.

Owing to the above firm selling out, the club decided to transfer their meetings in future to the residence of Mr. Barker, Wallace Street, Concord.

It was also decided upon, that the membership should be increased, and new members called for immediately. Intending members should call or write to Mr. Smith, Cheltenham Road, Burwood, or Mr. Barker, Wallace Street, Concord.

CONCORD AMATEUR RADIO CLUB.

The annual general meeting of the above club was held at the club room, at 8 p.m. on Thursday, 4th October, when the officers for the ensuing term were elected. The club decided to alter the name from Concord Radio Club to the above. It was decided unanimously that the meetings should be held every Thursday night, instead of every first and third Thursday nights, and the programme be as follows:—

7.45 to 8.30.—Instruction, supervised by Management Committee.
8.30 to 9.0 —Practical transmission and reception.
9.0 to 9.30.—Buzzer practice
9.30 to 10.30.—General topics.

This meeting was well attended, and resulted in three new members being enrolled The club receiver has been finished, and will be installed in a week or so.

All communications should be addressed to Hon. Secretary, W. H. Barker, "Euripides," Wallace Street, Concord.

WAVERLEY RADIO CLUB.

The Waverley Radio Club, at its meeting of the 4th October, received communications from the Wireless Press and the Wireless Exhibition Committee. The letter from the Wireless Press was in regard to an alteration in the procedure of international signalling, requesting the club's opinion on the matter. After discussion, it was decided to state that the club was agreeable, with certain suggested improvements. In the matter of the Wireless Exhibition Committee's request for support, the meeting registered its readiness to assist to its full ability. The committee working on the receiving set reported highly satisfactory progress, and expected to have it installed within a fortnight. The general committee would meet on the following Wednesday, when the club's vice-presidents, secretary and treasurer would be elected.

A discussion on the elimination of static followed, the Chairman (Mr. Perry), Mr. Thomson, Mr. Bowman, and others making interesting and valuable suggestions. The meeting was unanimous on the point that the elimination of static would have to be made after it had actually been received, as, at pre

sent, it is impossible to devise means to prevent the reception of static, without, of course, cutting out the signal as well.

USING A CRYSTAL DETECTOR TO RECEIVE C.W.

By G. Maxwell Coutts.

A very simple method of receiving C.W. on a crystal detector is to place an old misroscope in series with the telephone receivers. If the microphone is placed near a gas flame or in a breeze, the diaphragm will vibrate with the noise caused, and thereby vary the resistance of the circuit in which it is placed. C.W. can easily be read in this way, as the microphone acts as a small tickler.

THE KURING GAI DISTRICT RADIO SOCIETY.

The Society had a very interesting evening on 2nd inst. Mr. H. Stowe, who had kindly consented to lecture, was present with his Neutrodyne receiver, on which he delivered an excellent lecture.

The subject proved of great interest to the members who were busy with pensil and paper.

At the next meeting to be held on Tuesday, 16th inst., Mr. P. Renshaw will lecture on Harmonies.

Buzzer practice will commence as usual at 7.30 p.m.

2 HP—350 METRES

will commence testing on Wednesday, 17th inst., and will continue nightly for at least a week. I would be very pleased if experimenters who hear the transmission will communicate with me, Box 378, G.P.O., or ring North 226

ANOTHER NEW RECORD.

From Hartford, Conn., comes the news that signals had been successfully transmitted from an amateur station half-way round the earth. This is the farthest yet. The operator, E. W. Rouse, has his station at Galveston, and his signals were picked up by an operator on board a vessel some 100 miles south-east of Ceylon, India. For an amateur to cover eleven thousand miles is some feat.

A Home Made Tuning Buzzer

A tuning buzzer is required by everyone who uses a crystal, whether for general reception work or for occasional experiments. Its use saves a great deal of time, enabling adjustments to be made quickly as well as making it possible to be sure that the set is working at its maximum efficiency before the reception of signals, brought in by the aerial, is attempted. Tuning buzzers can be improvised in endless ways—even an electric bell with the gong removed can be pressed into service—but unless a high singing note is produced it is somewhat difficult to obtain a correct idea of the degree of signal strength obtained on different points of the crystal. Many of the instruments sold as tuning buzzers were not designed for this purpose at all, having as a rule a low pitched note making them, therefore, less satisfactory for the reason stated above.

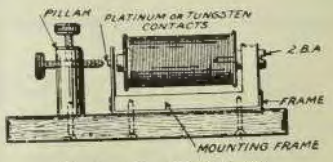


Fig. 1.—The complete buzzer

A buzzer that works excellently can be made with no very great difficulty by anyone whose workshop contains only a small outfit of tools. The cost of constructing it is very small, and if we leave out the question of the platinum points needed, a modest amount should cover the outlay on materials. Platinum points are comparatively expensive, but one can sometimes rescue suitable old ones from discarded or broken pieces of apparatus in one's box of odds and ends.

The core for the bobbin consists of a piece of the best soft iron, 1 1/8in. long and 3/8in. in diameter. At one end a hole is drilled and tapped for a 2BA screw. This hole should be ¼ in. in depth. Over it is slipped a bobbin made of a 1in. length of stiff paper tubing, to which are glued two circular end-pieces 1in. in diameter, cut from stoutish cardboard. The bobbin should be given a good coating of shellac both inside and out. If it is placed on the core whilst still wet, the shellac, when dry, will hold it firmly in place. The core projects 1/16in. at either end.

A short piece of 2BA screwed rod is inserted into the hole drilled in the core. This enables the bobbin to be mounted in the lathe for winding, or if a lathe is not available the rod can be fixed into

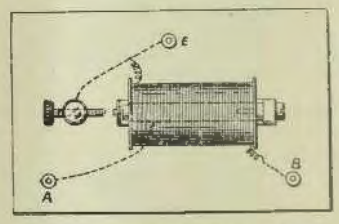


Fig. 2.—Showing connections of buzzer.

the chuck of a breast drill held fast in a vice. The windings are made with No. 30 D.C.C. wire, the bobbin being wound full.

The mounting frame is of brass. If suitable tools are available it can be cut from the solid. If not, cut a stout piece of sheet brass 5-16 in. wide and beat it into the L shape shown in Fig. 1. The bobbin is secured in place by means of a 2 B.A. screw.

The armature is made of a piece of clock spring, which must be annealed. Two 6 B.A. holes are drilled at to cool slowly before it can be worked. Two 6B.A. holes are drilled at one end to take the screws which secure it to the mounting.

At a point which coincides with middle of the core, a small hole is made. Into this is inserted a platinum rivet, which is flattened out by very gentle hammering. When the drilling has been done in armature is retempered by being heated in a bunsen flame and plunged into oil.

The contact pillar is a length of 3-8 in. brass rod secured to the wooden panel by a 4 B.A. screw driven into it from below. Through it is drilled and tapped a 4 B.A. hole, the centre of which must

The Australasian Radio Relay League.

By R. D. Charlsworth, Hon. Sec.

There is no doubt that the average wireless man is inclined to be apathetic. This has manifested itself more than ever during the last twelve months, but the cause has yet to be defined.

Since the league asked experimenters to join up there has been no great rush to do so, and many prominent Sydney experimenters have not sent in their application forms.

The league at present possesses approximately fifty members in this State, but most of these are situated in the metropolitan area. This limits the scope and purpose of the league's work at present, and no comprehensive scheme of working can be carried on.

With the opening up, however, of Mr. Todd, of Tamworth and Mr. Barlow, of Armidale, with transmitters, a route through to Queensland is assured. The route through to Victoria has only one intermediate station which is situated at Deniliquin, N.S.W.

Thus it will be apparent that many more transmitting stations are needed in the country, so as to provide ample facilities for relay tests, without overworking the few existing country transmitters.

Correspondence from experienced experimenters who desire to erect a transmitting station will be gladly received. Details should be given whether electric lighting is provided at their township or not, so that suitable information can be given in each case. All letters should be addressed to the Hon. Secretary, Box 378, G.P.O., Sydney.

Applications for transmitting licences may be sent to the Hon. Secretary of the league for special endorsement, provided that the applicant intends installing his apparatus for Relay League work. Associate members are also urgently wanted, as at present, with no organisation, few transmitters have sufficient reports of their transmissions, and only a vague idea of their range with various types of receivers. It should be remembered that there is a great deal of credit due to those who receive long distance tests and reports, which are vital to the earnest experimenter. With this in mind, every country receiving station should help the transmitters, and thereby help himself by the knowledge that his receiver is capable of certain ranges under various conditions.

be in line with the platinum rivet in the armature. Another hole also tapped 4B.A., runs from the top of the pillar into the first. The horizontal hole takes a 4B.A. platinum pointed screw with a milled head. That drilled vertically is for a setscrew.

Three terminals are mounted on the panel as shown in Fig. 2. One end of the winding goes to B, the other end being taken to the contact pillar. The brass frame is connected to A, the contact pillar to E. A dry battery is connected to A and B, a lead from E being taken to earth.

A very neat job can be made if the panel is mounted on a shallow polished case within which is a pocket flash-lamp battery. A small switch can then be provided to throw the buzzer in or out of action.

R.W.H.

H. F. TRANSFORMERS.

There is no doubt that, where only one stage of H.F. amplification is used for short-wave reception, there is nothing to hold candle to the reactance-capacity method of coupling, which gives longer range and greater signal strength than

3 NN, Victoria

any other. When, however, the number of H.F. valves is increased, the tuned-anode becomes increasingly difficult to handle, on account of its tendency to fall into self-oscillation.

Two stages can be used by an expert; three make the set so unstable that, unless heavy damping is resorted to, it is almost impossible to use them without the occurrence of frequent and violent oscillation.

Though less efficient, the copper-wound transformer has the advantage of being not so liable to cause trouble. If, however, two or three tuned transformers are used, the tendency of self-oscillation will be marked.

The simplest solution of the difficulty is to use transformers wound, not with copper, but with resistance wire. The introduction of a series resistance into an oscillatory circuit has the effect of flattening out the resonance curve; it also reduces the efficiency of the circuit to some extent owing to the resistance offered to oscillations not in resonance with it, for which in theory there should be an absolutely free path.

At first sight, then, the resistance-wound transformer would seem to entail loss of both selectivity and efficiency in amplification. In practice, however, neither of these effects is noticeable. Neither tuned anodes nor tuned transformers can be allowed to display their full powers on the multi-valve set. Selectivity is reduced by the necessity for detuning slightly in order to avoid oscillation, and efficiency as regards amplification suffers owing to the damping that must be introduced to control them.

The resistance-wound transformer has an optimum wave length, but as its resonance curve is very flat, there is no marked "peak," and it will work efficiently over a wide band. Since it has practically no tendency towards oscillation, hardly any damping is necessary, so that each transformer can be allowed to give its fullest measure of amplification. Thus, for long-distance reception on the shorter wave lengths three or even four H.F. valves can be used with no great difficulty, potentiometer control being all that is needed.

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Amateur Transmitting and Receiving Stations

TASMANIA

Nature of Licence.	Name.	Address.
C	Slater, H. I.	Kelso, West Tamar. R.
C	Werrett, E.	Hampshire. R.
V	Crooks, L. J.	64 Frederick St., Launceston. R.
C	Roberts, V.	24 Cromwell Street, Hobart. R.
C	Scott, A. C. J.	14 Law Street, Launceston. R.
C	Legge, A. W.	Ulverstone West. R.

NEW SOUTH WALES

V	Grant, A.	Lower Taylors Arm, Macksville. R.
C	Gould, W. H.	Woodlands Street, Manly. R.
C	Starkey, C. A.	Woodstock, Redmyre Road, Strathfield. R.
V	Gardner, F. S.	10 Church Street, Newcastle. R.
C	Cross, R. C.	Farquhar Street, Wingham. R.
C	Eastway, G. R.	Maroubra Bay Road, South Randwick. R.
C	Rudder, C. C.	"Devon," River Street, West Kempsey. R.
C	Rawnsley, A. J.	"Herbalart," La Raglan Street, Manly. R.
V	Walker, V. C.	"Ulladulla," Jeffrey Street, Canterbury. R.
V	Spurson, W. J.	14 Ben Boyd Road, Neutral Bay. R.
C	Levi, E. G.	56a View Street, Annandale. R.
C	Arnold, E. N.	521 Young Street, Albury. R.
V	Weynton, A. G.	"Talgai," Provincial Road, Lindfield. R.
V	Connolly, A. E.	Murrumbidgee Shire Council, Darlington Pt. R.
C	Cohen, O.	"Meroel," Botany Street, Randwick. R.
V	Wallace, Miss F. W.	6 Royal Arcade, George Street, Sydney. R.
C	Hyett, W. T.	"Bunding," Delve Street, Mortdale. R.
C	Parsons, E. F.	Church Street, West Tamworth. R.
C	Parkes, I.	"Tanna," D'Aram Street, Hunter's Hill. R.
C	Leggo, N. C. H.	12 Duncan Street, Arncliffe. R.
C	Lennon, N. J.	42 Gardener's Road, Daceyville. R.
C	Knight, C. L.	"Terralong," Cliff Road, Northwood. R.
V	Burrows, G. R.	3 Tranmere Street, Drummoyne. R.
V	Harper, R.	C/r. Cook and Francis Streets, Randwick. R.
C	Johnson, D. W.	Rocky Pt. Rd., Sans Souci, Kogarah. R.
2 Z M	Deane, P. M.	Clarence Street, Burwood. T.
2 Z I	Dixon, R. H.	C/o Colonial S.S. Co., Condong, Tweed River. T.
2 Z O	Willmott, T. R.	Coramba Road, South Grafton. T.
2 Z N	Cottrell, J. W. M.	23 Dolphin Street, Randwick. T.
2 O I	Whitaker, A. T.	31 Railway Crescent, Banksia. T.
2 B F	Forsythe, L. E.	"Hoylake," Sailor Bay Road, Northbridge. T.
2 A S	Grigg, H. E.	370 Military Road, Mosman. T.
2 D E	Renshaw, W. P.	"Waimea," Lord Street, Roseville. T.

The following have removed to the addresses indicated:—

1788	Rowe, J. A.	Highgate Street, Strathfield.
2 Z A	Keogh, W. G.	24 Harrow Road, Stanmore.
2706	Starkey, E. C.	Hilltop Crescent, Manly.
815	Stephenson, C. V.	C/r. Storey and Everett Streets Sth. Randwick.
1702	Stone, H. V.	Canberra.
2785	Lowe, R. D.	18 Park Street, Ashfield.
2 G Y	North Sydney Radio Club (G. McClure)	Burns Bay Road, Lane Cove.
2522	Hinde, W. J.	Homer Street, Undercliffe.
2 Z C	Lavington, F. M.	Bennett Street, Bondi.
1562	Yanker, R. A.	3 Lavender Street, North Sydney.
1236	Manning, J.	Fairholm Street, Strathfield.
1668	Page, F. R.	Forbes Street, Orange.
2 I A	Haigh, B. H.	14 Cecil Street, Ashfield.